



## Revolutionizing Digital Emotions

First Blockchain Render Protocol for Personalizable Content Marketplace  
Now, anyone can earn PEP by renting compute power even on a smart phone



ICO BY



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# Abstract

Mobigraph with its patented technology on personalized expression, is taking the whole world along in its journey to go beyond the current state of art emoticons and stickers. The vision is to make the world to express in a whole new way using real life (facial expression and body language) emotions in digital communication, thus allowing users to express using a vast set of expression which can be completely personalized and available to use in real time.

In this paper, Mobigraph proposes an open and decentralized eco system on Ethereum blockchain for personalized and self expressive content that fosters direct relationships between developers, creators, consumers and distributed render farmers with value shared among the participants. The purpose of this ecosystem is to create a digital economy for online personalized and self-expressive content creation, sharing and consumption instantaneously by scaling runtime render tasks on a distributed render network.

At the heart of this ecosystem is the Mobigraph token, **PEP** (Personalized Expressive Platform) token, whose fundamental value will be built by the offerings of the digital services in the PEP Network Ecosystem. PEP Token will be the first means of payment that attempts to enable consumers trade for personalized and self expressive goods or services provided by creators and developers which will have economic incentives to make great products.

Mobigraph's goal would be to make **PEP** token the de facto mean of payment for any and every personalized and self expressive content like Avatars, Animated Stickers/ Emoji, Geofilters, Lenses etc. on the blockchain platform. The ecosystem leverages blockchain technology to copyright, distribute, transfer ownership, transact content and remunerate render network participants.

The ecosystem boasts of a marketplace which enables direct trade between its participants. Content sold on marketplace are sold at creator/ owner's price without bearing any commision or hidden charges. For scalability of the platform, it also aims at a global consolidation of "Render Farmers" who are willing to participate in distributed runtime rendering by contributing their idle CPUs, GPUs on their local devices.

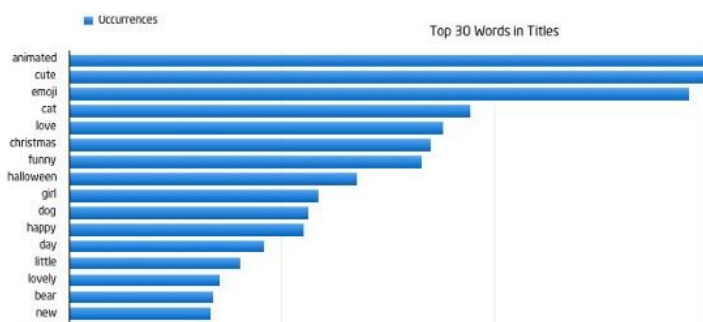
Mobigraph intends to bring all the content players (Messaging apps, Sticker platforms, Content creators, Ad Tech Units, Brands, App developers, Keyboard platforms, etc.), both existing and upcoming under one umbrella that corroborates personalization and self-expression commerce prioritizing consumer experience.

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# The Problem

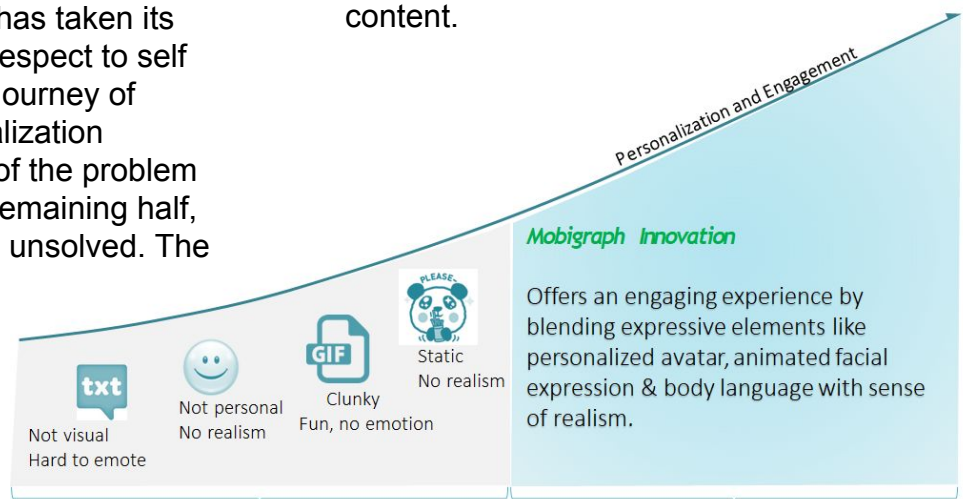
Smartphone users and brands are spending millions on emojis and stickers everyday in this multi billion dollar industry<sup>1</sup>. Emojis and stickers are getting outdated, boring & creatively limited. Avatars, Live Stickers, Camera AR Lens etc. are happening now as the need for expressive content is growing exponentially, but heavily lacks on personalization and engagement. Even though the stickers, emojis, GIFs tries to convey one's emotion, it is highly limiting when it comes to personalization and self expressions. Personalization encourages one's individuality to be released. Its content enriches conversations. This provides users with more compelling, shareable visual content that ultimately improves their experience.



"Animated" is the Most searched keywords in iMessage Sticker

By combining the power of animation and personalization, Mobigraph has taken its users one step further with respect to self expression. In this evolving journey of self-expression and personalization ,Mobigraph has solved half of the problem with its technology, but the remaining half, the market problem remains unsolved. The other half the problem is non-existence of unified marketplace for self-expression and personalized content.

The best form of emotional engagement happens in real face to face meeting, where the visual cues like facial expression and body language along with words, create a high level for emotional engagement. This higher emotional engagement happens because user is experiencing the way facial expression and body language via the animation. This is the reason why more and more users are looking for animated content.



All other social giants have their own closed sticker stores which limits the user choices and creators freedom. There are very few sticker platforms and they are heavily limited because they do not have the technology that will solve personalization and self expression problem. Also, these existing marketplace are designed for only one use case(messaging), whereas actually there are lot more use cases that involves content personalization and expressiveness. Mobigraph alone cannot address all the use cases without embracing all the stakeholders including developers, creators and consumers together through a connected system. Thus the need for an ecosystem arises and We, Mobigraph proposes an open and decentralized ecosystem for personalized and self expressive content that fosters direct relationships between developers, creators, consumers etc.

[1] <https://www.hivemindinc.com/category/millennial-marketing/>  
<https://digiday.com/marketing/digiday-guide-things-emoji/>  
<http://cyberfrogdesign.co.uk/emojis-are-changing-our-communication-with-customers/>  
<https://www.forbes.com/sites/vivianrosenthal/2016/08/19/why-emojis-and-stickers-are-big-business/#481149684965>

# Solution

PEP Network brings a new standard to this industry, transforms the existing business model to be more powerful, transparent and enables fast scalability across different markets. By combining of our innovation with power of Blockchain, AI and Distributed Rendering, PEP Network will bring the Creators, Consumers, Developers and Render Farmers together to revolutionize the Personalized Content Economy.

PEP Network offers visually rich, emotionally engaging and runtime personalizable content which pushes the industry forward to a new form of expressive content. With PEP Network, communications inside WhatsApp, Facebook, Telegram, SnapChat etc. can get more personalized, creative and fun. Designed for 3D experiences, PEP Network will bring new meaning to interactive Augmented and Virtual Reality experiences. For businesses and brands where emotional engagement matters the most, PEP Network content as Digital Ads, Branded Content & Mascots will drive high engagement and conversions in their marketing campaigns.

# Who are we?



mobigraph

We, Mobigraph Inc. a Silicon Valley company with [\\$1 Million](#) in funding with live products in market, some big partnerships and a granted patent on our technology. Mobigraph vision is to make Users & Brand Conversations Personal, Expressive & Playful. Founded by Ex-SAMSUNG experts in the graphic software and creative arts for the mobile and handheld device industry, with proven success stories in building graphics products for Samsung Galaxy Flagship Models. Creative team is lead by one of India's top 50 artists.

## Our Innovation

Mobigraph makes conversations between users & brands more personal, playful and expressive using hyper personalized emotions with Avatar Animojis, Animations & visual effects. With our patented technology innovation (US Patent US9706040), we are addressing key markets where Personalization and Engagement matters the most.

1. Apps like Messaging/ Keypad/ Social/ Dating can make their users more expressive with personalized emotions.
2. ChatBots - Today's most chatbots doesn't have a personality. We can bring that personality using our 3D avatar tech.
3. AR/ VR - We can bring 3D avatar holograms with personalized content in Augmented Reality (AR) and Virtual Reality (VR).
4. Brands can get closer to users with brand and user personalized content.



[US Patent granted #9706040](#)

## Our Key R&D

- Content Creation Pipeline
- Real Time 3D Rendering
- Selfie to 3D avatar
- AI based User Emotions
- AI based Face Detection



# Our Business

Our Products are live in market with active and loyal customer base. Our apps **QUGO** and **XPRESSO** has 650,000 + users and with 100,000 Monthly Active Users, 13% of users are already spending their PEP Network points to buy content and services. Our users spend 2,000,000 + minutes in a month with more than 12,000,000 GIF Impressions.

