



# Decentralized for Daily Life

White Paper - Version 1.0

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Color Platform Team

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## Summary

The Color Project is devoted to bringing the opportunities of a decentralized platform for daily life, and not to be hindered by a bloated blockchain and monstrously high transaction fees. This is why we are building a Crypto Platform that will be equipped to deal with not only the network strain of a high transaction environment, but still maintain decentralization and innovative applications and mechanisms to keep users engaged.

### **Color Prism: League Cluster Consensus for Speed, Usability and Efficiency**

Having to wait for a transaction to confirm (or wondering if it ever will) should be a thing of the past. However, for some blockchains it is still very much an issue. With Color, we want to ensure that not only is that problem solved, but secure and reliable confirmations should happen in fractions of a second, rather than minutes or hours. With our unique consensus algorithm, blocks will be processed in parallel clusters in seven separate leagues leading to drastically decreased block confirmation times, faster block and transaction propagation times, and an overall smoother user experience.

### **Color Spectrum: Parallel Processing and the Power of the Cloud**

In Color Spectrum, different dApps may have different arguments for how often they sync their results with the blockchain. Some may sync every execution with the blockchain, much like a traditional dApp, or others can process several dozen, hundred, or even thousand executions in the anonymized Color Spectrum, without taxing the blockchain and their application speed. This frees developers to make more complex dApps, as well as allows developers to integrate their skills in more familiar programming languages, like Java or C++. With this in mind, we hope it enables us to attract more developers who otherwise wouldn't bother learning cumbersome blockchain languages like Solidity.

### **Pixel Program: Mass Adoption and Growing the Community**

To accelerate spreading of Color Coins with an explosive network effect, the Color Platform uses a unique Pixel Program where participants get incentives for their active participation in spreading Color Coin throughout network. This will directly help tackle the growing inequality present in almost all forms of not just cryptocurrency, but in the world at large. Pixels will in time, convert to Color Coin, which unlike other networks. will be usable as a unit of exchange in all dApps that exist on the platform.

Aside from a solid foundation of governance, fast consensus, and strong technology, the environment we construct around the pixel will be vital to our success, and a key differentiating factor that brings us to a truly decentralized platform usable for daily life. Currency just isn't enough.

*Wondering where to go to create your next decentralized Application or for what Cryptoplatfrom community to join? **Think Color.***

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# 1. Challenges and Motivation

## 1.1. Introduction

The motivation for creating a new Blockchain Platform is simple, we felt that few projects sat back and thought honestly about the real problems facing the blockchain ecosystem today, and what is required to grow it to a scale of relevance. We saw a list of things that blockchain projects needed to do better and often were overlooked to focus on more superfluous minutiae that wouldn't end up being a user draw and rather, were simply novel code changes to an existing change. Aside from the biggest challenges of garnering users, the below are all the factors that lead Color to where it is today, and things we found that needed changing in the blockchain world.

## 1.2. Social Challenges

### Centralized services

Centralized platforms lead to centralized profits. The Apple App Store and Google Play Store collectively take 30% of the profits made from downloaded apps<sup>1</sup> – not just commissions from paid downloads but in-app purchases as well. With centralized services, high commissions are simply the price you pay for (inefficient) middlemen. Further, this reliance on centralized financial institutions to execute platform transactions isolates a massive unbanked population.

### Unbalanced reward models

The centralized exploitation model is simply a retread of existing models. Facebook, Twitter, and Instagram, for instance, are building billion-dollar companies off community labor, a relationship akin to the disproportionate profit of equity holders and base employees. Product profits accrue to administrators, and the actual content creators receive “achievements”, “badges”, and “honorary titles” only, thus disincentivizing the collective to improve the product.

## 1.3. Blockchain Challenges

The very first blockchain, Bitcoin, was designed for a specific task of a specific group of people - to do secure transfers of non-government coins among two anonymous parties over the net. Since 2009 the number of usage scenarios of blockchains

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<sup>1</sup> "Transaction fees – Play Console Help – Google Support"

<https://support.google.com/googleplay/android-developer/answer/112622?hl=en>. Accessed 18 May 2018.

exploded. Smart contracts, decentralized applications, decentralized autonomous organizations, - activists from all over the world tried hard to push those concepts into very specific framework of blockchain. No wonder that such attempts face significant challenges. Vitalik Buterin, a co-founder of Ethereum, summarized them in a blogpost<sup>2</sup>, which basically boil down to a few main points: Governance, Speed, Waste, and dApp usability and adoption. The question is how can we architect a Blockchain that addresses these four main points in a decentralized and secure way?

## 1.4. Network Challenges

### Efficiency

Vitalik Buterin: “PoW is burning billions of dollars per year, even more than all scams and thefts combined. Isn’t this a big tragedy?”

Modern blockchains, even the most advanced ones are plagued by the same original sin: all transactions are being executed one by one. It is true not only for Proof-of-Work blockchains, but for Proof-of-Stake as well: transactions are saved into blocks one by one, and only one node at a time can construct blocks. All this results in sequential execution of transactions and smart contracts. This turns the network behind a blockchain into a mega-supercomputer that just throws away 99% of its computing power.

## 1.5. Governance Challenges

### Centralization of infrastructure

As Vitalik Buterin stated recently “Bitmain and affiliated pools now have ~53% of all bitcoin hashpower. Isn’t this a really big problem?” Centralization of network resources imposes risks of attacks on the network, making it so that only a few main actors need to be coerced, infiltrated, or shut down to bring about serious pain to PoW networks.

### Governance

Vitalik Buterin: “Given how EOS governance has turned into an epic fail, doesn’t this mean that all on-chain governance including DAOs is fundamentally flawed? How can any DAO deal with bribe attacks, plutocrats and other risks?”

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<sup>2</sup> Vitalik Buterin. Hard questions to crypto people.

<https://bcfocus.com/news/ethereum-co-founder-vitalik-buterin-comes-up-with-seven-difficult-questions-for-the-cryptoverse/18297/>



On governance we have a lot to learn from existing methods, frameworks and attempts. There are some things in governance in which we need to get right from the start, and some things we have to assess the reality of being able to change those later on. Computer Scientists are looking for some perfect solution to blockchain governance that is secure and safe from a myriad of bad decisions and takeover. Like the U.S. constitution, a strong framework will be the foundation of changes that need to happen later. We've devoted a large part of our design with this sole question in mind, "What is fair governance in a cryptocurrency?".

## **1.6. Software Challenges**

### **Usability**

Vitalik Buterin: "Why aren't there any useful large-scale applications yet?"

Most blockchains introduce some kind of executable entities - smart contracts, chaincode, etc. Using newly invented or lightweight languages reduces reliability of the code and its expressiveness. Smart contracts are short and simple. The languages and technologies used in blockchains do not allow development of feature-rich and powerful systems. Only a few smart contracts exceed a thousand lines of code.

Can we create a dApp with complex business logic, rich content manipulation, connecting multiple parties? Color Platform's answer - yes!

### **Security**

Vitalik Buterin: "Why are there not yet good solutions to account security? When will the problem of account hacks and thefts be solved?"

Most blockchains come with just a compiler to build executable code. No tools for unit testing, continuous integration, code analysis. As a result only simplicity saves smart contracts from security breaches. Complicated smart contracts contain defects and vulnerabilities, and many security reports were already filed for security incidents, as well as high dollar breaches that could have been avoided had the developers had access to better tooling.

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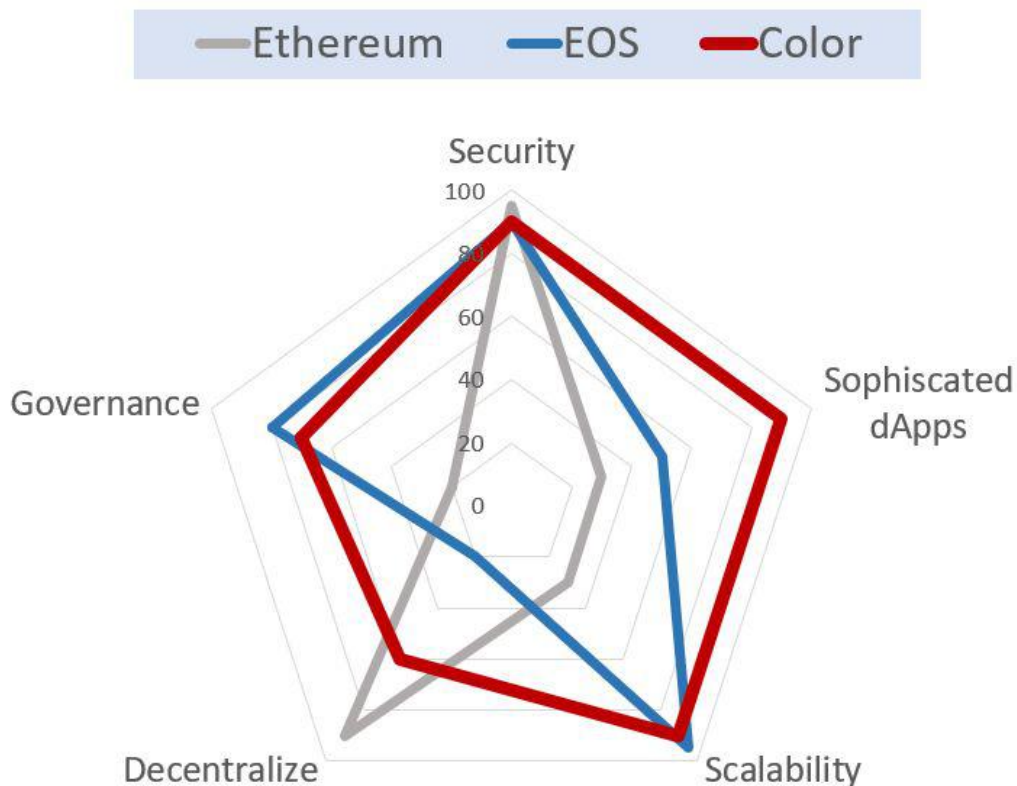
## 2. Color Platform

### 2.1. Introducing Color Platform

Color Platform is a feature-rich, efficient and productive environment for Decentralized Applications. We found answers to most of blockchain challenges that will strike the balance necessary for most use cases.

Color is a platform of decentralized app's and contents for the people. The Color Platform is redesigning decentralized governance to enrich those who use the platform. Color endeavors to revolutionize the dApp ecosystem by developing enterprise-level dApps. At Color, we're building a platform to host sophisticated dApps to attract users and build a community. These dApps employ human-centered design so non-technical users may adopt the platform. By removing the technical barriers to entry and making dApps easy, anyone should be able to use them.

