



EOT PROTOCOL

THE PROTOCOL FOR DGAMES

WHITEPAPER v1.0

Highlights



Massive Potential

Games will be one of the first killer applications for blockchain technology and cryptocurrencies. The global games market reaches 116B in 2017 and grows by 8.3% yearly^[1]. The mission of EON Protocol is to bring cryptocurrency to more people through games.



Make DGame Development Easier

The pain point for dgame (decentralized game) development is that developers have to learn blockchain technologies and new programming languages to build a game on public chains like Ethereum, EOS. They have to learn how to support multiple cryptocurrencies and digital assets. While with the help of EON Protocol, they can build dgames much easier and faster.



Established Community

We've built a community of more than 100k+ game players and developers. Our team has built a successful dgame called CryptoAlpaca, which has more than 200k registrations and 50k+ ETH-paid users. Besides, we will partner with USCGame (No.1 game department around the world) to build dgame jams in the future.



Top Tier Team

EON Protocol is initiated by EON Foundation, which is a multinational organization from the birth, with offices in Palo Alto, Beijing and Singapore. Our team members (Facebook, Toutiao, Netease, etc) have successful experiences in bringing innovative tech products to the masses.



High Profile Advisors

EON Foundation's advisors are industry veterans from gaming, blockchain tech, and token funds, including the founding director of USCGame department, early investor of Ripple & Coinbase.

I Table of Contents

4	Abstract
5	Introduction
5	Game Industry Overview
5	DGame Overview
7	Problems to Solve
9	Outline of Vision
11	EON Protocol
11	Technical Architecture
16	EOT Token
18	EON Foundation
18	Governance
18	Foundation Council
19	Advisory Board
20	Roadmap
21	References

| Abstract

The global games market (software) revenues reaches 116B in 2017, which is even bigger than global sports business. By 2017, there are 2.2 billion active gamers in the world, of which 47%, or 1.0 billion gamers, spend money while playing. Besides, almost every game has its own in-game currency, which supports in-game payment of digital assets and other services. Gaming is not only a fast-growing industry with huge market size, but also the one actively embraces new technologies. From PC, smartphone to Virtual Reality headset, gaming is usually the first application to take off and effectively educate the mass market. Hence, we see gaming as the best user case for blockchain technology and games are easily to be integrated with cryptocurrencies. If 10% of gamers use cryptocurrency as payment in the game, there will be 220m new cryptocurrency holders. This will efficiently educate people about what is cryptocurrency and blockchain technology, as well as expanding the market size of the whole blockchain industry.

In order to accelerate this process, we initiated EON Foundation to build and promote EON Protocol (EOT). EON Protocol is a protocol for dgames (decentralized games, or blockchain games). It uses a layer 2 solution to help dgames run smoothly as if on traditional web hosting. It also provides in-game wallet feature for game developers to support multiple cryptocurrency payment and the exchange of digital assets (non fungible tokens).

The concept of EON Protocol was developed during the process we built CryptoAlpaca, a dgame based on Ethereum, with more than 200k registrations. By building a dgame by ourselves, we found the pain point of dgame development. We want to help game developers build dgames easily and fast, and our mission is to bring cryptocurrency to more people through games.

Introduction

Game Industry Overview

In 2017, the global games market (software) revenues reaches 116B, which is more than three times the \$38.6 billion in movie ticket sales. As gaming continues its convergence with traditional media and entertainment, new comparisons can be made. An increasingly striking comparison is one to the global sports business. If we add revenues from console gaming hardware (around \$10 billion this year) and PC gaming systems and peripherals (around \$23 billion in total), gaming is already a bigger global business than sports.

Gaming is not only a fast-growing industry with huge market size, but also the one actively embraces new technologies. From PC, smartphone to Virtual Reality headset, gaming is usually the first application to take off and effectively educate the mass market. The phenomenal success of CryptoKitties^[2] have proved that gaming is the best way to educate the mass market about blockchain concepts.

DGame Overview

History of DGame

While CryptoKitties is the first game most people played on blockchain, it is not the first dgame (decentralized game, or blockchain game) ever created. The history of dgame can be dated back to 2014 February, when Huntercoin^[3] is released. It claims to be a live experimental test to see how blockchain technology could handle full on game worlds. In the game, you compete with other players to mine Huntercoin. After Ethereum was released in July 2015, it became easier to build a decentralized app on blockchain, and more dgames were created. CryptoPunks^[4] is one of those pioneers. There're 10000 unique collectible characters generated algorithmically in the game, and people can collect and trade those characters. CryptoPunks is a great demonstration of value exchange powered by blockchain technologies. The 3 features of blockchain: free, trustworthy and globally accessible, greatly increase the efficiency of digital assets trading among game players. And when the asset is a digital cute cat, the world goes crazy. On the peak, the transactions of CryptoKitties take up more than 20% of all transactions on Ethereum, and the highest price for a cat is \$114,481.59.