**Keyboard** - With **KIKA** Keyboard partner, more than 10 million GIF impressions were created in a month. **Touchpal** keyboard with 750 million users, will soon find XPRESSO inside their keyboard

**Snapchat partner**- **SwipeStudio** has powered up their business with XPRESSO for Augmented Reality Lenses & Video Ads

**AR Partner** - **4lio**, the world first Augmented Reality Contact App had brought awesomeness to their users with our innovation

**AD Tech** - Our refreshingly new AD units have already added immense conversion for brands like **Mudpipe**

# Partner Business

# Thriving Future

With Bitmoji avatar success, recent APPLE animoji announcement and AR revolution happening, the future is extremely promising for Mobigraph. We are already in active partnership discussion with Top Smartphone Manufacturer, Top Messaging Apps, Leading AD Tech & Chatbots companies.

# Accolades

Hot Innovative  
Startup 2018  
Paul & Writer



Best Enhanced  
Communication App  
2017

San Francisco  
Chronicle

BuzzFeedNEWS

YOUR STORY | INSPIRE  
INNOVATE  
IGNITE

THE ECONOMIC TIMES

BW DISRUPT  
ENTREPRENEURS' DISRUPT

indiatoday

ENTRACKR

NETTYFEED

Canaltech

THE TIMES OF INDIA

StreetInsider.com

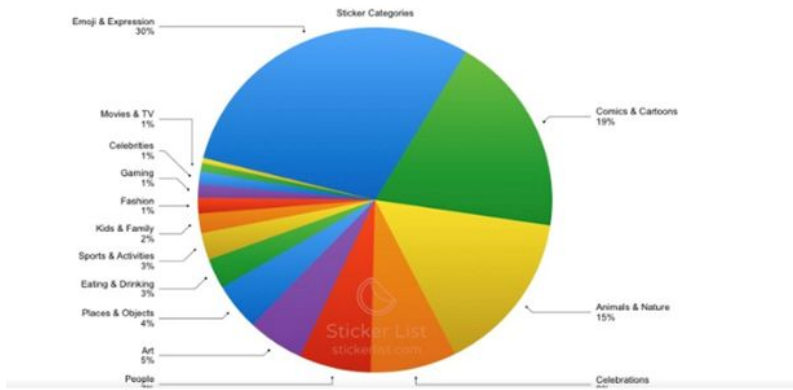
Startup  
Success Stories

KNOWSTARTUP  
INSPIRING STARTUPS IN INDIA

# Market overview

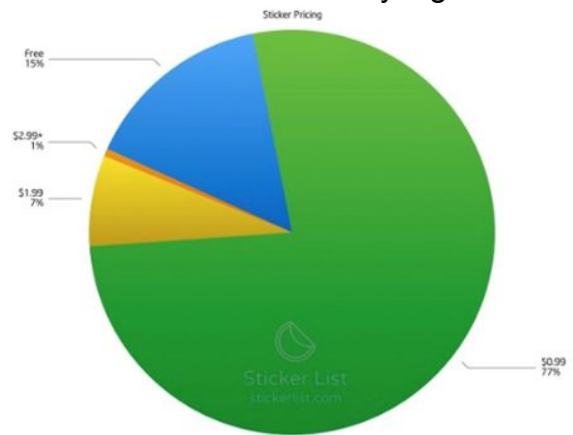
## Current Trends

From tattoo trends to personalized photo filters are indulgences for people for self expression and customization. Platforms have emerged in messaging and social media that intelligently integrates emoji, stickers, and GIFs to enrich conversations. These content are seen as monetization models for messaging and social media platforms. Line Apps \$240M sale from stickers and SnapChat and Bitmoji acquisition for \$100M established the market potential for this kind of content. Leading brands also pour in their money for Branded stickers to be used inside social media. According to this [article](#) stickers are worth \$10Billion and if we include all top messaging and social media giants, we believe this market is worth more than \$10 Billion Dollars.





Emoji & Sticker Category Distribution inside iMessage

Today most popular content are emojis, stickers, avatars, filters and lenses. Users spend to buy these virtual assets for their daily digital life.



Cost of Emoji/Sticker Pricing inside iMessage

## Market Trends by 2021

 <p><b>Messaging</b></p> <p>\$250 Billion 2021</p> <p>Source: Statista</p>	<p><b>Ads</b> Banner Ads &amp; Video Content Marketing</p> <p>\$30 Billion 2021</p> <p>Source: Polar, Ironpaper</p>	<p><b>Chat Bots</b></p> <p>\$3 Billion 2021</p> <p>Source: Markets&amp; Markets</p>	<p><b>AR/VR</b></p>  <p>\$165 Billion 2021</p> <p>Source: Ama- Atlanta Digi Capital</p>
<p><b>Merchandise</b> (Personalized Merchandise)</p> <p>\$31 Billion 2021</p> <p>Source: Business Wire</p>			

Personalized Merchandise market is underserved with no technology innovation and this is expected to be [\\$31 billion by 2021](#).

There will be [6 Billion users by 2020](#) using Messaging, Keyboards, Camera apps where expressiveness is a key user need and its expected to be [\\$250 billion dollars](#).

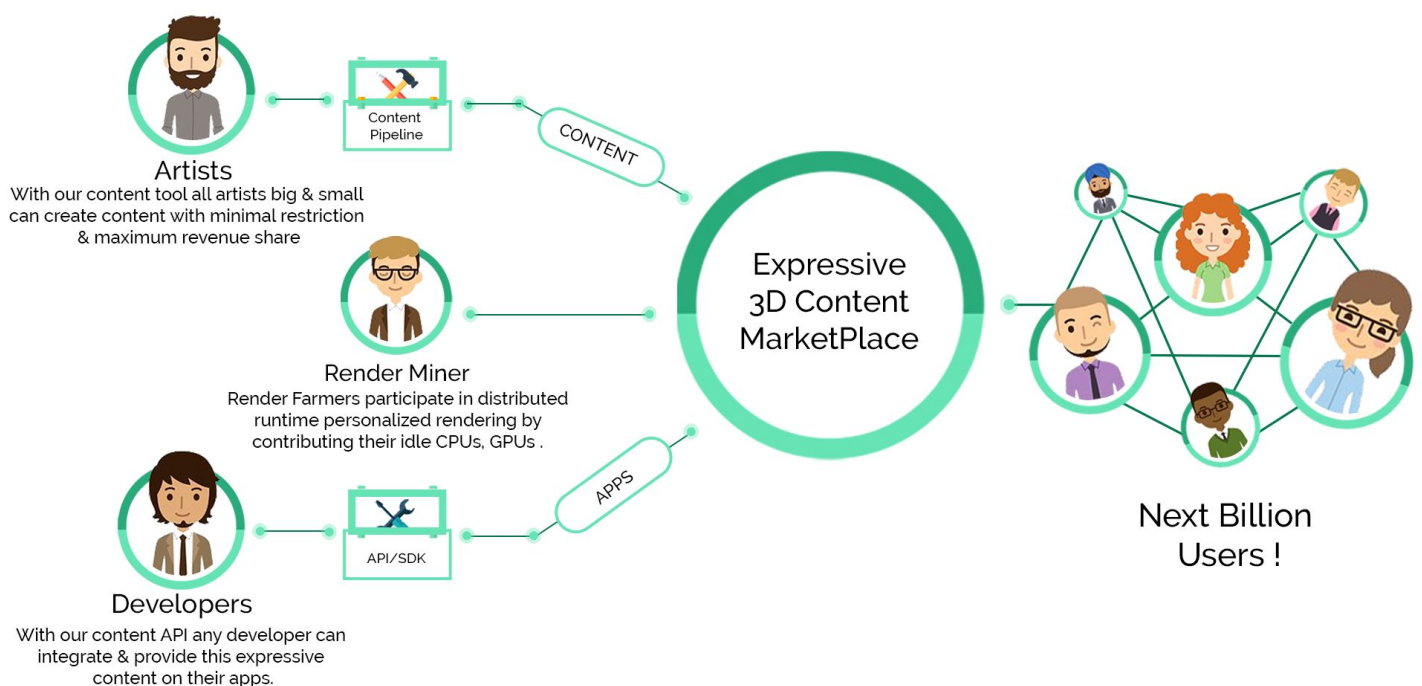
With invent of Camera as a tool for expressiveness, AR will revolutionize the self expression content going beyond AR Lenses. The global AR market will be worth more than \$165 billion by [2024](#). Roughly 15% of revenue from Social Media & In App purchases. As chatbots are figuring out their adoption model for business and users, the problems of engagement and personality remained to un solved [Chatbot market size](#) is estimated to grow to \$3 billion by 2021. As digital ad marketing ROI is slowing down, there is a need for new way to convey the brand value and message. [Banner Ads market size is \\$30 billion](#) and content based marketing has shown some promises for better conversion.

# PEP Network Ecosystem

The first decentralized ecosystem for personalized expressive content trading on distributed rendering network. A community friendly and trustless personalized content exchange among participants achieved by blockchain technology, which allows

- Content ownership and copyright to creators
- Runtime personalization of content by consumers
- Facilitates custom apps to integrate and access content marketplace for developers
- Distributed rendering capability utilizing idle CPUs and GPUs for Render Farmers thereby ensuring fair allocation of remuneration for all participants.