In Summary, Color Platform can be compared with other prevailing blockchain platforms as follows.



[Figure 1 - Blockchain challenges Diagram]

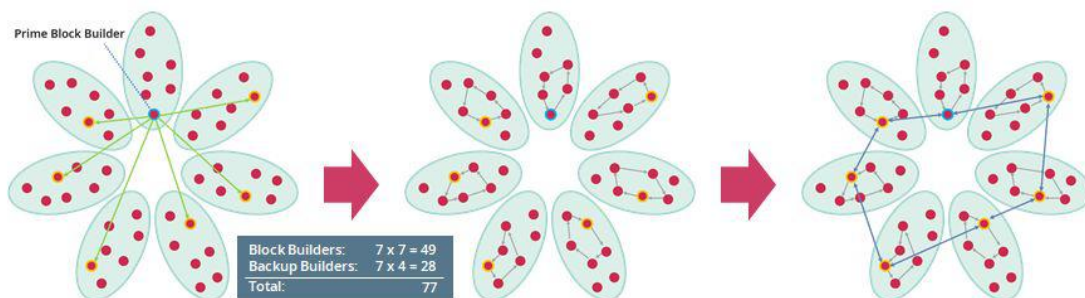
Color Platform is a powerful new platform for the ecosystem of decentralized application of tomorrow. The cornerstones of Cloud Platform are Color Spectrum technology and Color Prism consensus algorithm.

## 2.2. Color Prism Consensus Algorithm

### Color Prism Overview

The Color Prism Consensus algorithm will be the backbone of the Color Platform, ensuring dApp and Core transaction flows happen accordingly. Using Color Prism Consensus, we believe it will achieve two main things:

- Achieve Transaction Confirmation Speeds at twice the rate of Practical BFT through concurrent transaction confirmation.
- More Decentralized than EOS, thus being more Robust and harder to bribe the mining consensus participants.



[Figure 2 - Color Prism Cluster Structure]

### Technical Details

Color Prism is a three phase DPoS consensus algorithm.

It includes 49 validating nodes, called **Block Builders**, grouped into 7 Leagues. Only these nodes are eligible to build blocks. Each node participating in Color Prism Consensus algorithm belongs to exactly one League.

For each block, the algorithm selects a Lead Block Builder in each League as well as a Primary Block Builder for the round. They are selected using pseudorandom deterministic algorithm and change for each next block.

1. The first phase of block production is constructing a block. The primary Block Builder, selected out of 49 nodes to construct a new block, creates the block from transactions in shared mempool. Then the primary Block Builder transfers the block for validation.  
To do so the primary Block Builder sends the block to 6 Leaders, as well as to the members of its own League. The Leaders disseminate the block among the members of their League.
2. After the first phase concludes, every 49 Block Builders have a copy of the newly constructed block. Then, within each League, the nodes vote for block approval. Color Prism Consensus utilizes PBFT algorithm for establishing consensus between members of Leagues.
3. During the third phase of Color Prism Consensus algorithm the League Leaders establish the global consensus. They communicate to each other the results of consensus within their Leagues and come to common consensus.

The major reason why we group nodes into Leagues is minimizing network communication and corresponding delays. Experiments show that DPoS algorithms spend most of the time in sending blocks to validating nodes and exchanging votes between each other. The clustering algorithm with Leagues significantly reduces the number of network transmissions.

Through this process we have devised that our theoretical 'top speed' for Consensus is roughly 2.5 times higher than that of Practical BFT with 49 nodes. See the confirmation speed chart below for details:

Step	Plain PBFT	Color Prism
Producing Block	10ms	10ms
Sending/Receiving Block	To 48 BPs - 400ms	To 6 LBB's in 6 Leagues - 150 ms
Sending/Rec Second Block	n/a	To 6 BB inner league 50ms
Consensus Confirm	Among 49 nodes 700ms	Inner League 100 ms
Consensus Second Confirm	n/a	Among League 100 ms
Total:	1110ms	410 ms

[Figure 3 - Confirmation Speed Comparison Chart]

## Color Prism Participants

Color Prism Consensus includes 49 nodes to build and validate blocks. How they are elected however is not based on the amount of coin holder votes they amass, but rather on reputation and performance as well as how many coins they are personally putting at stake for the network. The tentative figures to describe the weight of what goes into choosing a Block Builder is below in the Contribution Index Formula:

- 40% Based on number of Coins Staked that are voting for each candidate.
- 30% Based on a Community Contribution Index, which will have many ways to be increased systematically such as referrals.
- 30% System Performance Index. The further away from 100% the block confirmation is, the score will drop exponentially, thus replacing this participant with a backup until they can recover their score.

It is assumed that the more coins a user has at stake, means the less likely they are to do “bad things” in fear of getting their coins confiscated. The index, combining reputation, performance, and stake, is calculated every 24 hours.

All Block Builders should prepare servers and run real-time with enough bandwidth in their league. Block Builders are expected to provide adequate low latency confirmations within each league.

Block Builders, in order to maintain their position, must maintain a high contribution index. A contribution index is a sort of community rating that calculates a whole suite of metrics from reputation to referrals, activity and merit worthy contributions to the platform. All Block Builders must prepare a “campaign” and run to be elected to provide consensus. A Block Builder must first be a regular Council Node and will then stake their coins while providing consensus.

Once the Block Builders are selected, they will remain in that spot as long as they can keep their score high enough and are not missing above a certain threshold of blocks, provided a Backup Block Builder does not surpass their rating and “dethrone” them from the active Block Builder’s league.

## Conclusion

The Color consensus algorithm is essentially a hybrid PBFT algorithm that uses a unique Cluster Consensus algorithm. Color Prism works in randomly selected leagues to prevent cartels, improve security and lower the amount of unnecessary chatter. Due to its unique network structure, Color Prism has potential to be one of the fastest consensus algorithms, beating plain PBFT by nearly 2.5x the speed.

## 2.3. Color Spectrum Technology

Color Spectrum is a powerful new technology that leverages the blockchain in a robust cloud environment for an optimal balance of performance and security.

All modern blockchain technologies face several major issues:

- Simplicity of smart contracts. Blockchains have inherent limitations on duration of code execution.
- Sequential execution of transactions in sequential blocks downgrade the whole network to the power of a single computer, that produces the blocks.

Color Spectrum is devoted to overcome these limitations to equip developers with powerful coding tools and provide them with an efficient execution environment.

Decentralized Applications, dApp - is the new buzzword, that was coined along with blockchain and distributed ledger. "Decentralized" means that neither the user or developer know where exactly in the infrastructure an application runs. This execution model was originally called "fog computation", similar to cloud computing.

Many blockchain projects deemed to overcome the shortcomings of the dApp approach, first introduced in Ethereum. Generate blocks faster to increase performance (e.g. EOS), introduce block DAG instead of chain to make concurrent execution (e.g. RChain). But they all keep the original feature of "fog computing" - calls to dApps are mixed with data, and the code is executed by miners (or block producers) in sequence while building a block.

But running the code while building blocks is the root of all limitations on smart contract execution. The time duration of code execution is limited, otherwise block build time becomes prohibitively long. Execution is sequential and is performed by a single computer - the one that builds the block at the moment. The limitations are inherent in the blockchain design, especially in code execution.

To overcome these limitations Color Spectrum took a completely different approach. In Color Spectrum, we decoupled code execution from storing data in the irreversible and non-modifiable history (i.e. the blockchain). The key point of Color Spectrum is the following: the code of dApps is executed before transactions are written to the blockchain.

To preserve the benefits of decentralization, Color Spectrum uses technologies of cloud computing to conceal details of dApp deployment from the outer world. Furthermore, cloud computing infrastructure gives the value of concurrent execution and efficient utilization of computing resources.

## Color Spectrum Overview

The key difference between Color Spectrum and many other blockchain platforms that support smart contracts execution (e.g. Ethereum, NEO, EOS, and others) is the way transactions are processed. In other platforms, the typical lifecycle of a transaction includes the following stages:

**Build Block:** *Clients propose their transactions to a miner / block builder and the network disseminates it among all nodes, where one of the nodes builds a block using the transactions.*

**Execute:** *Transactions are sequentially executed one by one during construction of a block by a miner / block builder and re-executed by other nodes to verify state update that the block builder saved as a result of the block.*

In order for all peers to synchronize the state, transactions must always execute deterministically: the same transaction must always create the same result on each node, no matter whether the block is being constructed or validated.

Furthermore, transaction execution time should be as short as possible. Sophisticated code, with rich business logic takes longer time to execute, thus introducing latencies and delays into block construction. This is the reason why many blockchain platforms put limitations on smart contract execution - either by higher fees for CPU time (like gas in Ethereum) or by limiting CPU time (like 30ms in EOS).

Color Platform introduces a new paradigm of smart contracts **Execute-Validate-Build** block:

**Execute:** Transactions are executed in parallel. Developers use well-known and powerful languages to code their dApps - Python, Javascript, Java.

**Validate:** Block Builders check the results of transaction execution during block construction and consensus.

**Build Block:** validated transactions are saved in blocks one by one.

Transactions in Color Spectrum are executed before they are put in a block. This allows nodes to execute transactions in parallel, greatly improving throughput.