DGame 2.0

Although gaming is leading the innovation of blockchain, those early dgames' gameplay are not well designed. Most of those games were built by blockchain engineers, not game designers.

Hence, we call them dgame 1.0^[5]. The feature of 1.0 dgame is: A) game assets are built on blockchain(e.g., Ethereum); B) gameplay is simple and weak. A game of weak gameplay cannot attract people to play it for a long time.

In order to further push the boundaries of dgames, we created CryptoAlpaca^[6], a 2.0 dgame.

During the process of developing CryptoAlpaca, we always put gameplay as our highest priority.

No matter it is PC game, mobile game, or dgame, gameplay is the key to the success of a game.

We created a rather complex gameplay that can retain players for a long time. The game was successfully launched in February 2018 and proved to be a success. It has more than 200k registrations 3 months after the launch, and 50k paid users (in ETH). In a word, 2.0 dgames start to focus more on the gameplay, rather than showing off blockchain technologies.

Difference Between Traditional Games and DGames

After building a dgame by ourselves and talking with other dgame developers. We start to find the answer to a crucial question: what's the difference between traditional games and dgames. Only by knowing the differences, we can build better dgames. Our answers are as follows: 1) traditional games' in-game currency can not be used outside the game, while for dgame, gamers can exchange the currency of different games. This is a huge challenge for traditional game designers, because they've never done this before. 2) most of traditional games' in-game assets cannot be traded inside or outside the game, while for dgame, developers can create digital assets as non fungible tokens, which can be traded inside or outside games; 3) parts of games' logic can be written using smart contract (public and audit-able), which means game developers cannot make money by tricking players anymore; 4) the governance of games may change, traditional games' lifecycle is controlled by a centralized game developer, while for games, the future of a game is governed by the game community (e.g., Huntercoin continues running even after the developer behind it is dead).

We see 1&2 as the first crucial steps for dgame to take off. And after the penetration rate of dgame reaches 10% (10% of gamers around the world uses cryptocurrencies in games as payment), games with 3&4 features will become more and more. The core of a good game remains the same: providing a great game experience, yet the economy system, business model and governance of a game will change dramatically. It will be even bigger than the change from pay-to-download model to free-to-pay model.

Problems to Solve

As we mentioned above, there are 4 major differences between traditional games and dgames. This means that game developers have to learn a lot of new things in order to integrate their games with blockchain. That's why we have the original concept of EON Protocol. We want to lower the barrier of developing dgames by providing blockchain toolsets to game developers. Those toolsets will be integrated into the existing game building pipeline. Hence, game developers don't have to learn new programming languages (e.g., Solidity of Ethereum) that are usually not used in game industry. They can focus on the design of the game, while integrate their games with blockchain easily and quickly.

The first version of EON Protocol will generally solve the following 3 problems in developing dgames. And in the future, we'll add more features to EON Protocol.



Performance Limitation

While public blockchains (Ethereum, EOS, etc) provide an audit-able infrastructure for cryptocurrency transactions and digital assets (Non Fungible Token) trading, they don't well support large-scale, logic-heavy dgames. The limitation on transaction speed (EOS claims to build a blockchain for dapps, the max TPS is 10,000), and the limitation on transaction fees (in order to avoid attacks for the blockchain, public chains have to charge transaction fees to increase the cost of attack) make public blockchains not suitable for running the whole application. Unless dgames can run smoothly as if on traditional web hosting, gamers won't play dgames because they're slow and expensive.

In order to run large-scale and logic-heavy dgames, we create a layer 2 solution with on-chain/off-chain architecture. It uses public chains as the base layer infrastructure for cryptocurrency payment and digital asset trading. This guarantees the security and reliability of financial transactions in dgames. While for other parts of dgames, we'll put them off-chain to improve performance and reduce cost.