PEP Network ecosystem offers a decentralized marketplace for personalized and self expressive content. It will be one stop market for all self expressive and personalized content needs for the consumers and brands. It fosters direct economic relationships between developers, creators, consumers and Render Farmers with value shared among the participants.



The purpose of PEP Network ecosystem is to facilitate participants to create, copyright, manage and distribute personalized self expressive content. Participants use the services/ tools provided by this ecosystem to express themselves and also to create personalized content. To do so, they need to subscribe to use services and the payment for the same would using **PEP** token.

## 1. Content Creators

An individual artist, art studio, brands who would create customizable content using the Studios (Content/ Bot/ Ad). The creators can then sell the rights for the customizable content usage or even transfer the ownership of the customizable content for content trade.

## 2. Developers

App developers or partners who use API/ SDK inside their apps (AR/ VR/ Messaging, Keyboard , etc.) to get customizable content created by Content Creators. These are then passed on to the users of the Apps.

## 3. Content Consumers

These are the users of the PEP Network ecosystem consume the various types of customizable content that are generated within the ecosystem. The consumers can personalize the customizable content at runtime and share the personalized content to other social media apps etc.

## 4. Render Farmers

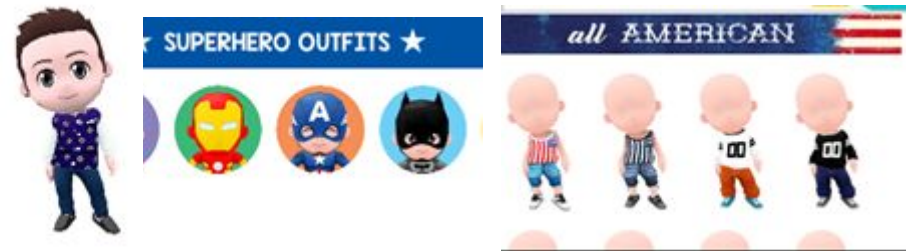
Any devices that has idle CPUs and GPUs and internet connection can participate in the ecosystem to render consumer personalized content at runtime. These participants are Render Farmers on the ecosystem. Every Render Farmer is rewarded based on the “Proof of Rendering”. The reward would be based on the complexity and the time taken of the render job.

# PEP Network Content

PEP Network content is a completely personalizable and expressive content designed for optimal performance on any mobile device. Real time personalisation by user is allowed on many attributes including but not limited to character, accessories, text (in any language), themes and audio. These properties of content make it suitable for use in any form of digital communication.

## Character Outfits & Accessories

Personalizable accessories like tops, bottoms, shoes, special outfits, coolers, hairstyles, etc.



## Animated Stickers

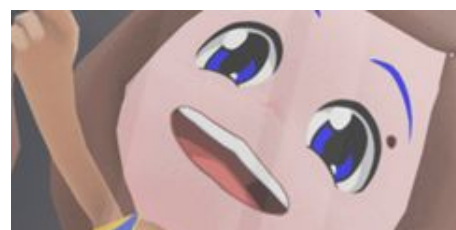
Animated and personalizable stickers and sticker packs



Lenses - Camera



World Filters



Mascot for brands, business, celebrities



Ad Unit - PEP Network content as a refreshing engaging AD for brands, business and celebrities

# PEP Network Services

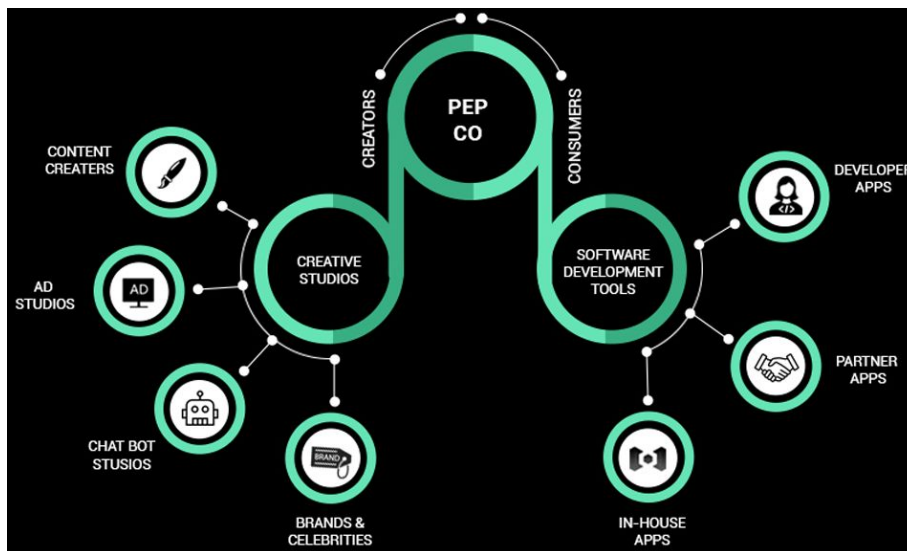
PEP Network services provide the tools to create, consume, distribute and runtime render customizable content. These services will be used by the participants of the PEP Network ecosystem.

## Content Creator Services

- Content Studios: Provides the full set of tool chain to create personalized content. This includes tools, pre designed assets and 3D content pipeline designed for faster creation and deployment of animations, outfits, geo/world filters, etc.
- Ad Studio & Bot Studio: AD agencies & businesses, will use Ad Studio, Bot Studio to create ADs & Bots. These Studios come with set of creation tools, pre designed assets, navigation flows, deployment tools which will enable easy creation and deployment Ads and Bots.

## Content Consuming Services

- SDK: SDK/ API enables developers and partners access PEP Network content and runtime personalisation ability. Using the SDK, developers and partners can create their own Apps or integrate PEP Network content into existing apps. The possibilities are limitless for SDK integration. Few examples of SDK usage are:
  - 1) Keyboard partners integrating PEP Network content into proprietary keyboards
  - 2) AR based apps, storytelling apps, video apps
  - 3) Messaging apps integrating PEP Network content for user engagement



## Content Rendering Service

- Render Client : Provides an installer, which upon installation adds the device as a render client to the farm of renderers.
- Render Controller Module : Acts as a registry for render farmers and their render clients. Further, it controls the distribution and allocation of render jobs. Render jobs are allocated based on availability of processing power, number of tokens pledged, render success rating of that render client.

# Why Blockchain?

We have been searching for a sustainable monetization model that does not compromise user experience, ownership, security and privacy. With advent of blockchain, it makes more sense for us to move towards crypto economy where the monetization can happen without compromising the privacy, ownership, security and user experience.

## Copyright Protection

The Ecosystem should ensure that the content creator copyrights are respected. For this purpose all content transaction details including copyrights for content would be recorded on blockchain as its immutable.

As part of copyright assurance to the creator, each content uploaded would be assigned a unique identifier (UID) based on crc and hash value. Along with the unique identifier, content creator details would also be recorded on the blockchain. A smart contract would be executed to submit the details on the blockchain. The ecosystem ensures that the content belonging to its author/creator would not be transacted by any other person and that copyright infringement is blocked. All payment transactions that happen on the unique identifier is guaranteed to be propagated to the appropriate author of the content. During any transaction of content exchange or content upload, the ecosystem verifies the copyrights to prevent misuse of content. For each transaction, verification happens in which the seller is checked against the UID to ensure that improper sale does not happen.

Content Authorship	Content Listing	Content transaction
UID	UID	UID
author	author	transaction ID
owner	owner	buyer
category	time	seller
time	expiration	amount
	price	time
	listing ID	type
	Listing type	Usage duration

## Fast global transactions

All the contents are sold at owners price and the transaction takes place between the seller and buyer without any other hidden costs other than gas charges for recording transaction on blockchain. Blockchain ensures secure, fast and transparent transactions all around the world. The Owner receives the payments for every transaction.

## Distributed Render Protocol

A distributed rendering model is compelling because anybody can participate in the ecosystem for contribution and remuneration. Breaking up complex rendering jobs into smaller tasks and distributing them over the network would definitely fasten the availability of rendered content for the end consumer. This model is also compelling for the reason that millions of users have devices which have CPUs/ GPUs that are idle for significant duration of time every day. To perform the rendering tasks these users aka. Render Farmers would gain sufficient monetary benefits as PEP tokens. Anybody who wants to be Render Farmer should download and install the Render Client from the ecosystem on their preferred device. The Render client would check for the minimum capabilities of the device to participate for rendering tasks and create an account on the ecosystem to participate in the rendering tasks. The accounts would be linked to the blockchain through Smart contracts and unique wallets.