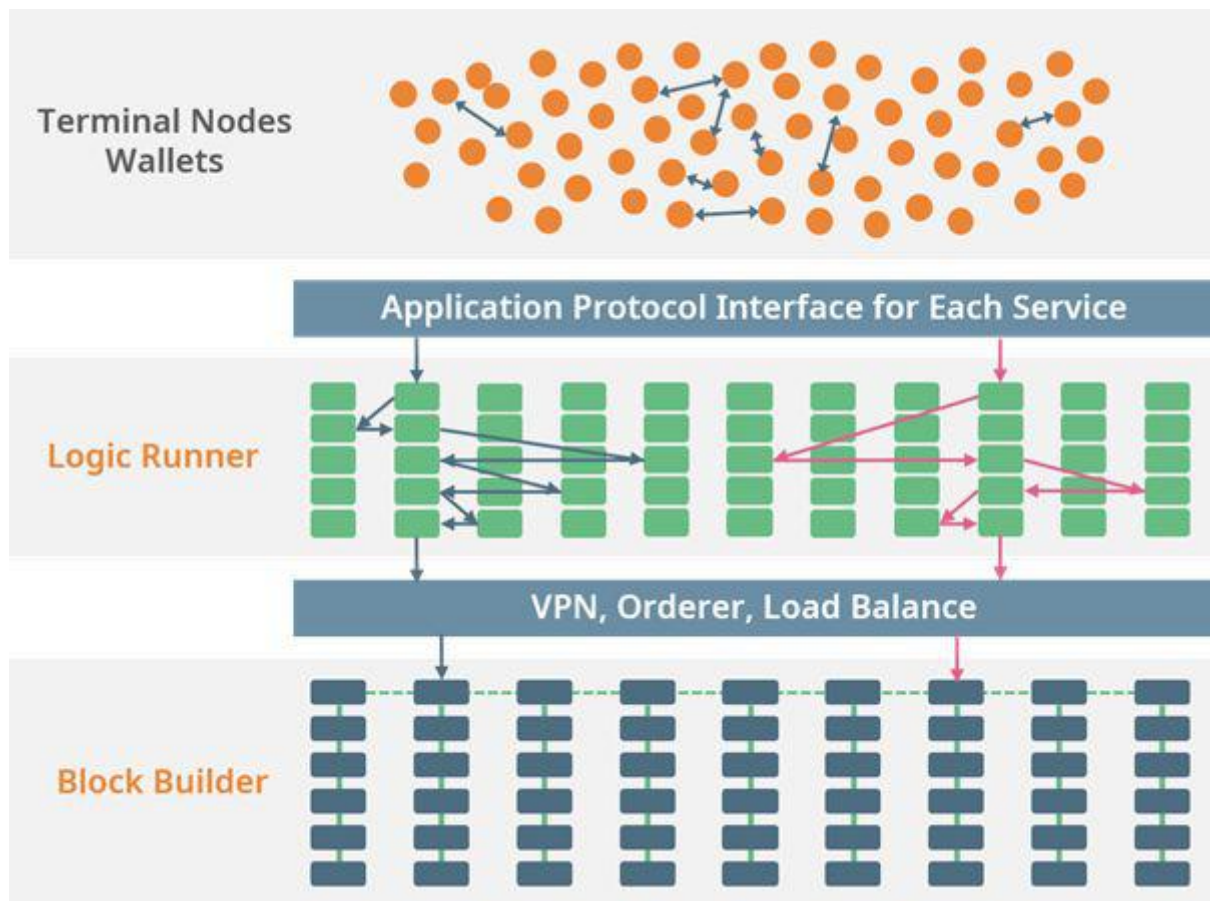
In the Color Spectrum execution model, the results of executing dApp code for a transaction are explicitly agreed upon before the transaction is added to the ledger.

Color Spectrum focuses on providing developers with advanced coding practices. They can develop dApps in almost any language they like, such as Python, Javascript, Java or even C.



## Two-tier Architecture of Color Spectrum

Decoupling the transaction execution from blockchain data storage leads to a two-layer architecture. In the first layer consists of Council Nodes that perform the function of “Logic Running”, which execute the business logic of decentralized applications. The second layer implements blockchain operations for dApps.



[Figure 4 - Color Spectrum Technology]

Council Nodes are at the core of the Color Spectrum. They host the business logic of dApps, perform processing of users' operations, and store results to the underlying blockchain. Business Logic of a dApp, hosted by a Council Node, is executed within a devoted environment, provided by the **Color Execution Environment (CEE)**.

CEE provides an execution environment for dApp code including language environments, system software, middleware to communicate with the API layer, as well as storage and a blockchain. The first release of Color Platform will include CEE capable running applications in modern programming languages. A large part of our resources will be devoted to this effort.



The second tier in Color Spectrum is Block Builders, that form a distributed ledger for irreversible storage of computation results. To achieve mass adoption, Color needs to reach transaction speeds that rival or surpass those of traditional payment providers such as Visa and Mastercard. Scalability issues become more prominent with decentralized blockchain platforms.

The architecture of Color Spectrum is designed to provide unprecedented level of performance. To do so we decoupled computation and consensus - computation is performed by the Council Nodes, while consensus is performed by Block Builder layer. The consensus in Block Builder is planned to be from PoS family, where the actual Block Builder nodes are selected and replaced based on Color internal scoring system.

The consensus algorithm in Color Platform is responsible for three objectives:

- validating the results of computations in Council Nodes,
- synchronizing the state in heterogeneous and geographically distributed environment,
- keeping irreversible and immutable log of major events of the dApps that run in the platform.

Currently, the Color Consensus algorithm under development has a primary goal of attaining more speed with only making minimal sacrifices to security and decentralization compared to existing models. The Color Consensus architecture being developed already has a theoretical speed of more than two times that of PBFT, while maintaining decentralization and security.

Color Consensus can be described as a PoS hybrid that runs in parallel, where the Block Builders (those that provide consensus) are elected not by member votes, but by their stake to the network. Then a weighted system based on performance and platform participation and reputation (see below the section “Color Prism Consensus Algorithm”).

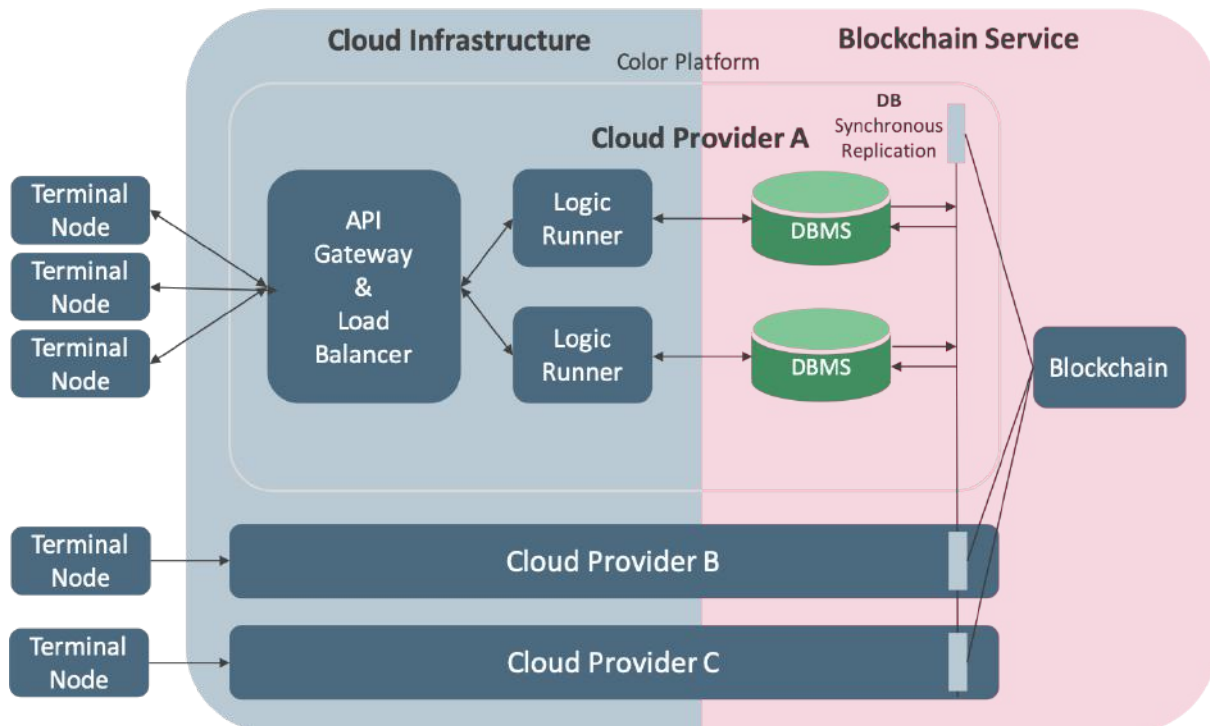
## **Clouds in Color Spectrum**

Running dApps in Council Nodes implies requirements on the infrastructure that hosts them.

We believe that developers should be able to implement the business logic of their dApps in well-known programming languages, such as Python, Java, PHP, Javascript.

To prevent code injection and data modification, and ensure decentralization, the Infrastructure should be able to launch dApp code at different physical locations, even

while handling subsequent requests. The infrastructure should monitor resource consumption and launch Council Nodes on demand from clients.



[Figure 5 - Cloud in Color Spectrum]

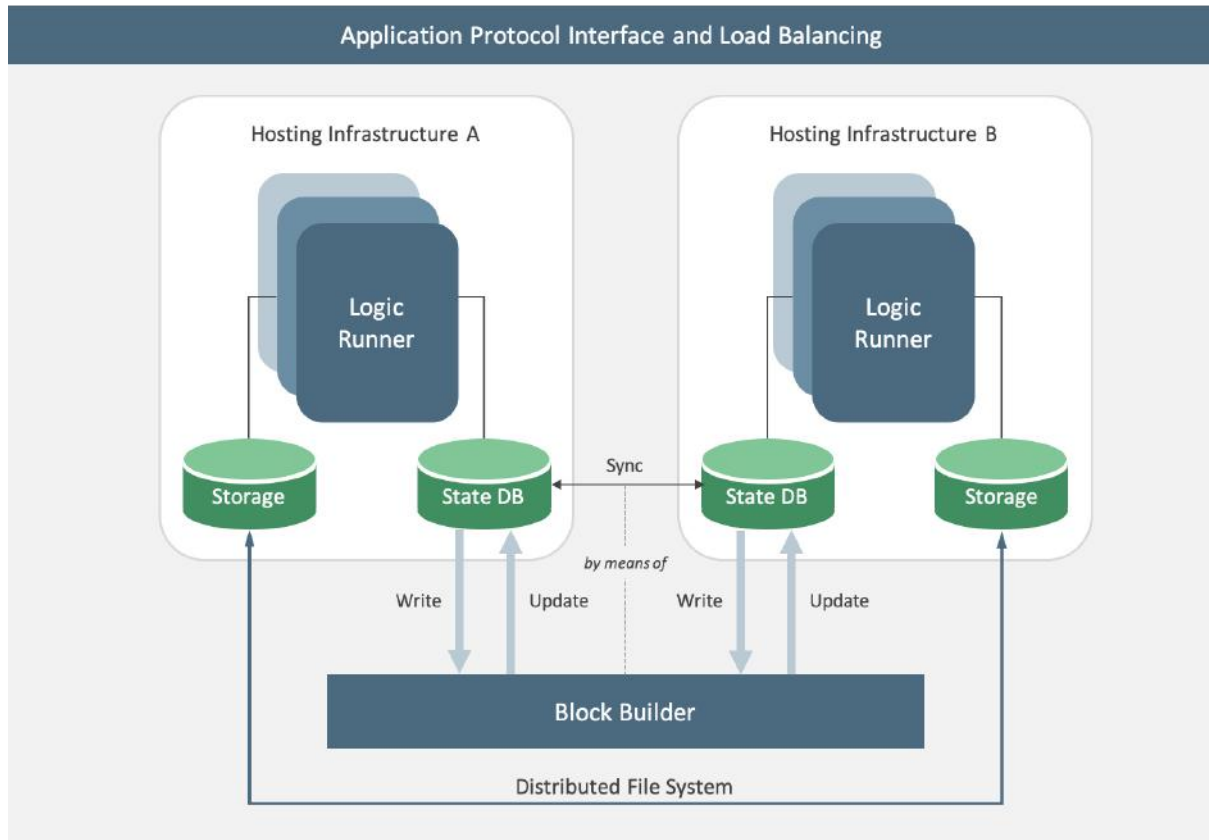
Modern cloud infrastructures meet all the requirements listed above. They are language-agnostic and execute code in any language thanks to containers. Clouds monitor running containers and launch them at arbitrary nodes within their infrastructure (this is why they are called “clouds”) and implement various resource allocations policies.