## Proof of commitment

In order to perform certain actions on the ecosystem like rendering, initiating or participating in Content creation bidding process, participants should pledge ("Stake") PEP tokens prior to performing the actions. The amount of the PEP tokens to pledge would depend on the task, reputation of the participant etc. The pledged tokens are the assurance the participant offers in case the outcome of the action undertaken by them is not met as committed. The stake is returned to the participant once the actions are performed successfully, else the participant could be penalized by transferring the stake to the affected participant or to the ecosystem as in case of Proof of Render. The performed task and its outcome will reflect the reputation of the participant which are recorded on the blockchain. The amount of pledged tokens would be a factor of the initial bid price. The pledged tokens would be returned in either of the two cases -

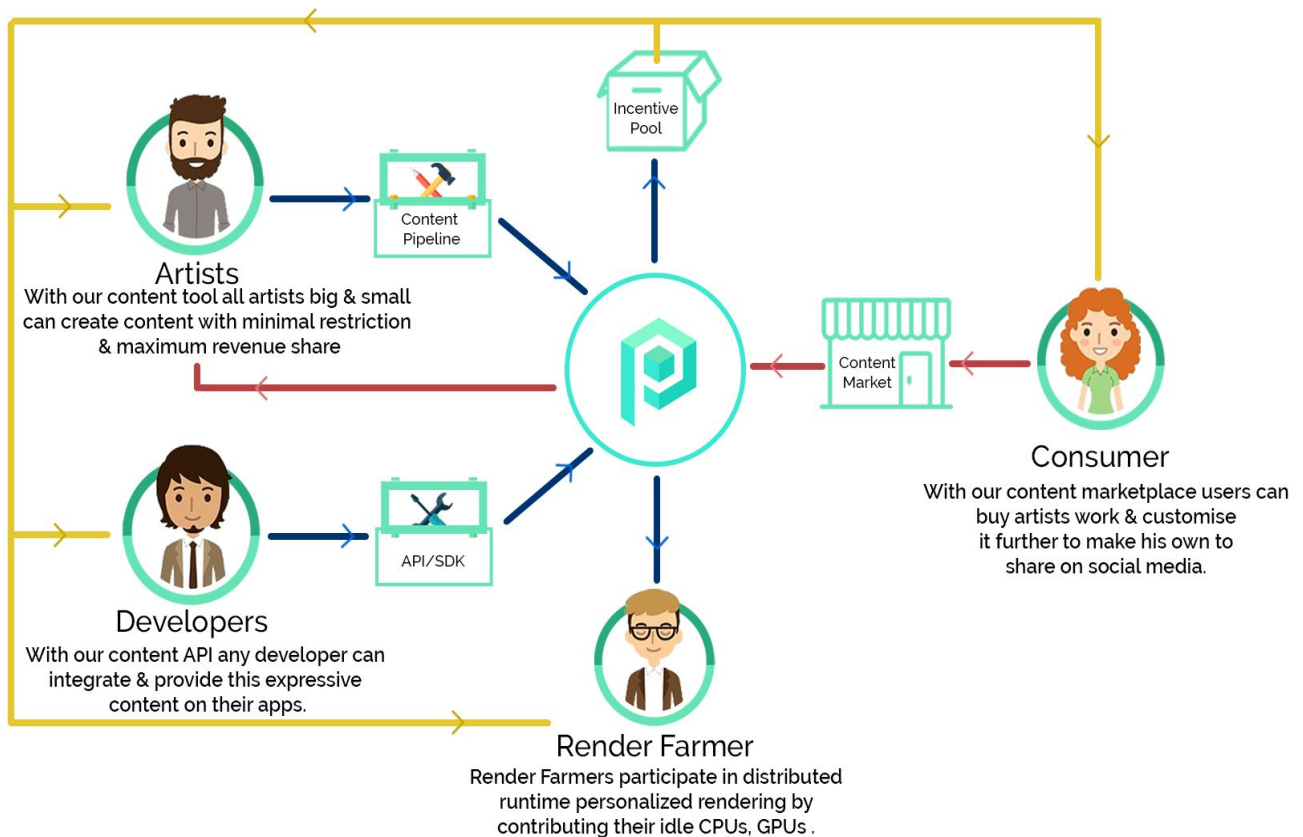
- 1) Unsuccessful bid
- 2) Completion of the task to the satisfaction of the bid initiator



# PEP Token

PEP Network introduces a self sustaining and lucrative economic model to trade customizable content. A new cryptocurrency “PEP Tokens” at the core of this distributed digital economy is designed to drive the value exchange across the ecosystem.

PEP tokens are new way to earn and spend based on personalizable and self expressive content. PEP tokens can be earned and spent by all the participants of ecosystem. PEP tokens hold value across all the digital services within the ecosystem thus enhancing the economic possibilities for a real-world value.



## Token Utility

PEP Token is a utility token which offers access to PEP Network content and services. With PEP Network content and services participants can create, curate, trade, distribute content across the ecosystem. Some of the PEP token uses in the ecosystem are as follows:

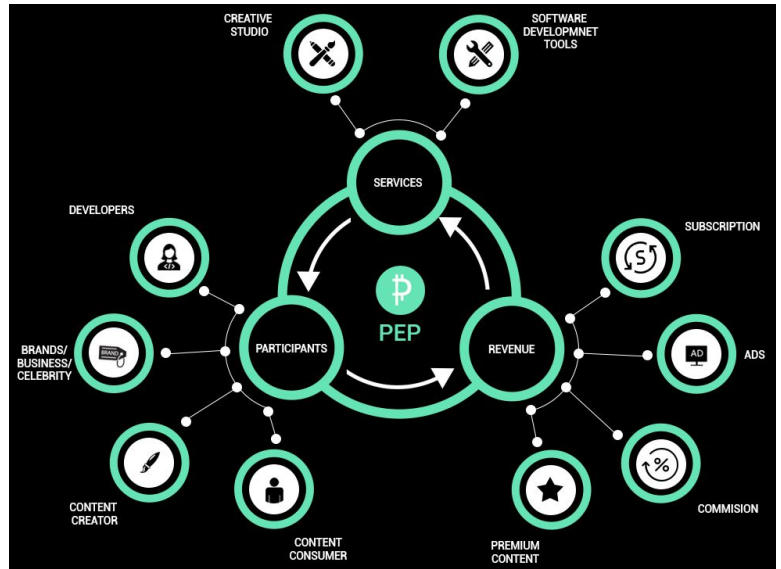
1. Create copyrighted customizable content using Studios by subscription
2. Develop apps (AR/ VR/ Keyboard/ Social media/ Games) which can access content marketplace using API/ SDK upon subscription

3. Sell customizable/ customized content usage rights to consumers
  - a. Rights to consumers could be unlimited/ time bound usage, non exclusive/ exclusive etc.
  - b. The price for the content sale is solely determined by the creator and the payment is recorded on blockchain
4. Transfer the ownership of content to another participant. This means all rights on the content is transferred and the buyer owns all the rights of the content. The price for the content ownership is solely determined by the owner and the payment is recorded on blockchain
5. Content creation auction (initiate)
  - a. Creators can participate in bidding to create specific contents. In this case the content will be owned by the initiator of the bid and not by the creator
6. Content sale auction
  - a. Content owners can initiate a content sale bidding for contents owned by them. Copyright would be transferred to the successful bidder
7. Participate in rendering/ transcoding personalized content to create shareable formats like Gifs/ Mp4/ Jpeg
8. Purchase usage rights for customizable content
9. Personalize and share customizable content on possessing content rights

# Business Model

PEP Network business model revolves around the 3 main entities, namely Services, Participants and Revenue. Mobigraph will invest in and building tools, services and most importantly a thriving community.

This will enable a flourishing ecosystem leading to an exponential growth in content creation & consumption. More content and innovative apps around the content will lead to greater revenue. Revenue generated by the ecosystem would be reinvested for building more services enabling new use cases for content trade. This interdependent cycle of reinvesting the revenue made via the ecosystem for the development of the ecosystem ensures profitability for all participants and expansion of PEP Network. Participants will also be incentivised for their contribution to the ecosystem.



## Revenue Model

Mobigraph will generate revenue through the following revenue streams

1. Revenue from sale of content created by Mobigraph
2. Revenue from subscription
  - o Content Studio usage by content creators
  - o API/ SDK is a tier based for developers, more the usage less the subscription fee
1. Revenue from Ads and Marketing Campaign
2. Listing Fees - Listing of content on Market place attracts a one time listing fee. The fees varies based on the duration of listing, listing priority, number of contents to be listed, type of content (animation, AR filter, Ad format, etc.) and the mode of sale (exclusive, license rights etc.)

The below table summarizes the PEP token flow (spend/ earn/ pledge) amongst participants and ecosystem

	Spend				Earn					Pledge	
	Subscription Fees	Listing Fees	Buying content	Content Bid	Incentive	Render Fees	Content Sale	Content Bid	Consume Ads	Content Bid	Proof of Render
Content Creator	✓ ( Content Studio )	✓	✓	X	✓	X	✓	✓	X	✓	X
Developer	✓ ( API / SDK )	X	X	X	✓	X	X	X	X	X	X
Render Farmer	X	X	X	X	✓	✓	X	X	X	X	✓
Content Consumer	X	X	✓	✓	✓	X	✓	✓	✓	✓	X

# Ecosystem Growth

We have multiple growth strategy to acquire users for **PEP Network**.

- 1) Mobigraph Apps
- 2) Partnerships
- 3) Developer Apps

## Mobigraph Apps

Currently our existing apps XPRESSO, QUGO, Chrome Plugin and Social Media Community has total of 750K+ users and we have 150K MAU. We will bring all these users into **PEP NETWORK** with our app upgrades. From day one, the token will be used in our existing community.

As we continue to market and acquire millions of users, they will buy the token for its utility inside the apps. To fuel faster growth of our apps, we will be partnering with OEMs and other app distribution partners. We already have partnered with Huawei App Store, where XPRESSO app has been selected as a premium app and it qualifies for free promotion among its 30 million user base. We will work towards more distribution partners, that would get us exponential growth.

We anticipate the PEP NETWORK usage to grow from 5x to 10x a year from 2018 to 2022. This ecosystem has all great potential to reach 1 Billion Users by 2022.

## Partnerships

We have signed up few partners already for our current business and we will strive to bring the their users to the ecosystem with partner rewards and incentive system. Following are the existing partners of our business

### 1. Apps - Keypad, Messaging, Camera etc.

**Current Partners:** TouchPal Keypad (700 million users)

**Ongoing-** Top Keyboard Companies,  
Top Messaging Companies, Top Internet Company,  
Top GIF companies

### 2. Augmented Reality Apps

**Current Partner:**

4lio- World's First AR Contact app  
SwipeStudio- No 1 SnapChat Geofilter Maker

**Ongoing-** Top Indian Messaging App

### 3. ChatBot companies

**Current Partner:** Machaao - Sports Prediction Bot with 100K Daily Active Users

**Ongoing-** Story telling Bot, Healthcare Bot and more to come

### 4. Ad tech companies and Ad agencies

**Current Partner:** SwipeStudio (SnapChat Video Ads)

**Ongoing-** Top Mobile Ad Network, Top European Native Ad Agency, Top Social Media Agency and more

## Future Partnerships

Smartphone market is dominated by Top players like Samsung, Apple, Huawei, Lenovo etc. are looking for innovative expressive technology. Top messaging apps like Messenger, Whatsapp, KIK, Line, KakaoTalk, Hike are looking for new ways to make their users to express. Top keyboard companies like TouchPal, KIKa, SwiftKey etc. are actively looking at new creative and fun tech to boost their engagement.

We have already invested time in building relationships with few of the above said companies and active discussions are on towards partnerships. Partnership deals will bring enormous users to the ecosystem and thereby increasing the utility demand of the PEP token.

## Developer Apps

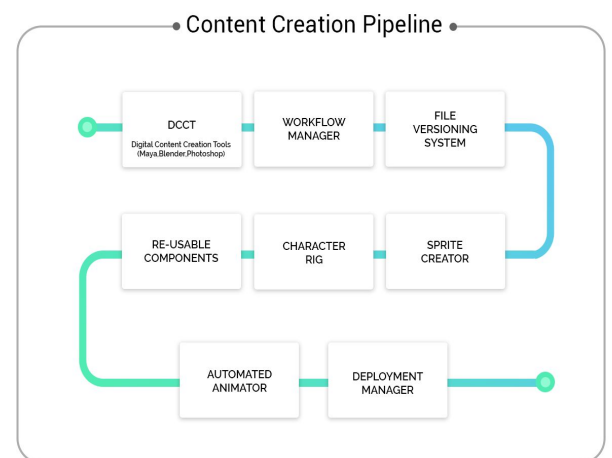
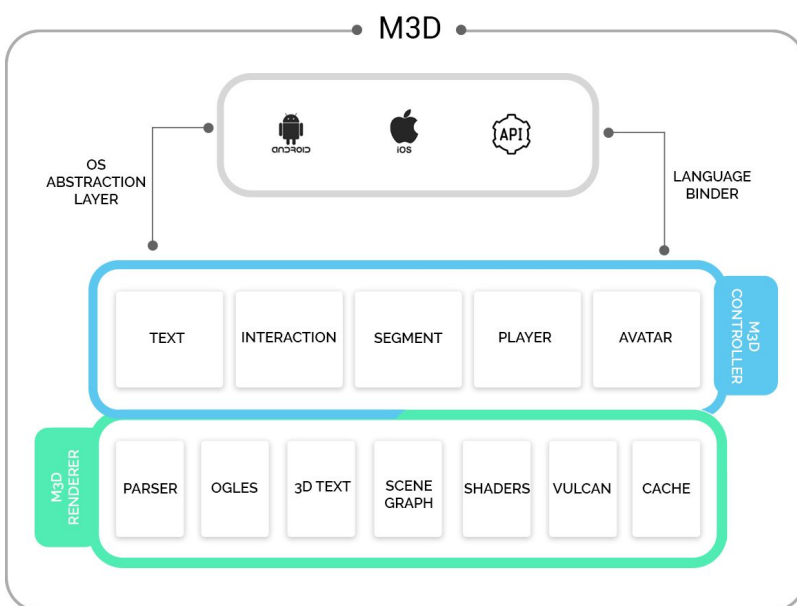
Along with partnerships with big businesses we have very simple REST API based interface that can be used by any indie developer. They can use the expression API to create new apps/experiences or uplift the engagement of their existing apps. Later in the whitepaper we will explain how we design the blockchain protocol which will help to keep the cost of these API at a minimum.

# Technical Architecture

PEP Network introduces first of its kind completely customizable content. Powering this is Mobigraph's own 3D rendering engine(M3D), a C++ based platform agnostic rendering engine which supports popular desktop, mobile & cloud operating systems. With its performance first architecture, it can render at 60 FPS even on entry level android devices. M3D is integrated to content creation tool and the rendering API/ SDK making it one of the core technologies of PEP Network.

PEP Network content tools are plugins that can be added to any popular DCCT (Digital content creation tool) like Maya. The plugins accomplish 2 tasks. They provide structured (stage wise task distribution) and quick (many reusable components) procedure to create content. Secondly, they integrate in the backend with M3D. Once the artist finishes content creation using content studio, the content is automatically converted into .mobi format, which is a lightweight, modularized, binary format. Animated content is created using Skeletal & Facial animation techniques. Avatars & accessories are modelled as 3D meshes which are collection of 3D vertices (x,y,z) and bones which dictate how the vertices moves. Like a typical skeletal animation, PEP Network animation moves the bones thereby displacing the vertices to cause motion. Facial expressions are brought through fluid sprite sheets. Designing the animations & avatar on popular DCCT in full 3D gives the content the ability to be completely customized on the runtime. For example user can create an avatar by choosing different 3D accessories (ex. shirts, pants, shoes, hair etc.) which get attached onto the base bone structure to give the complete customized look. The content tools further allow the artist to upload his art to the content store where he can choose to list them for desired price.

PEP Network rendering API/SDK are wrappers around M3D rendering & customization features. Once the user buys the content, he can using M3D's features customize the content in many different ways. M3D understands all customizations and renders the content and exports in the desired format. From a birds eye view M3D is composed of the following components mobi parser, animation player, avatar manager, text renderer, 3D renderer & encoder modules.



# Blockchain based render protocol

PEP Network introduces a new blockchain based protocol which will allow anyone to lease their excess compute/render power in exchange of PEP Tokens for personalizing digital emotions.

## Why is this new blockchain protocol so important for PEP Network ?

PEP Network introduces content that can be runtime personalized by user by creating their own 3D avatar , adding custom text in any language and by choosing themes and styles. These customization of content needs to be rendered into a formats like GIF/Mp4 that can be shared across any social medium. This real time rendering at scale is currently made possible by hosting Mobigraph's M3D rendering engine on the centralized compute providers like AWS.

PEP Network exposes a set of APIs that developers can use to create new or add to their existing apps or businesses. To allow for large scale adoption these API's are charged at a very nominal price in PEP Tokens. As scale increases and because of higher operating expenses due to centralized cloud providers the API cost can increase and make it economically not viable for many developers & businesses. This economic viability can hamper the growth of the Network. Further centralized software is prone to known attacks like DDoS making PEP Network unable to process any customization for the duration of the attack.

To mitigate this problem we are introducing a new blockchain based distributed rendering protocol, where the render needs of the PEP Network are served not only by any centralized cloud compute provider but by anyone that has excess computing power. Any individual that has compute power to spare can install an executable or app , that leases this excess power to the PEP Network rendering needs. Any nodes that successfully completes rendering tasks for PEP Network is remunerated by PEP Tokens. Because no one is hosting a dedicated machine and just giving away what is excess, the cost of rendering at scale will be much cheaper. This cost benefit will be passed to the developer via cheaper API.

Blockchain technology allows us to implement this distributed rendering protocol in a streamlined fashion. All rendering activities are recorded initially off chain and eventually on the blockchain as proof of render. All token pledges are locked in smart contracts and the render reward payouts are recorded in blockchain as well - This ensures trustless value transfer between PEP Network & the render farmer.

## Who can be a render farmer ?

Anyone with any computing power to spare can be a render farmer. Even a person with a high end smartphone and a strong bandwidth can be a successful render farmer.

PEP Network is the first project which allows smartphone users to be remunerated by leasing their excess compute power. This is possible due the M3D rendering engine.