Cloud infrastructure isolates execution of dApps while still running them on the same platform. Container-based clouds provide small start-up time of service nodes and deliver the property of ‘serverlessness’. On top of that, containers consume almost zero resources until they are invoked to handle actual requests.

The two-tier architecture of Color Spectrum resembles Hyperledger Fabric, but Color Spectrum makes a great step forward. Hyperledger Fabric has a concept of “Endorsers”, the nodes that execute a transaction before building the blocks. They call this the “execute-order” strategy. The Hyperledger Fabric introduces their own policies and protocols to manage endorsers, support a very limited set of software technologies, but provide almost no protection against cartels and code modification aimed at endorsers. The cloud architecture in the Color Spectrum is much more advanced, flexible, reliable and stable technology.

## Bridging Cloud with Blockchain

The cloud infrastructure provides Council Nodes with a distributed storage environment. It includes a distributed database to store state variables that are to be synchronized between various Council Nodes, distributed storage for unified and ample access to dApp files and content, uploaded by users. And one of the most important functions provided by the Color Spectrum is access to blockchain. It is the middleware provided by Color Spectrum that handles dApp requests to store transactions into the blockchain.



[Figure 6 - Blockchain in Color Spectrum]

Like almost all other blockchain-based platform the Color Platform is equipped with a State Database. This database stores dApp persistent variables, such as wallet balance or a list of purchases. DApp business logic that runs on Council Nodes connects to the State DB to read and write variables, to update the state of the application.

The State DB is tightly coupled with Block Builder that uses blockchain to permanently store updates to DB. When a dApp commits a transaction to the State DB, the latter fires a transaction with new state values to the Color Ledger. One of the nodes in the ledger's network takes this transaction to build a block. Other nodes validate the block and add them to the network.

Each new block from the network is used to update the state. Special care is taken to resolve conflicts, when a state variable is used in a running dApp transaction and at the same time it arrives in a new block. In this case the state is updated from the new block and the transaction is restarted.

More complicated cases happen when Block Builders face two committed transactions starting from the same state. In this case, the Block Builder will reject one of them and inform the node that produced the rejected transaction that it needs to re-execute the transaction again.

## 2.4. Pixel Program : The Color System dApp

### Pixel Program

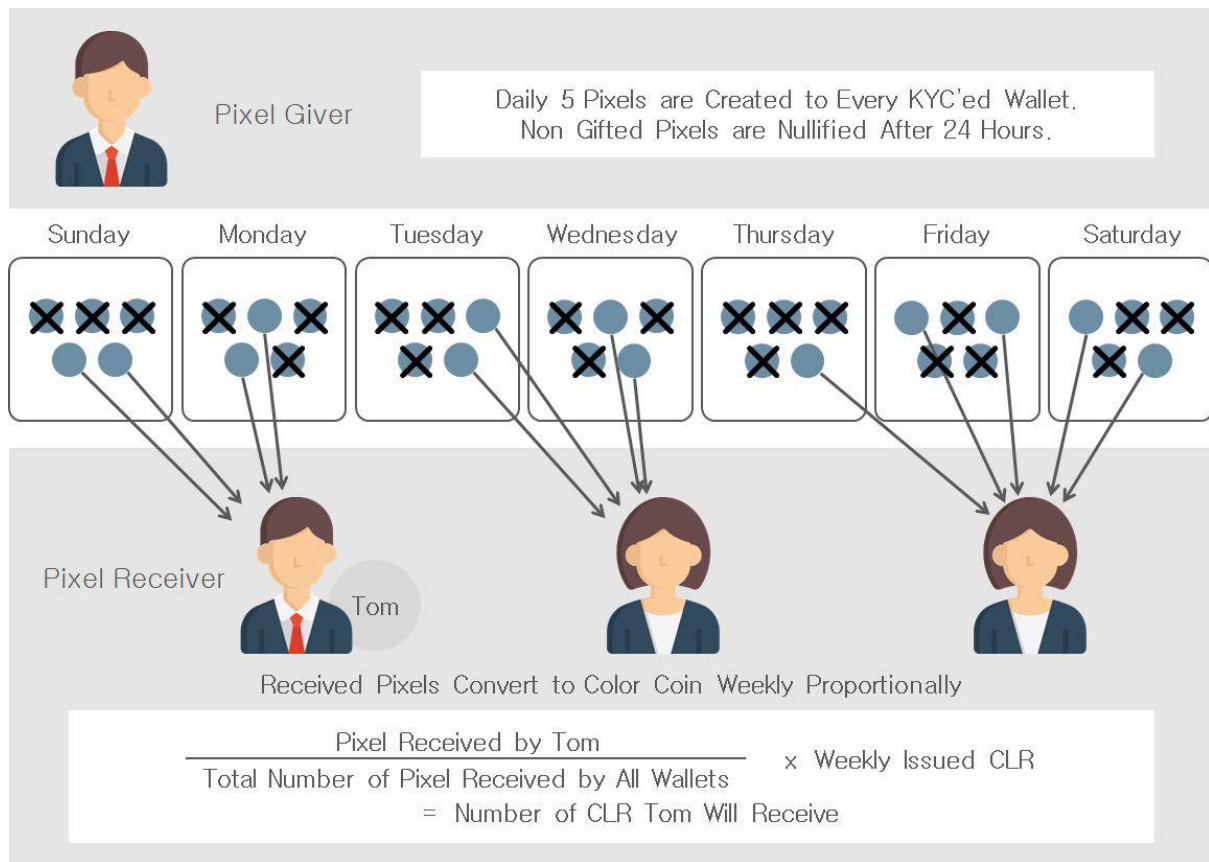
Fair distribution of tokens has always been a problem. Cryptocurrencies such as Bitcoin are treading the same path as fiat currency, in that wealth is gravitating toward the already rich while poverty-stricken members of society are continuously detached from wealth. The problem is most apparent in PoW (proof of work) cryptocurrencies, in that the initial miners reap the majority of the rewards. Similarly, in the PoS (proof of stake) model, large coin holders continue to be rewarded with coins.

This is why the Color Platform is focused on the fair distribution of tokens and the continued usage of tokens. The Pixel Program is a network-effect-driven issuance program that distributes “Pixels.” Pixels are essentially a referral program turbocharged by the power of the blockchain. The Pixel Program is based on the “gift economy” from Charles Eisenstein’s book “Sacred Economics: Money, Gift, and Society in the Age of Transition.” The Pixel Program aspires to promote a world of more economic equality through a gift-giving economy:

*“Another way to see the unexpected fruits that arise from the mystery is that when we live in the spirit of the gift, magic happens. Gift mentality is a kind of faith, a kind of surrender—and that is a prerequisite for miracles to arise. From the Gift, we become capable of the impossible.”<sup>3</sup>*

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<sup>3</sup> Charles Eisenstein. “Sacred Economics: Money, Gift, and Society in the Age of Transition,” ReadHowYouWant.com, Limited, 2011. Google Play Books. Web. 18 May 2018.  
[https://books.google.co.kr/books/about/Sacred\\_Economics.html?id=SjRdMAEACAAJ&redir\\_esc=y&hl=ko](https://books.google.co.kr/books/about/Sacred_Economics.html?id=SjRdMAEACAAJ&redir_esc=y&hl=ko).



[Figure 7 - Pixel Program Process]

Pixels will not only be sent to popular users, but to those who need financial support or charitable organizations such as the Red Cross, Amnesty International, or Doctors Without Borders, etc. Additionally, Pixels can be used to fund artistic projects or startups. One example is supporting independent game studios via Pixels. While the core distribution of Pixels is organic, the Color Team is developing various dApps to accelerate the distribution of Pixels.

Pixels will also play a pivotal role in governance of the platform. The key here is that active users of the system will have a say in how the system is governed, for more information on this see section 4.2.

## Pixel Distribution

Pixels are a type of “airdrop” distributed to all Color Coin wallet holders, five Pixels a day. They are awarded on a periodic basis. Starting from Sunday GMT 0:00, the Pixels have a lifespan of 24 hours. Pixels in their original form do not have any value. The only way Pixels have value is by sending them to other wallet holders. Pixels must be sent to another person’s account within 24 hours or they will become void. Each user can send up to five Pixels to a single account per week. Once a wallet holder receives Pixels, the

Pixels will become Color Coins. The received Pixels may be converted to Color Coins on a weekly basis, after Saturday GMT 24:00.

This “conditional sharing mechanism” aims to disincentivize hoarding, provide stable issuance, and increase overall user participation in the system. Most importantly, the Pixel Program promotes the active circulation of Color Coins. It will ultimately increase the circulation of Color Coins.

The equation for converting Pixels into Color Coins is as follows:

$$\frac{\text{Pixels Received by Individual Wallet in a Week}}{\text{Total Pixels Received by All Wallets in a Week}} \times 200,000 \text{ CLR}$$

Every week there will be an airdrop issuance of 200,000 Color Coins. Every 52 weeks the total supply of Pixel Program airdrops will drop by a certain rate, adjusted every year by Color Council. For the first 52 weeks, a total of 200,000 Color Coins will be issued weekly through Pixels. The subsequent 52 weeks will see a total of 190,000 Color Coins issued weekly through Pixels if the Council decides the decreasing rate for the next year to 5%. The systematic decrease in Pixels will continue for a span of 64 years.