M3D Rendering engine's following properties make it possible to be hosted even on a smartphone

1> Lightweight : size of the main executable is around 1 MB

2> Fast : renders at 60 FPS on a smartphone, has capability to render at higher speeds on workstations and servers.

3> Energy efficient : rendering for one hour with M3D is equivalent to watching a video for one hour on a smartphone.

## How does the protocol work?

### Joining the Render Farm

The proposed protocol allows anyone to join the PEP Network ecosystem with their own computing devices. Registration can be done in the PEP network portal. Along with registration, PEP Tokens have to be pledged. Post registration, the Rendering Client software appropriate for an OS can be downloaded and installed on a device. The Rendering Client software can be configured with parameters ( like how much power to share, run only when idle etc). Render farmer can provide any number of devices. Each Rendering client joining the network needs to have an share of PEP tokens available out of the total pledged tokens.

The Rendering Client software does the basic requirements check (like minimum CPU clock speed, GPU with driver support, quota of tokens pledged etc.) before allowing the computing device to join the network. Any failure in the requirements check prevents the client from joining the network.

### Scheduling render tasks

The render tasks of the PEP Network are scheduled by the Render Job Scheduler(RJS). The scheduler uses the following parameters to decide which RC to give this job.

a> Processing power of the RC (RC with higher processing power has higher chance of getting the task)

b> Amount of pledge tokens placed by the RC towards successful completion on the task.

c> Reputation of RC determined by its successful rendering ratio(RC with higher success ratio has higher chance of getting the task)

d> Time since the RC was disconnected from the network(if a RC is connected to PEP Network for longer has ratio has higher chance of getting the task)

e> Time since last task was scheduled(RC that is idle for the longest period has higher chance of getting the task)

f> Initially RJS considers any newly joined Rendering Client ( RC ) as reliable and assigns jobs as other factors will not be available.

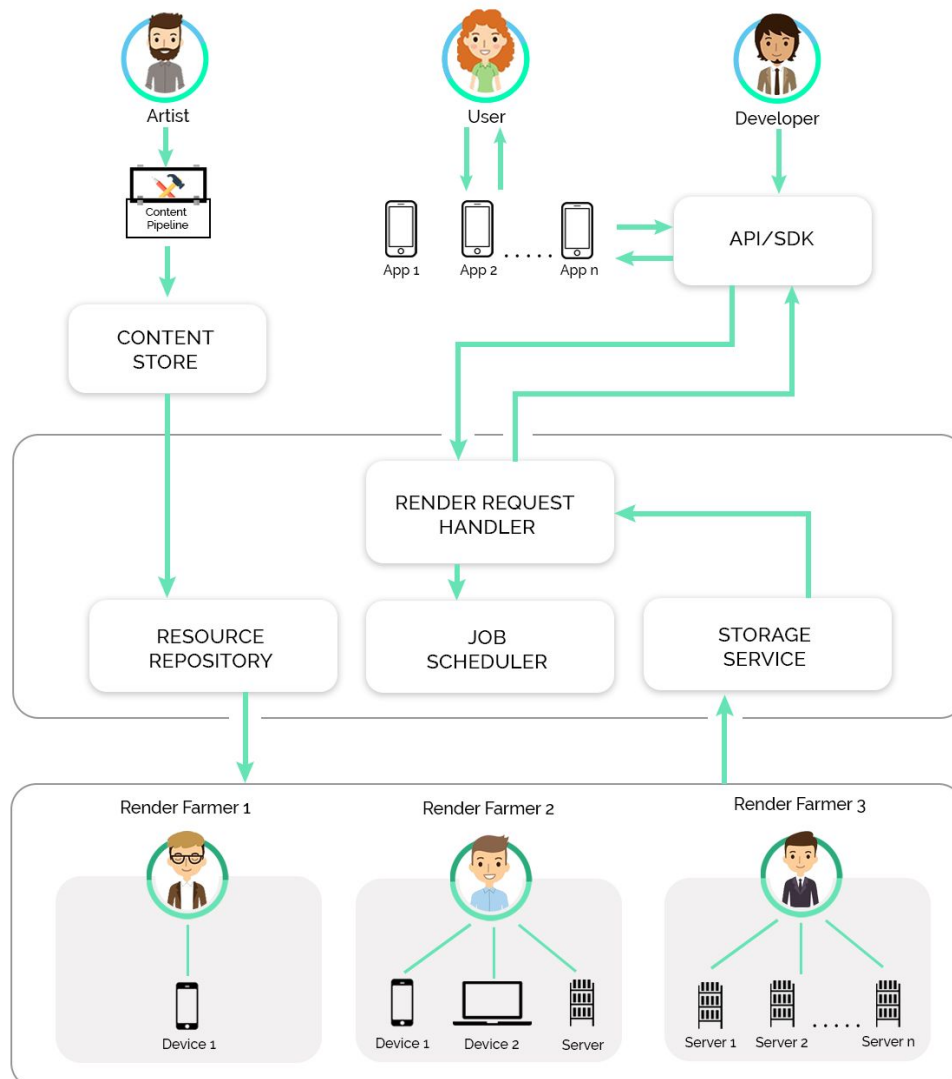


## Processing render task

The Rendering Job Scheduler allows an Rendering Client to process jobs only upon pledging tokens. The rendered artefact is uploaded to the Render Storage Service ( RSS) upon completion of an rendering job by the M3D module. RSS validates the uploaded artefact . On successful validation, the render work is recorded possibly in an off chain network. The render reward is accruable to the render farmer ( Recorded on on-chain ) to avoid micro payments on blockchain. There are 2 cases in which a task is deemed unsuccessful.

1> Time Exceeded : Once the RC starts processing the task , the RJS runs a timer for a stipulated time. This time is heuristically computed based on the RC's class of computing power and task complexity.If the task completion notification is not reached within the stipulated time , the task is considered to be a failure.

2> Corrupted Artefact : If the completed artefact fails validation the render task is deemed as failed. On failure , the render work status is updated possibly in an off chain network. This task is rescheduled with another RC. As a penalty for accepting and failing to render the render farmer pledge token are claimed by the PEP Network.



## Future plans

As the number of RC's provided by render farmers increases, We can move into an P2P ( Peer to Peer ) decentralized model as we can take advantage of the increased bandwidth and storage - for example - leveraging swarm or IPFS based networks. This also allows us to move out of the centralized scheduling model and instead allows an rendering job to be sent to an Rendering Client which can be discovered ( based on latency etc). This can make the network more resilient compared to the vulnerabilities faced with an centralized model. The rendering client can be made more autonomous.

## Why Pledge

The pledge of token works as an economic deterrent for rogue render farmers to enter the render farm. To reduce the burden on a new render farmer some leeway will be created where initial few render tasks can be done with no pledge of tokens.

## Economic Viability

The major cost for leasing a computing device for rendering is the cost of electricity.  
At the time of creating this document, cost of running a workstation is computed as follows

Cost of electricity in the US : 1000 KWH/hr = \$0.12

Average electricity consumption of a workstation : 150 watts

Average cost of running the workstation for 1 hr = \$0.018

Number of tasks such a workstation can complete in a min = 5

Current reward for 1000 such tasks = 1 cent

Number of tasks completed in an hour = 18000

Earning in one hour = 18 cents per hour

Even considering that in the worst case the schedule rate is 10% of the total render capacity, it will still be economically viable for the render farmer. As the network grows in user base it will result in more customization request traffic making it lucrative for more and more individuals to join as render farmers.

The above calculations are done just to show the possibility of economic viability and in no way present any guarantee for such rewards. The protocol and its implementation are subject to change without further notice based on market conditions and technical feasibility.

# Token Details

## Token Allocation Summary

In the **PEP** Network Smart contract Token generation, 600,000,000 **PEP** tokens will be created. 50% of the **PEP** tokens created will be sold to Public, and 5% reserved for Bonuses. The rest will be allocated for Reward & Incentives, Team and Future stakeholders. The contributions would be terminated upon achieving the Hard Cap or Sale tier end date is reached, whichever comes first.