Tentatively, there may be Pixels issued in other ways to reward users for their participation. We are currently considering app-level integrations with partners, and possible governance on this issue by the steering committee.

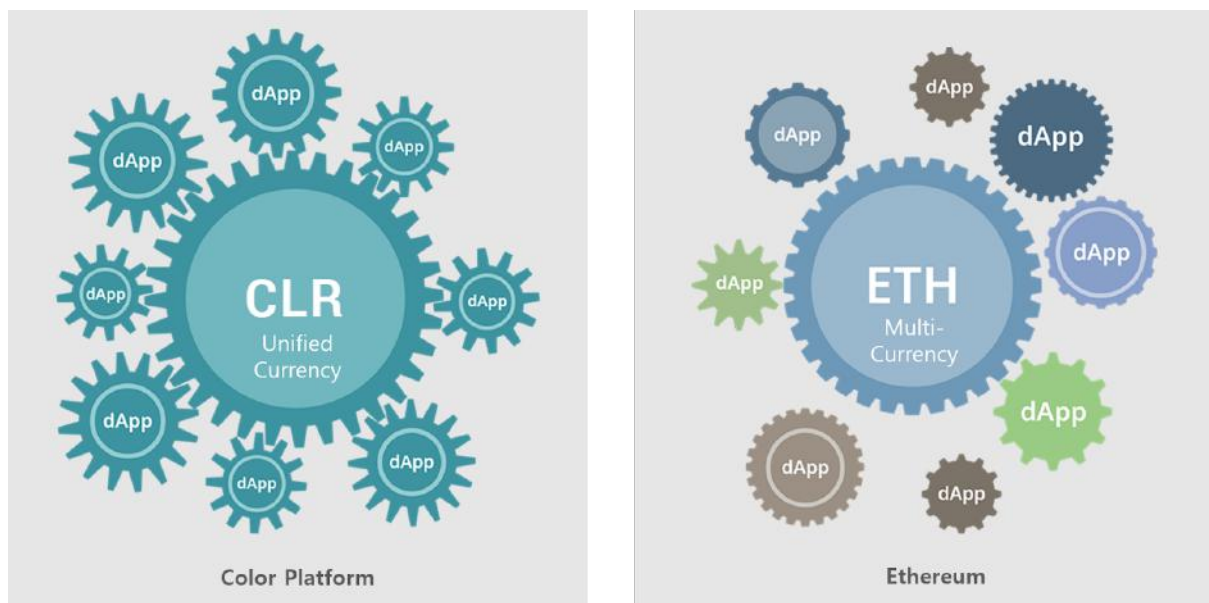
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## 3. Color Ecosystem

### 3.1. Overview

Color Platform is more than just a platform to execute dApps. It is the core of the whole environment that makes it useful not only for developers but for end users as well.

Color Ecosystem includes wallet applications, useful dApps and a central hub where users can search and connect to various dApps. Unified currency among Color dApps generates network effects.



[Figure 8 - Scalability of Color Platform dApp]

### 3.2. Reward Inc

Reward Inc is a reward app where users can earn promotion Pixels through activities such as attendance, participating in advertisements and inviting friends. Users are divided into 12 ranks from intern to president based on the promotion points they've earned within the app. The higher the position, the more base pay and bonuses users earn. Pixels are given out every day at GMT 6:00. These credits can then be exchanged for the Color Coins. Position changes are made in real-time according to promotion points earned by the user. The higher the position, the more difficult to achieve the promotion points.



Participation in advertisements will result in being rewarded Pixels. Users can receive Pixels by account linkage, referrals, and other methods. This system is especially favorable for social media influencers, thus, engagement with them will create a positive feedback loop into the Color Ecosystem. Reward Inc is a service with a high customer loyalty and these enthusiastic users will be able to participate actively in various dApps on the Color Platform.

### **3.3. Color Design**

Color Design is an interior design platform based on ranking. Color Design established a marketing system with high reliability and effectiveness by signing a business contract with renowned architects. Color Design saves and manages information like interior designs, customer evaluation data, and user information on the blockchain.

Color Design simplifies the process and reduces costs to a mere 10% compared with existing interior platforms. Users pay only with Color Coin to use paid services like local advertising products. Designers are recommended and discovered by the Color Design advisor group before they go through a validation process with Color Design official evaluators. Each design project will be evaluated by more than 1,000 customers. Color Design will provide users with a ranking chart developed based on the Color Design unique ranking algorithm.

Customers who take part in a design project assessment will be rewarded with Pixels based on the accuracy of the evaluation. If designs are ranked at the top of the daily chart, designers will be rewarded with the Color tokens according to their rank. Interior design companies will not be subject to huge middleman costs anymore, the savings will be better for everyone. Additionally, construction companies will operate at low costs through Color Design local advertising products. Blockchain technology will facilitate the selection of outstanding construction contractors based on a reputation system.

### **3.4. Color Guide**

Color Guide is something like 'Michelin Guide by Users' created by the community. Many existing restaurant and entertainment guides are plagued with fake or incorrect information. Color Guide is devoted to sharing reliable and valid information. Before registering your restaurant information in the Color Guide, you will need a Proof of Visit with a 3 second short video. If you share realistic and detailed restaurant information such as taste, kindness, cleanliness, waiting time, parking, you will receive



Pixels as incentives. The better the food information you share with the Color Guide is, the more Pixels you get.

Consumers who evaluate restaurant information registered in the Color Guide also receive Pixels. Proof of Visit is required for consumers to evaluate restaurant information. Evaluations are done in a way that gives you more detailed score, and the closer you get to the average score, the more Pixels you can get.

Color Guide also provides food information service. Experts like food columnist, restaurant power blogger, publish recommendations based on their reputation. We have strengthened the magazine's ability to expand the breadth of content by providing information on hidden restaurants that are not open to the general public and real restaurant information that impresses experts.

By applying the reward system to information sharing and verification activities, we can secure reliable restaurant data and provide it to users who need real taste information. This will increase confidence in the Color Platform and increase the user base.

More dApps are under development and will be disclosed as launching schedule becomes available.

### **3.5. Incentives Programs**

Cryptocurrency introduces a whole new way to create an ecosystem for a company or platform. In the old model, a company's stock, reward system, and currency were all quite different and only accessible through distinct centralized systems governed by a strict set of rules. Today, we can build systems that encompass complex schemes where shareholders, users, and creators can all be incentivized to make a better product or service using a single cryptocurrency token. This has the potential to create a positive feedback loop based on greater system usefulness and an increase in the number of participants.

Color invites partners to join the Color ecosystem and utilize the power of a unified cryptocurrency, Color Coin, to create new, value-based incentive programs for their community contributors.

## 4. Color Platform Evolution

### 4.1. Roadmap

Color architecture introduces new exciting features - clustering consensus, cloud-based execution environment, Pixel program, governance. To ensure maximum performance, reliability and scalability of Color Platform the new features will be released gradually during 2019-2021.

Along with platform development, several partner companies of the Color Platform Team will focus on the continued development of dApps. A multitude of dApps will become available even before and after the token-generation event (TGE), reflecting Color's commitment to building an ecosystem of valuable applications. Such dApps can utilize their own point or token mechanism and interface them to ERC20 form of Color Tokens until Color Coins are issued on the Color MainNet. The roadmap stipulates that the platform will have garnered enough Color dApp users from the early stage of Color Platform development. These early dApps will switch to the true Color MainNet, that will see our decentralized governance and platform in full swing.

It is natural for Color to have colors as release names. They are listed in the same order as color go in a rainbow.

Red Release Q4 2019	Orange Release Q2 2020	Yellow Release Q4 2020	Green Release Q4 2021
<ul style="list-style-type: none"> <li>• Pixel Program</li> <li>• Prism Consensus</li> </ul>	<ul style="list-style-type: none"> <li>• Smart Contracts</li> </ul>	<ul style="list-style-type: none"> <li>• Sharding and Channels</li> </ul>	<ul style="list-style-type: none"> <li>• Color Spectrum</li> </ul>

### Development milestones : White Release

The White Release encompasses the release of our ERC-20 token, MVP, and Exchange listing.

### Release "Red" : Pixel Program & Color Prism (Q4 2019)

This release introduces the working Mainnet with Color Coin and Pixel. This release will start free flotation of Color Coin and will usher the native implementation of Pixel Program.

The Pixel Program is developed as a core dApp of the Color Platform Ecosystem and can be used to secure early expansion of the color platform.

Expected outputs:

- Pixel Program: Pixel Program integrated into Mainnet, Pixel Program client software.
- Prism Color Consensus Algorithm: Mainnet with synchronous cluster BFT algorithm.
- Mainnet tools: block explorer, client software, integration with popular wallet software.

## **Release “Orange”: Smart Contracts (Q2 2020)**

This Milestone will enrich the ecosystem of the Color Platform with smart contracts.

The smart contracts introduced on this stage will later be transferred to the Color Spectrum environment, whilst the dApp developers could benefit from Color Coin, Color Pixel and the community.

The smart contracts will be executed in Webassembly. Smart contracts could be developed in C/C++, Go, Javascript.

## **Release “Yellow”: Sharding and Channels (Q4 2020)**

Yellow brings cluster structure of Prism to a new level.

It is well-known, that financial transactions have strong locality property. In 90% of transactions or more the sender and the recipient of a transaction belong to the same region. US citizens tend to spend money in US stores, Koreans pay to Korean sellers, etc.

Sharding implies that such localized transactions will be processed by a local League, leaving the main network for cross-league operations. Channels are dedicated servers that handle transactions of specific dApps.

Introducing sharding and channels will increase the transactions per second performance counter of the Color Platform by an order of magnitude.

## **Release “Green”: Color Spectrum (Q4 2021)**

Along with other releases, The Color Team will be working on Color Spectrum, a next generation cloud-based blockchain platform.

## 4.2. Governance

### Overview

The Color governance system will be at the cornerstone of Color's strategy to become a dominant coin in the space. The philosophy of our governance structure is such that the decisions that need to be made on the platform from the beginning and ongoing need to keep the five major stakeholders in mind:

- New Users
- Existing Users (with reputation)
- Active Participants on the Color Platform
- Developers/Maintainers
- Network Infrastructure Providers

In existing systems you can see these five stakeholder groups (or less) existing in some kind of pyramid that has clear winners and "losers" on every step of the decision making process and beneficiary scale. Take Dash for example, a regular new user (unless they were really wealthy) would not have much of a say in the decision making process. In existing systems Masternode prices are \$200,000+, which dictate your direct involvement capability with the platform's primary governance engine. If we were to consider who might be the largest beneficiaries to the least in Dash, we might get a pyramid like the following: Masternode owners, Developers/Maintainers, Miners & Existing Users (With reputation), New Users.

This pyramid is similar amongst a lot of coins, where the regular users don't get a lot of benefit, and block builders are always in a weird position where in a lot of cases block builders (miners in other networks) can even be hostile to the network, and not have the best interests of it at heart. Not only that, but as Vlad Zamfir so eloquently put it, "When miners become more powerful, everyone else gets less of a say." The reality is, whether we like it or not, with the advent of pools, the coveted decentralization that we hold so dear has become a lot more centralized than we'd like to admit. While P2P mining pools and decentralized exchanges exist, the incentives to make really great products do indeed stem from the profit motive, which is why it may be quite some time before those systems really take off in any meaningful way.

So then the question becomes, how do we fix it? Regular old user's don't have a say, and don't get benefits right away from using most existing cryptocurrency systems. We want to reward every part of the ecosystem and allow everyone to have a voice. This is why we've devised a system that benefits the entire ecosystem and provides them with a platform, not just those few at the top. A design this way from the beginning is crucial.

## Steering Committee

Steering Committee will govern the technological evolution of Color Platform. Among their responsibilities will be how major codebase changes (releases) happen, and how larger decisions are put forward on to the community and committed to. The 9 members of the Steering Committee will represent all communities that burgeon from the Color Platform: platform developers, dApp developers, infrastructures for Council Nodes and Block Builder, end users of dApps. The 9 members of the Committee will be elected by the Council Nodes through direct voting.

The major obligation of the Steering Committee is to oversee the development process of the Color Platform.

Color Platform code will be publicly available at GitHub and open for contributions and issue reports. Open source software is driven by two forces - enthusiasts that code “just for fun”<sup>4</sup> and companies that benefit from communities or services that emerge around the software.

In Color Platform we will provide valuable incentives to both categories of contributors. Patches, accepted by the Core Dev team, will receive rewards in CLR. The actual volume and procedures are still to be defined, but we believe in coding community and that with little support it will become one of the strongest drivers to Color Platform technology excellence.

## Arbitration Committee

The Arbitration Committee will consist of five members that hear cases of mostly technical failures. If a smart contract glitched and the funds became unreachable, or if a large amount of funds were stolen, this committee would have the ability to reclaim those funds on behalf of the user.

Another aspect of the software development is Quality Assurance. In open source software it is the community that voluntarily submits bug reports. Well-written reports, with detailed descriptions on how to reveal a defect, will be rewarded from Governance Support expenses.

Extension of the platform, such as new features and improvements, could be submitted through treasury projects. If the community votes for such a proposal, it receives funding.

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<sup>4</sup> Torvalds, Linus; Diamond, David (2001). Just For Fun: The Story of an Accidental Revolutionary. New York, New York, United States: HarperCollins. ISBN 0-06-662072-4.

## Council

Council in Color will be users who have over (tentatively) 50,000 Color who stake it towards the network, **and pass the mandatory participation metric**, will get the ability to vote in the treasury system. **Council Nodes must perform the Logic Running Function in order to receive treasury votes, and all treasury votes must be spent in order to receive compensation.** The Logic Runners will have to have high availability (24/7) and low latency and run the Logic Running Software to receive any votes or rewards in the system. When a user wants to retrieve their coins from their stake, they must wait for a 4-week lockup period to conclude before their stake is returned to them. The mandatory participation metric rules will be set forth by the Steering Committee before MainNet Launch.

Council Nodes will have the opportunity to vote on proposals concerning treasury funds, changes in governance policies, and changes to the direction of the Color Coin, and vote on the appointment of Steering Committee members.

Council Nodes will get **10** votes every 4 weeks for every 50,000 coins they have, however, with the quadratic formula they won't be able to affect the vote in quite as linear of a fashion, provided they are serving the network adequately and are in good standing

Council Nodes will undergo KYC procedure to ensure responsibility and reliability of testing, detect cartels and vote manipulation.

## The Treasury

The treasury funds make a large part of the block reward, but what are they for exactly? A quick peek into Dash's Budget tracker<sup>5</sup> shows us that these funds, at least in Dash, the largest longest running coin with an integrated treasury system, the fund usage is rather diverse. Funding anything from Latin American outreach projects to building up services, and even keeping the Steering Committee around to work on the project. That's right, if Color Platform users decided that once the Core development team runs out of their own funding, it is going to have to prove its worth to the network through continually requesting the needed funds for the monthly operating expenses to the treasury.

Some examples of expected treasury proposals would be feature adds to existing dApps, new dApps, outreach efforts, our partners and Steering Committee requesting operating budgets, etc. The idea is that the more eyes that are on the treasury, higher quality submissions will be a must. This will prevent waste and amateur proposals from

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<sup>5</sup> "Budget - Masternode monitoring and budget voting - DashCentral.org."  
<https://www.dashcentral.org/budget>. Accessed 3 May. 2018.

being the only things that are in the treasury system, outside of the monetary incentive and high competition alone.

Lastly, The Treasury may be leveraged for the use of the Steering Committee to get a community vote from the Logic Running Color Nodes for contentious code changes, governance changes, and any other survey type questions that they see fit.

### How Treasury Voting Works - Quadratic Voting

Quadratic voting gives you a pool of votes that you can spend multiples on one proposal, but the more votes you want to vote on a proposal, it gets exponentially more expensive with that pool of votes to do so. The concept of Quadratic Voting was proposed<sup>6</sup> to restrain unlimited voting capabilities of rich and extra-rich. Vitalik Buterin, co-creator of Ethereum, supported the idea of quadratic voting in his blog<sup>7</sup>. Quadratic voting defines the “price” of giving  $N$  votes as  $N^2$ . A typical Quadratic voting table might look like this:

Number of votes	“Voice Credit” cost
1	1
2	4
3	9
4	16
5	25

Color plans to use a scheme very close to this one in its treasury. We plan to implement a true Quadratic Voting model through a friendly user interface.

### Differential Voting and Funding

Differential voting means that a ballot is considered passed not by plain majority but rather by prevalence of number of positive votes over negative ones by specific threshold.

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<sup>6</sup> Eric A. Posner & E. Glen Weyl. *Radical Markets. Uprooting Capitalism and Democracy for a Just Society*. Princeton University Press, 2018.

<sup>7</sup> [On Radical Markets](#). Vitalik Buterin's website

Votes for normal funding proposals will require a 10% passing differential to be passed, e.g. the number of supporting votes is at least 10% more than rejecting votes, such as 45% cons and 55% pro. Major funding votes or systematic changes/constitutional changes will require 20% passing differential. After that, only the highest rated proposals will pass as funding allows. If a proposal met the differential but there is not enough funding, the next highest voted proposals will be funded until no more proposals can be funded. This is to ensure proposals for small amounts the the community generally likes don't get blocked because a larger effort passed, but the funds weren't there for it.

### **Treasury Proposal Costs**

The way the treasury will work within Color is that Council Nodes will be able to vote on proposals (which can be submitted by anyone if they pay a fee). As with other treasury systems there will be a dynamically calculated proposal fee that changes every month. This will take into account three things:

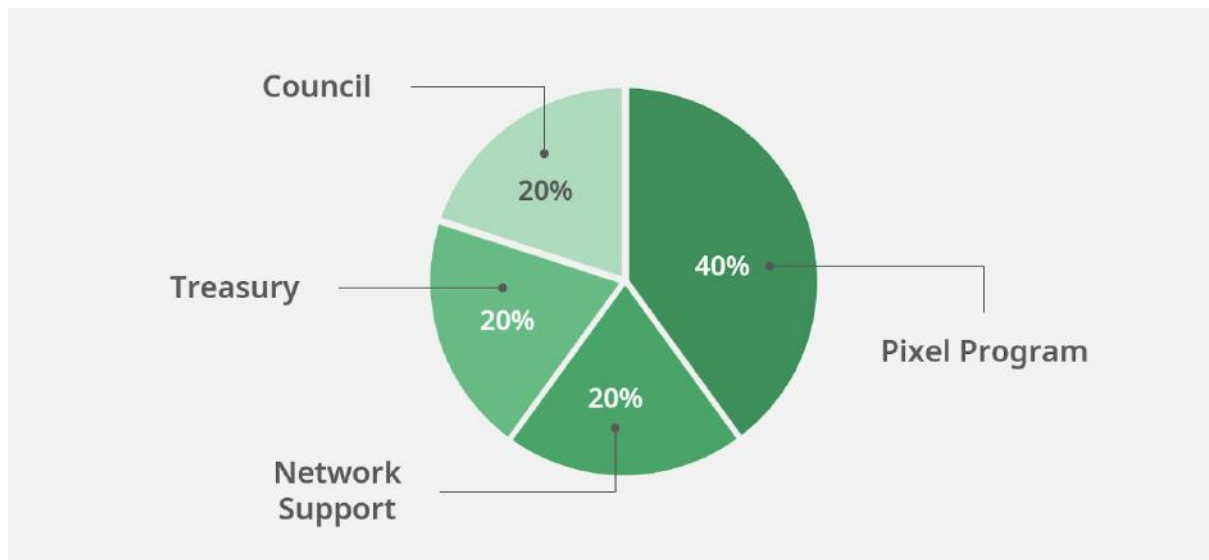
- 1) The number of proposals submitted last proposal cycle
- 2) The cost of a proposal in terms of USD now vs. the last proposal cycle
- 3) The amount of unallocated treasury funds in the last cycle.

This will ensure that there won't need to be a rule change every time the price of Color changes. If the last proposal cycle went by and almost no one submitted proposals, the cost would drop significantly for that fact alone, but if the price of the Color token going too high was part of the reason no one submitted proposals, that would further drive down the price of proposals as well. We hope to prevent spam proposals, but also not price out anyone who wants to add value to the system.

### **Governance Rewards**

We believe that with the addition of the Pixel program and voter compensation it accomplishes two things: Fixing the imbalance of rewards in a system by encouraging real usage and participation, rather than simply chanting the mantra of "[Hodl](#)". By introducing Pixels, users are incentivized in sending and interacting with the platform at large, rewarding them for becoming notable figure on the platform, and possibly recipients of more Pixels. In some respects, they could be seen as upvotes that turn into spendable "points" at the end of a given week. This distribution will be essentially a core dApp for Color and will function as a way for new users to hit the ground running with the Color Platform, or a way for active users to have a voice and be rewarded.