- All the unsold tokens of the ICO token sales including bonuses would be transferred to Reward and Incentive Pool and locked in for a period of 6 months
- The PEP tokens allocated to the team would be locked in a smart contract for a 24 month vesting schedule with 6 months cliff

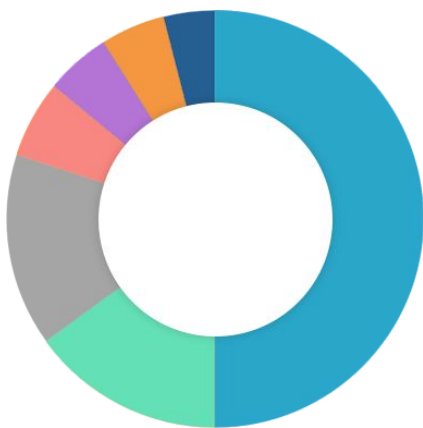
## Token Allocation

1. Hard Cap : \$30 million
2. Payment Methods : BTC, ETH
3. Total **PEP Tokens** : 600,000,000
4. **PEP Tokens** for Sale : 50%

## Token Sale Details

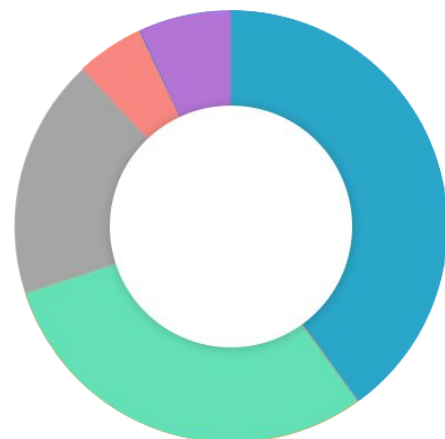
Whitelist PreSale	:	15th May 2018	to	17th May 2018
Public sale	:	30th May 2018	to	30th June 2018

## Token Allocation



- 50% Pre & Public Sales
- 15% Platform Rewards & Incentives
- 15% Team
- 6% ICO Expenses
- 5% Bonuses
- 5% Reserved
- 4% Future Stakeholders and Advisors

## Fund Allocation



- 40% R&D, Achieving Roadmap milestones
- 30% Marketing & PR
- 18% Operational Expenses
- 5% Legal, Tex & misc
- 7% Reserves for Future use

## Token Pricing

1 PEP Token = 0.1 USD

\*

## Token Distribution

PEP tokens will be distributed 14 days after Public Sale ends, provided that this term may be extended due to unforeseen circumstances. Payment method will be in Bitcoin or Ethereum or other currency (cryptocurrency) as may be additionally introduced by the Mobigraph. Mobigraph intended to use funds received during token sale for further development of the project, payment of salaries and future expenses. This will help accelerate development and also enable the team to work full time with total commitment.

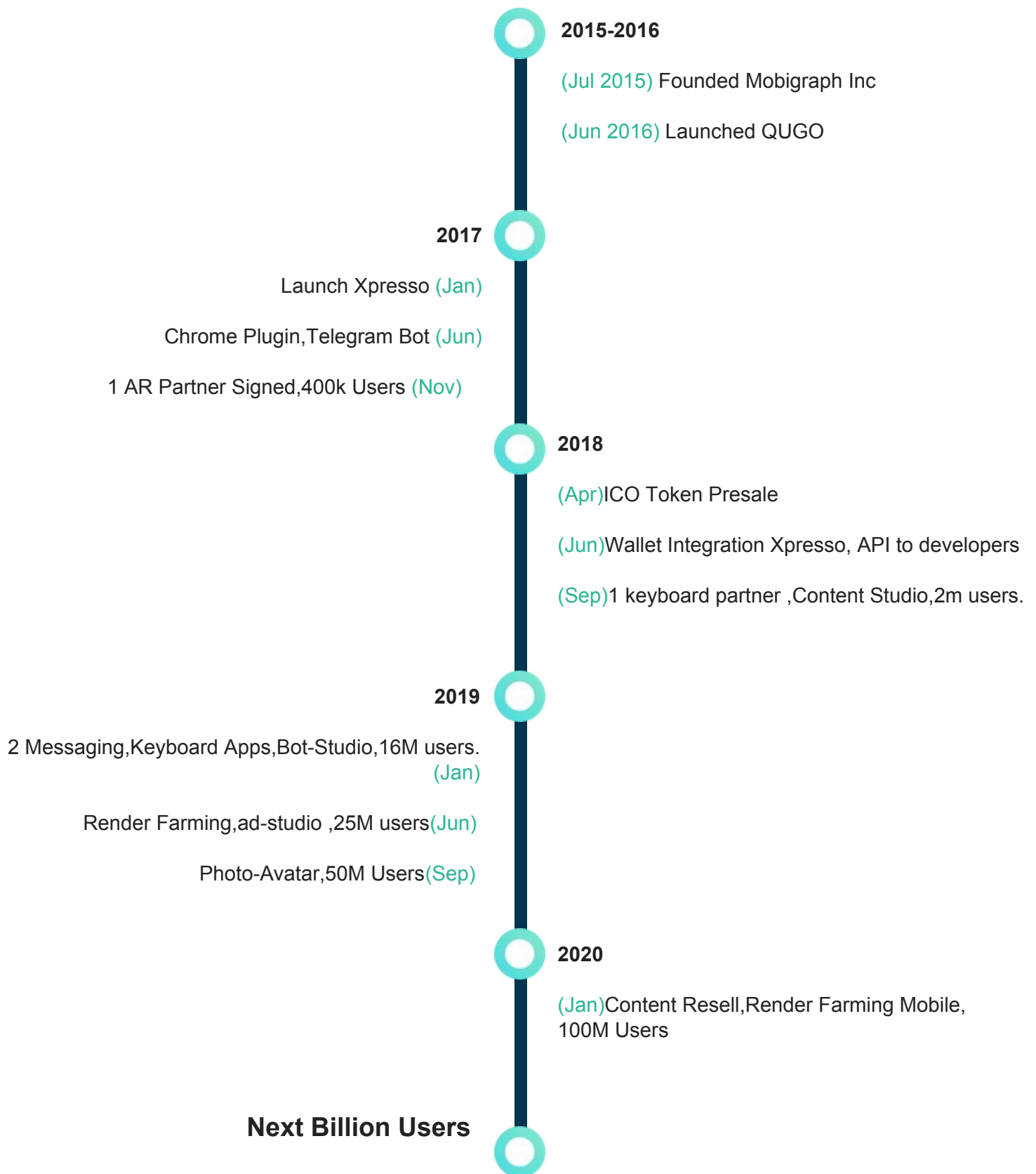
## Token usage upon sale completion

The PEP token may be used once all purchased PEP tokens will be distributed to purchasers. Also, holders of PEP tokens are free to sell their tokens to users who need those for customizable animation download from our Apps

Mobigraph's Xpresso app would be the first service to join the ecosystem

- Xpresso users would spend PEP tokens to download customizable content and can earn PEP tokens by watching Ads inside Xpresso
- API will be made public and developers will be able to use it by subscription for App integration

# Roadmap



# Team



**Udayakumar Kadirvel**  
CEO & Co-Founder

Innovator with 2 Patents | 18+ Years Experience in Product & Business Leadership | Head of Graphics at Samsung | Key Contributions towards Samsung's Mobile growth to World No 1 | Bachelor of Computer Science | Product Guy



**Siddhartha Vinnakote**  
CTO & Co-Founder

Patent Owner | 12+ Years Experience in Technical Leadership | Chief Engineer at Samsung | Software shipped in Billion phones | Mobile & 3D Graphics Expert | Masters of Technology from IIT | Tech Geek



**Sujith kumar C R**  
Chief Strategist & Co-Founder

Patent Owner | 19+ Years experience in Product leadership | Senior Chief Architect at Samsung | Key Products shipped in Billion phones | Expert in Solution Architects, Computer Vision, Imaging & Rendering | Bachelor of Computer Science



**Subrhmnyam A S**  
CPO & Co-Founder

Patent Owner | 13+ Years experience in Product leadership | Principal Architect at Samsung | Key Products shipped in Billion phones | Technologist & Expert in Mobile Stack | Bachelor of Information Technology | Product Geek



**Govind Malehithlu**  
COO & CBDO

Advisor at Boon Tech | 22 Years of Experience in Sales & Business Development | Director of Sales at ALTEN Calsoft | Over \$50million Revenue Generation | Smart Savvy Huslter | Strategic Marketing & Lead Generation Specialist



**Palanikumar Thangapandian**  
Cloud Expert & Blockchain Beginner

Innovator with 5 Patents | 14+ Years Experience in Cloud & Server Technologies | Senior Cloud Architect at HP | Architected Revolutionary Cloud Printing for 300M Printers | Tech Geek | Masters in Technology, BITS



**Rakesh Nanda**  
Creative Director

An Award Winning Animation Filmmaker, Comic Artist and illustrator | 6 Years+ Experience in Creative | Masters in Animation and Film Design from IIT Bombay | lipuster



**Sanjeeth Bloor**  
Head of Marketing

Over 18 Years of Experience in Marketing & Communications | Country Marketing & Communication at Freescale | Involved in Marketing Top Brands Toyota, Microsoft, Wipro | Media Management

# Advisors



**Eduard Dzhamgaryan**

Strategic, Marketing & Crypto Advisor

Entrepreneur, CBDO ICObox|  
ICO Analyst/ Advisor| CEO and  
Founder of GMPay| ICO, TGE,  
Blockchain, Cryptocurrency,  
Fintech Enthusiast| Member of  
Advisory Board – Genie,  
TravelChain, Micromoney

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[www.icobox.io](http://www.icobox.io)



**Mark Lin**

Infrastructure Manager at EverString

Ex-Google | Blockchain enthusiast |  
Expertise in Cloud infra |  
App Infra | Machine learning |  
Admob Inc | Google Inc |  
EverString

[LinkedIn](#)



**B Dweik**

Director of Marketing, Planning  
Lattice Semiconductor

Semiconductor Professional |  
Product Marketing Computer  
Architecture I/O Technologies|  
Machine Learning Artificial  
Intelligence| FPGA, Gate Arrays,  
ASIC | Design Vision Award |  
DFI winning Design Vision  
Award DesignCon 2007| Memoir  
Systems| Lattice Semiconductor

[LinkedIn](#)

# Risk Factors

The purchase of PEP token (hereinafter in this article “Risk Factors” referred to as the "Token" or "Tokens") may be associated with a high degree of risk. To protect the interests of Tokens’ potential purchasers, the Mobigraph (hereinafter in this article “Risk Factors” referred to as the "Company") team conducted an analysis of such potential risks and outlined the result of this analysis in this chapter of the Whitepaper.