[Figure 9 - Reward distribution]

Every week Color Platform will release an amount of coins to the circulating supply. During the first 52 weeks this will be 500,000 CLR each week, but after each 52 weeks period the sum will decrease by 5%.

Weekly coins release will have the following distribution:

**Pixel Program:** These are given from the formula introduced in the Pixels section. This will reward new and active users who contribute and utilize the platform. During the first 52 weeks the Platform will generate every week 200,000 CLR for Pixel rewards. Then, gradually, this amount will decrease, and the amount required to gain 200,000 CLR for Pixel Program will be compensated from transaction fees.

**Block Builders:** In the Color system, the network pays rewards to those who make the Platform run. The Platform will emit 100,000 CLR every week (declining every 52 weeks by 5% rate) and transfer additionally 40% of transaction fees to cover the expenses of these nodes.

However, it is unlikely these rewards will result in voter promise rewards (rewards paid to voters for voting for block builders) because the nodes will become Block Builders based on their ability to provide real infrastructure backing to the dApp creators and those who have needs for a distributed hosting system. In order to provide free or near-free hosting services, we will need to provide rewards to those that host the content. Nodes for Block Builder will be selected by the Council.

**Treasury:** The Treasury will be the lifeblood of the continuing development of the Color Platform. In the future, the community may want to grow and have ideas for the coin that would require something beyond the budget, and eventually the Steering Committee team would hope to compete for Treasury funds in which the Council

Nodes can vote for. The treasury will be a place where anyone can come, pay a proposal submission fee and that proposal would then be up for a vote in the Treasury system. If it gets a certain amount of votes and the funds are still available, then that proposal will be paid out.

The Platform will emit 100,000 CLR every week (declining every 52 weeks by 5% rate) and transfer 30% of transaction fees to the Treasury.

**Council:** The Platform will emit 100,000 CLR every week (declining every 52 weeks by 5%) and transfer 30% of transaction fees to rewards of Council Nodes for their activity in governance of the Color Platform. Council Nodes can only earn treasury votes if they are actively staking their coins and running the Logic Runner software. Council members must then spend all of their votes in order to be compensated.

## 4.3. Token Issuance

### Token Generation Event Terms

The Color Coin (CLR) is a platform cryptocurrency that will be used on every dApp across the Color Platform. The Color Coin plans to unite and create a synergy among dApps, instead of allowing disconnected dApps to slow down the platform.

#### Initial Token Supply

400,000,000 CLR

#### Token Generation Event Token Supply

200,000,000 CLR

#### KYC Requirements for Token Generation Event

First Name, Last Name, Age (Above 18 Years Old), Gender, Nationality, and Residence Country.

#### Token Generation Event Unsold Tokens

Treasury

#### Token Generation Event Accepted Currency

Ethereum

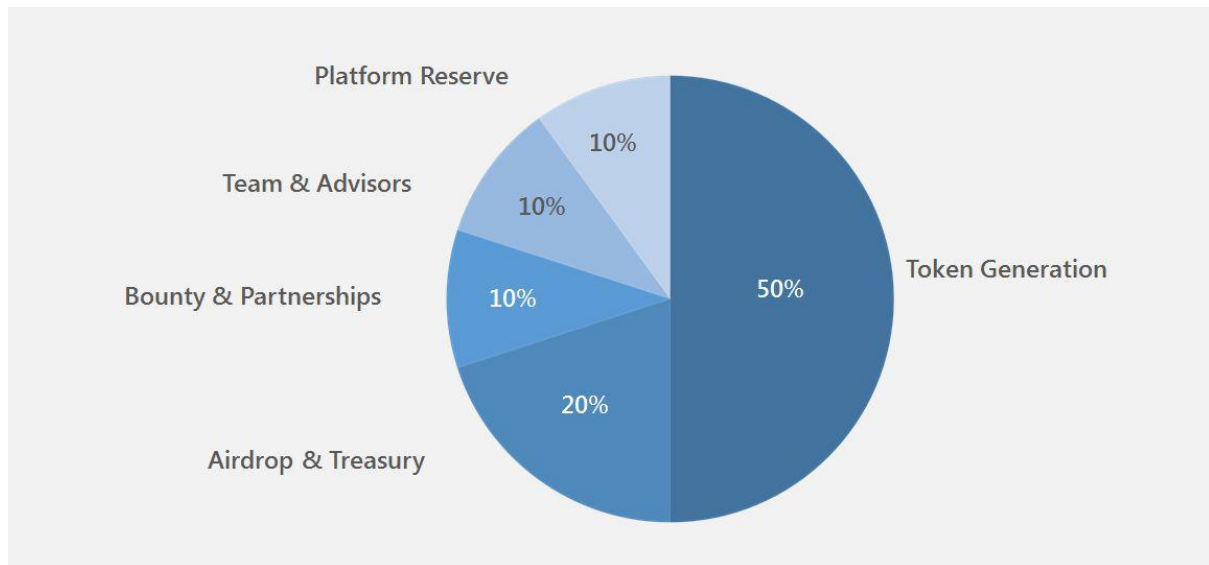
#### Token Release Period

64 years

#### Token Release Decline Rate

By 5% every 52 weeks

## Token Generation Event (TGE) Breakdown



[Figure 10 - TGE Breakdown]

### Token Generation Event (200,000,000 - 50%)

In the token generation event (TGE), a portion of the initial 400,000,000 coins will be offered to participants as ERC20 tokens. The TGE breakdown is presented below.

### Bounty and Partnerships (40,000,000 - 10%)

Delegates from the Color Project such as the marketing team, dApp-development teams, and others will be given access to a fund used to award bounties. Bounty rewards may include a bonus for finding bugs in the platform (or dApps running on top of it), contests, etc.

### Team and Advisors (40,000,000 - 10%)

The companies and organizations that came together to make the Color Platform a reality took an enormous risk. These coins will be used to compensate those who made Color possible, which will incentivize further development on the Color Platform.

### Platform Reserve (40,000,000 - 10%)

Development may encounter unforeseen circumstances in which more Color Coins may be required. Steering Committee withholds these tokens and may use them to support platform development if necessary.

### Airdrop and Treasury (80,000,000 - 20%)

Development may encounter unforeseen circumstances in which more Color Coins may be required. Steering Committee withholds these tokens and may use them to support platform development if necessary.

## Token Generation Event Proceeds

This section describes the expected spending of the funds earned during TGE.

### Platform Development

The majority of token-generation-event proceeds will be invested in the development of the Color Platform by the Color Team.

### dApp Development

The Color Platform aims to develop 10 dApps. The Color Team is currently working with third-party developers to build dApps on the Color Platform. The bulk of dApp development funds will go toward supporting internal and external dApp teams.

### Operation Expense

The Color Platform is a global platform with bases in Singapore and South Korea. The operation expense will mostly be used to maintain and expand the office-management team.

### Strategic Partnerships

The Color Platform plans not only to internally develop dApps but exponentially expand its dApp library by partnering with various third parties. The Color Platform will build upon these strategic partnerships and distribute Color dApps to various markets.

### Marketing and Promotions

Marketing is the backbone of any product success. The Color Platform aims to continually invest in marketing Color Platform products. The Color Team intends to devote a separate team to each dApp and execute a cohesive marketing campaign.

## Token Release Over Time

Initially 400,000,000 CLR are to be released through TGE. Additional CLR will be emitted as per the inflation rate. The additional coins will be gradually released over time. For the first 52 weeks of the platform operations weekly release rate will be 500,000 CLR. Every 52 weeks this rate will decline by 5%.

The decreasing rate of 5% could be adjusted by the Color Council and/or Steering Committee in the future based on the demand and supply of Color Coins and the stability of Color network.

There are four long-term channels of releasing additional locked coins:

- 40% of weekly released coins will be used to convert donated Pixels into Color Coins in **Pixel Program**. For the first 52 weeks it will be 200,000 CLR per week.

- 20% of weekly released coins will be used for **Network Support** to cover expenses of Block Builder nodes on constructing blocks from. For the first 52 weeks it will be 100,000 CLR per week.
- 20% of weekly released coins will be transferred to **Treasury**. Treasury will be funding projects devoted to further development of Color Platform and Color Ecosystem.
- 20% of weekly released coins will be spent to support **Governance**. Those coins will be spent as a reward to Council Nodes for their work on community development and voting for new initiatives.

## 4.4. Transaction Fees

In order to support Color Network operations and its further development, transactions involving coin transfer will be imposed to small fees. The current value of the fee is expected to be 0.05% of the value of the transaction with minimum of \$0.005. The reason for transaction fees is to have capped total supply of Color Coins and avoid unlimited inflation. Having transaction fee is also to prevent DDoS attacks.

At the early years most of the expenses of Council and Block Builder nodes would be covered by direct emission of coins. Over time the business activity in Color Platform network will grow, resulting in constantly increasing income of transaction fees. We expect that around year 10 of Color Platform it would be the transaction fees to cover more than 50% of operational expenses.

Transaction fees will be transferred to the following goals:

- 40%: Rewards for Block Builders;
- 30%: Treasury;
- 30%: Governance.

The actual distribution may change with time according to governance decisions.

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## 5. Disclaimer

Please read this entire section carefully. If you are in any doubt as to the action you should take, please consult your legal, financial, tax, or other professional advisor(s). The white paper may be updated before the main Token Generation Event.

### 5.1. Legal Statement

- (a) This white paper ("white paper") in its current form is circulated for general informational purposes only in relation to the Color Platform ("the Color Platform") project as presently conceived and is subject to review and revision. Please note that this white paper is a work in progress, and the information in this white paper is current only as of the date on the cover hereof. Thereafter, the information, including information concerning ("Pax Datatech Pte Ltd.,") business operations and financial condition, may have changed. We reserve the right to update the white paper from time to time.
- (b) No person is bound to enter into any contract or binding legal commitment in relation to the sale and purchase of the Color Coin (as defined below) and no payment is to be accepted on the basis of this white paper. Any sale and purchase of the Color Coin will be governed by a legally binding agreement, the details of which will be made available separately from this white paper. In the event of any inconsistency between the above-mentioned agreement and this white paper, the former shall prevail.
- (c) This white paper does not constitute or form part of any opinion on any advice to sell or any solicitation of any offer by the issuer/distributor/vendor of the Color Coin to purchase any Color Coin, nor shall it or any part of it, nor the fact of its presentation, form the basis of or be relied upon in connection with any contract or investment decision.
- (d) The Color Coins are not intended to constitute securities, units in a business trust, or units in a collective investment scheme, each as defined under the Securities and Futures Act (Cap. 289) of Singapore or its equivalent in any other jurisdiction. Accordingly, this white paper therefore does not, and is not intended to, constitute a prospectus, profile statement, or offer document of any sort and should not be construed as an offer of securities of any form, units in a business trust, units in a collective investment scheme, or any other form of investment, or a solicitation for any form of investment in any jurisdiction.