IMPORTANT: THE LIST OF RISK FACTORS DESCRIBED BELOW IS NOT EXHAUSTIVE. IN ADDITION TO THE RISKS DISCLOSED IN THIS WHITEPAPER, THERE MAY BE EXISTING OTHER RISKS WHICH THE COMPANY'S TEAM AT PRESENT CAN NOT REASONABLY FORECAST.

These risks can materialize in other forms of risk than those specified here. Prior to acquiring Tokens, each potential Token purchaser is advised to carefully review all the information and assess the risks of such purchase, including but not limited to, the risks set forth in this Whitepaper and to decide upon purchase of Tokens based on such assessment.

## 1. Technical and technological risks.

1.1. Risks of the blockchain. Tokens are released on Ethereum blockchain. In this regard, any malfunction of the Ethereum protocol may lead to a restriction in the use of Tokens and / or to the fact that Tokens or the platform will function in an unforeseen manner.

1.2. Risk of hacker attacks on the platform, smart contracts, or Tokens. Tokens can be expropriated and / or stolen, by hacking Tokens, or otherwise. Hackers or other groups or organizations may attempt to intervene in a smart contract or Tokens in various ways, including, but not limited to, virus attacks, DDOS attacks, concerted attacks, network attacks, and denial of service attacks, and others. In addition, since the Ethereum platform is based on open source software, there is a risk that Ethereum smart contracts may contain intentional or unintentional errors or shortcomings that could adversely affect Tokens or lead to loss of Tokens, or loss of access or control Tokens. In the event of such an error or weakness of the software, there can be no remedy and tokens owners are not guaranteed any compensation.

1.3. Risk of hacker attack on the computer of tokenholder, or loss of passwords / of private keys. Purchased Tokens can be stored by the tokenholder in her/his digital wallet or safe, for which a password, a digital key or a combination of digital keys is required. Accordingly, the loss of the necessary keys associated with such digital wallet or safe, can lead to loss of access to Tokens. In addition, any third party that gets access to such passwords and / or private keys (by way of getting (through hacking, or negligence of token holder) access to login credentials of token holders' hosting-wallet, or otherwise), will be able to use Tokens of the token holder. Company assumes no liability for such losses.



1.4. Risk of using new technologies, and changes in technology in the future. Tokens and blockchain are fairly new and relatively untested technologies. Although at the moment they have largely proven their efficiency, reliability and security, there is no guarantee that in future these technologies do not fail in any way. Further, as technological progress develops, flaws can be found in these technologies, which flaws will prevent their functioning in the way that they function at the moment. Finally, there is no guarantee that these technologies will be compatible with any new technologies invented in future. In the event of such incompatibility, use of Tokens and blockchain can be found unreasonable and stopped.

1.5. Risk of incompatibility of the cryptowallet service. An electronic cryptowallet or wallet service provider that token holder has chosen \ will choose for obtaining and storing Tokens, must be technically compatible with Tokens. Failure to comply with this condition may lead to the fact that the token holder will not be able to get access to her\his Tokens. Token holders must independently determine the fact of the compatibility of the cryptowallet she\he registered, with the Tokens. Company assumes no responsibility for any errors related to wrong determination of the above fact.

## 2. Regulatory Risks.

2.1. Risk of regulatory uncertainty. Regulatory status of cryptographic tokens, digital assets and blockchain technology, is unclear or not defined in many jurisdictions. It cannot be excluded that such technologies, and, in particular, Tokens, will in future become subject to one or more (adopted or new) interpretations of laws (or other regulations), court judgments, or actions by various regulatory bodies around the world, including, but not limited to, the imposition of restrictions on the use or possession of digital tokens, such as Tokens. Such changes can adversely affect Tokens in various ways, including, for example, by determining that Tokens are regulated financial instruments that require registration or compliance with other legal requirements and procedures. Company may stop distributing Tokens, developing a platform or terminating operations in a particular jurisdiction if the actions of regulatory authorities of the relevant jurisdiction make it illegal or not commercially viable to proceed.

2.2. Risk of inability to obtain, maintain or renew licenses and permits. As of the date of Tokens sale, there are no statutory requirements requiring Company to obtain any licenses and permits necessary for the sale of the Tokens, but the risk that such legislative requirements may be enacted in the future cannot be ruled out. In this event, possibility of sale and further use of Tokens will depend on the procedure of issuing such licenses and permits, and on compliance with their terms. We cannot exclude that requirements of the law will be technically or economically unachievable for Company. Company may stop distribution of Tokens, develop a platform or terminate operations in a particular jurisdiction in the event of economic, technological or other inability to obtain the required licenses or permits under such jurisdiction.

2.3. The risk of governmental action. The industry of blocking and reversing tokens is new, and simply by virtue of novelty can be subject to increased supervision and regulatory control, including investigations or enforcement actions. There can be no guarantee that the government will not study the activities of the parties. All this can be investigated, which in turn can have a significant negative impact on Tokens and / or platform development.

## 3. Business risks.

**3.1. Risk of failure in development.** It cannot be excluded that for various reasons, including but not limited to, for reasons of insolvency of business or technological strategies or business arrangements, technological problems, emergence of new technologies, etc., that the model that Company developed and described in this Whitepaper, will not achieve the desired functionality, be inoperative, or work in a way different from what developers designed it for. Also, we cannot exclude the risk that for these or different reasons, development and implementation of the model can take longer than Company predicts at the moment, and when the model is ready, it will appear to be outdated and/or irrelevant.

**3.2. Risk of insufficient implementation.** It cannot be excluded that, for various reasons, including, but not limited to, for reasons of insolvency of marketing strategies, external constraints, or competitors' actions, the model developed by Company and described in this Whitepaper model may appear to be unpopular and/or unclaimed, lacking use and application.

**3.3. Risk of dependence on third parties.** Even after the launch, the model developed by Company and described in this Whitepaper will rely, wholly or partially, on third parties, for adoption and implementation of certain functions, as well as for continuing its development, maintenance and support. Though above-mentioned third parties are carefully selected by Company's team, there is no insurance or guarantee that these third parties will do their job properly, or otherwise meet users' needs, and this can have a significant adverse impact on the platform.

**3.4. Risk of loss of cash.** The project described in this Whitepaper, the model developed by Company, the platform being created, as well as any funds collected within the framework of the Token sale described, are not insured. In case of failure of the project for any reason, loss of functionality of the Token or platform, there is no private or public insurance representative to whom token holders can apply for reimbursement.

**3.5. Risk of force majeure.** In the future, there may be extraordinary circumstances that Company cannot reasonably anticipate or prevent and that may be subject to restrictions or impediments to the operation of the Company or Token platform. Company performance may be interrupted, suspended or delayed due to force majeure circumstances. For the purposes of this Whitepaper, force majeure shall mean extraordinary events and circumstances which could not be prevented by Company and shall include: acts of nature, wars, armed conflicts, mass civil disorders, industrial actions, epidemics, lockouts, slowdowns, prolonged shortage or other failures of energy supplies or communication service, acts of municipal, state or federal governmental agencies, other circumstances beyond Company's control, which were not in existence at the time of Whitepaper release.

**3.6. Value of Tokens.** Once purchased, the value of Tokens may significantly fluctuate due to various reasons. Company does not guarantee any specific value of the Tokens over any specific period of time. Company shall not be held responsible for any change in the value of Tokens.

## 4. Other risks.

**4.1. Taxes.** Token holders are solely responsible for determining if the transactions contemplated herein are subject to any applicable taxes whether in their home country or in another jurisdiction. It will be the sole responsibility of Token holders to comply with the tax laws of any jurisdictions applicable to them and pay all relevant taxes.

**4.2. Disclosure of Information.** Personal information received from Tokens holders, the information about the number of tokens owned, the wallet addresses used, and any other relevant information may be disclosed to law enforcement, government officials, and other third parties when Company is required to disclose such information by law, subpoena, or court order. Company shall at no time be held responsible for such information disclosure.

**4.3. Risk of Insufficient information.** Tokens are at a very early developmental stage and its philosophy, consensus mechanism, algorithm, code and other technical specifications and parameters could be updated and changed frequently and constantly. While the Whitepaper contains the up-to-date key information related to Tokens at the date of the Whitepaper, it is not complete nor is final and is subject to adjustments and updates that Company may make from time to time. Company is not in a position, nor obliged to report on every detail of the development of Tokens and other elements of the system presented by Company and therefore will not necessarily provide timely or full access to all the information relating to the Tokens, but will use reasonable efforts.