- (e) No Color Coin should be construed, interpreted, classified, or treated as enabling or according any opportunity to purchasers to participate in or receive profits, income, or other payments or returns arising from or in connection with the Color Platform, the Color Coin, or products, or to receive sums paid out of such profits, income, or other payments or returns.
- (f) This white paper or any part hereof may not be reproduced, distributed, or otherwise disseminated in any jurisdiction where offering coins/tokens in the manner set out in this white paper is regulated or prohibited.
- (g) No regulatory authority has reviewed, examined, or approved of any of the information set out in this white paper. No such action has been or will be taken in any jurisdiction.
- (h) Where you wish to purchase any Color Coin, the Color Coins are not to be construed, interpreted, classified, or treated as: (a) any kind of currency other than cryptocurrency; (b) debentures, stocks, or shares issued by any entity; (c) rights, options, or derivatives in respect to such debentures, stocks, or shares; (d) rights under a contract for differences or under any other contract with the purpose, or pretended purpose, to secure a profit or avoid a loss; or (e) units or derivatives in a collective investment scheme or business trust, or any other type of securities.

## **5.2. Restrictions on Distribution and Dissemination**

- (a) The distribution or dissemination of this white paper or any part thereof may be prohibited or restricted by the laws or regulatory requirements of any jurisdiction. In the case where any restriction applies, you are to inform yourself about, to obtain legal and other relevant advice on, and to observe any restrictions that are applicable to your possession of this white paper or such part thereof (as the case may be) at your own expense and without liability to the Color Platform or its representatives, agents, and related companies ("Affiliates").
- (b) Persons to whom a copy of this white paper has been distributed or disseminated, provided access to, or who otherwise have the white paper in their possession shall not circulate it to any other persons, reproduce, or otherwise distribute this white paper or any information contained herein for any purpose whatsoever, nor permit or cause the same to occur.

## **5.3. Disclaimer of Liability**

- (a) The Color Coin and related services provided by the Color Platform and its Affiliates are provided on an "as is" and "as available" basis. The Color Platform

and its Affiliates do not grant any warranties or make any representation, express or implied or otherwise, as to the accessibility, quality, suitability, accuracy, adequacy, or completeness of the Color Coin or any related services provided by the Color Platform and its Affiliates, and expressly disclaim any liability for errors, delays, or omissions in, or for any actions taken in reliance on, the Color Coin and related services provided by the Color Platform and its Affiliates.

- (b) The Color Platform and its Affiliates do not make or purport to make, and hereby disclaim, any representation, warranty, or undertaking in any form whatsoever to any entity or person, including any representation, warranty, or undertaking in relation to the truth, accuracy, and completeness of any of the information set out in this white paper.
- (c) To the maximum extent permitted by the applicable laws and regulations, the Color Platform and its Affiliates shall not be liable for any indirect, special, incidental, consequential, or other losses of any kind in tort, contract, or otherwise (including but not limited to loss of revenue, income, or profits and loss of use or data) arising out of or in connection with any acceptance of or reliance on this white paper or any part thereof by you.

## **5.4. Cautionary Note on Forward-Looking Statements**

- (a) Certain information set forth in this white paper includes forward-looking information regarding the future of the project, future events, and projections. These statements are not statements of historical fact and may be identified by, but not limited to, words and phrases such as “will,” “estimate,” “believe,” “expect,” “project,” and “anticipate” or words of similar meaning. Such forward-looking statements are also included in other publicly available materials such as presentations, interviews, videos, etc. Information contained in this white paper constitutes forward-looking statements including but not limited to future results, performance, or achievements of the Color Platform or its Affiliates.
- (b) The forward-looking statements involve a variety of risks and uncertainties. These statements are not guarantees of future performance and no undue reliance should be placed on them. Should any of these risks or uncertainties materialize, the actual performance and progress of the Color Platform or its Affiliates might differ from expectations set by the forward-looking statements. The Color Platform or its Affiliates undertake no obligation to update forward-looking statements should there be any change in circumstances. By acting upon forward-looking information received from this white paper, the Color Platform or its Affiliates’ websites, and other materials produced by the



Color Platform or its Affiliates, you personally bear full responsibility in the event that the forward-looking statements do not materialize.

- (c) As of the date of this white paper, the Color Platform has not been completed and is not fully operational. Any description pertaining to and regarding the Color Platform is made on the basis that the Color Platform will be completed and be fully operational. However, this paragraph shall in no way be construed as providing any form of guarantee or assurance that the Color Platform will eventually be completed or be fully operational.
- (d) PUF-related forward-looking milestones will heavily depend on the outcome of its POS (Proof of Concept) period. If the POS results in inappropriateness of PUF integration to Color Platform, all the PUF-related projects may be dropped.

## **5.5. Potential Risks**

- (a) Please carefully read every piece of information, understand, and analyze the risks and related factors before deciding to participate and purchase the Color Coin. The risks include but are not limited to:
  - (i) risk of losing access to the Color Coins due to loss of identification information, loss of requisite private key(s) associated with the digital wallet or vault storing the Color Coin, or any other kind of custodial or purchaser errors;
  - (ii) fluctuations of the value of the Color Coin post-issuance due to the general global market and economic conditions. Such volatility in the value of the Color Coin may lead to the Color Platform not being able to fund the development of the Color Platform ecosystem or not being able to maintain the Color Platform ecosystem in the manner intended;
  - (iii) changes in political, social, economic, and stock or cryptocurrency market conditions, and the regulatory environment in the countries in which the Color Platform or its Affiliates conduct their businesses and operations, and the ability of the Color Platform or its Affiliates to survive or compete under such conditions. It is possible that certain jurisdictions will apply existing regulations to, or introduce new regulations addressing, blockchain technology that may be contrary to the Color Coin and/or the Color Platform ecosystem that may, inter alia, result in substantial modifications of the Color Platform ecosystem and the Color Platform project, including termination and loss of the Color Coins;

- (iv) changes in the future capital needs of the Color Platform or its Affiliates and the availability of financing and capital to fund such needs. A lack of funding could impact the development of the Color Platform and the uses or potential value of the Color Coin;
- (v) for a number of reasons including, but not limited to, an unfavorable fluctuation in the value of the Color Coin, the failure of business relationships, or competing intellectual property claims during development or operation, the Color Platform project may no longer be a viable activity and may be dissolved or simply not launched, negatively impacting the Color Platform ecosystem, the Color Coin, and the potential utility of the Color Coins;
- (vi) the lack of interest from a large number of companies, individuals, and other organizations for the Color Platform and services and that there may be limited public interest in the creation and development of distributed applications. Such a lack of interest could lead to a lack of funding and also impact the development of the Color Platform and the uses or potential value of the Color Coin;
- (vii) significant changes made to the features or specifications of the Color Coin or the Color Platform before the release or implementation of the Color Platform project and/or the Color Platform ecosystem. While the Color Platform intends for the Color Coin and the Color Platform ecosystem to function as described in this white paper, the Color Platform may nevertheless make such changes;
- (viii) competition from alternative platforms that may have been established, which could potentially adversely impact the Color Coin and the Color Platform (e.g. lack of commercial success or prospects caused by competing projects);
- (ix) interference with the use of the Color Coin and the infrastructure of the Color Platform due to any weaknesses or malware that may be intentionally or unintentionally introduced into the software of the Color Platform, whether or not by a third-party member, the Color Platform, or its Affiliates. The blockchain used for the platform is also vulnerable to attacks that pose a risk to the platform and the performance of related services;
- (x) occurrences of catastrophic events, natural disasters, and acts of God that affect the businesses or operations of the Color Platform or its Affiliates and other factors beyond the control of the Color Platform or

its Affiliates. This includes mining attacks and attacks by hackers or other individuals that could result in theft or loss of proceeds of the Color Coin sale or the Color Coin and impacting the ability to develop the Color Platform ecosystem;

- (xi) The Color Coins and other cryptocurrencies are a new, untested technology and constantly developing. The full functionality of the Color Coins is not yet complete, and no assurance can be provided of such completion. As technology matures, developments in cryptographic technologies and techniques or changes in consensus protocol or algorithms could present risks to the Color Coin, the Color Coin sale, the Color Platform project and/or the Color Platform ecosystem, including the utility of the Color Coin and the functionality of PUF (Physical Unclonable Function) chip;
- (xii) The Color Coins confer no governance rights of any kind with respect to the Color Platform project, the Color Platform ecosystem, and/or the Color Platform, and all decisions will be made by the Color Platform at its sole discretion, including decisions to discontinue the Color Platform's products or services, the Color Platform project, and/or the Color Platform ecosystem, to create and sell more Color Coins for use in the Color Platform ecosystem, or to sell or liquidate the Color Platform; and
- (xiii) The tax treatment and accounting of the Color Coins is uncertain and may vary among jurisdictions. There may be adverse tax consequences, and independent tax advice in connection with purchasing the Color Coin should be obtained.

In addition to the risks stipulated above, there are other risks that the Color Platform and its Affiliates cannot predict. Risks may also occur as unanticipated combinations or as changes in the risks stipulated herein.

- (b) If any of such risks and uncertainties develops into actual events, the business, financial condition, results of operations, and prospects of the Color Platform or its Affiliates could be materially and adversely affected. In such cases, you may lose all or part of the value of the Color Coin.

## **5.6. No Further Information or Update**

No person has been or is authorized to give any information or representation not contained in this white paper in connection with the Color Coin, the Color Platform, or its Affiliates and their respective businesses and operations, and, if given, such

information or representation must not be relied upon as having been authorized by or on behalf of the Color Platform or its Affiliates.

## **5.7. No Advice**

No information in this white paper should be considered to be business, legal, financial, or tax advice regarding the Color Coin, the Color Platform, or its Affiliates. You should consult your own legal, financial, tax, or other professional advisor(s) regarding the Color Coin, the Color Platform, or its Affiliates and their respective businesses and operations. You should be aware that you may be required to bear the financial risk of any purchase of the Color Coins for an indefinite period of time.

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