Payments

Right now, a lot of dgames use third-party wallets (MetaMask, MyEtherWallet, etc) for in-game payments. This actually provides a very bad user experience for gamers, because they have to

learn how to use the wallet and deposit their money into the wallet (if they don't own that specific wallet before). Some of those gamers (especially people with little experience about cryptocurrency) may even give up to play the game. What's worse, most of those third-party wallet only supports limited platforms. For example, MetaMask don't have a mobile version, which means that if the dgame has both PC and mobile version, it has to use 2 different wallets.

Another challenge for dgame payments is that the holders of any cryptocurrency is rather limited. If a dgame uses EOS (EOS has about 400k addresses in 2018, July) as payment currency, the total targeting user base is less than 400k. The user base is so small that it may not generate enough revenue for developers to iterate the game. Developers need to support multiple cryptocurrencies in their games to expand user base, as well as generating more revenue.

In order to solve the 2 issues above, we'll provide a in-game wallet SDK for dgame developers.

The in-game wallet SDK is part of EON Protocol, and its details will be discussed in later sections.



Digital Assets

Digital asset is usually implemented as a non-fungible token. A non-fungible token (NFT) is a special type of cryptographic token which represents something unique; non-fungible tokens are thus not interchangeable. This is in contrast to cryptocurrencies like Bitcoin, and many network or utility tokens that are fungible in nature^[7]. Non-fungible tokens create digital scarcity that can be verified without the need for a centralizing organization to confirm authenticity. While digital scarcity for things like avatars in video games has existed for many years, this form of scarcity relies on the validation and security of the game developer. The value of a digital asset is not decided by game developer anymore. Digital assets may be traded among players inside game and even outside of the game, and the value of a digital asset is decided by multiple factors. This opens a new door for game designers, and the design of game economy system will be greatly impacted.

Right now, Ethereum has a non-fungible token standard called ERC-721, while for other public chains, there're no similar standards yet. Even though ERC-721 is a fairly recent development, there are already a couple promising non-fungible token projects (CryptoKitties, Decentraland, etc). We believe that more and more dgames will support non-fungible tokens in the future, and we'll push to set the standards of non-fungible tokens on major public chains. Those standards will all be supported in EON Protocol.

Outline of Vision

The concept of EON Protocol was developed during the process we built CryptoAlpaca, a dgame based on Ethereum, with more than 200k registrations. By building a dgame by ourselves, we found the pain point of dgame development. We want to help game developers build dgames easily and fast. Thus, we initiated EON Foundation (see more details in later sections) to build and promote EON Protocol (EOT). EON Protocol is a protocol for dgames (decentralized games, or blockchain games). It uses a layer 2 solution to help dgames run smoothly as if on traditional web hosting. It also provides in-game wallet feature for game developers to support multiple cryptocurrency payment and the exchange of digital assets (non fungible tokens).

Our mission is to bring cryptocurrency to more people through games, as game is always the best way to educate people about new technologies.

Playing Games Using Cryptocurrencies

By 2017, there are 2.2 billion active gamers in the world, of which 47%, or 1.0 billion gamers, spend money while playing. Besides, almost every game has its own in-game currency, which supports in-game payment of digital assets and other services. If 10% of gamers use cryptocurrency as payment in the game, there will be 220m new cryptocurrency holders. The number is 10 times larger than the current user base of cryptocurrency (July, 2018). By helping more game developers integrate their games with cryptocurrency, EON Protocol will greatly accelerate this process.

In the future, every game may have its own cryptocurrency, and the cryptocurrency can be always exchanged with other cryptocurrencies. This is an open economic system, which means that if a gamer wants to leave game A to join game B, they can exchange A's cryptocurrency with B's cryptocurrency. It give gamers an opportunity to reinvest their earnings from one game to another. To design an open economic system is much harder for game designers because traditional games usually have a closed economic system. Yet, the open economic system is more similar to our real life worlds, and it is what gamers expect to experience in virtual games. Also, gamers will actually benefit a lot from the open economic system. This will drive gamers to play those games supporting cryptocurrencies.

In a word, we strongly believe that more and more games will support cryptocurrency and have open economic system.

Digital Asset Ownership & Trading

In traditional games, the value of digital assets (avatars, weapons, potions, etc) is determined by game developers. In most cases, gamers purchase assets from developers and cannot sell them anymore. Those assets are stored on the centralized server and actually not owned by gamers. The invention of Non-Fungible Tokens (NFT) transfer the ownership of digital assets from game developers to gamers by creating verifiable digital scarcity. Each digital asset can be represented as a unique NFT. When a digital asset is purchased by a gamer, its ownership is also transferred to the gamer.

Gamers not only truly own the digital assets, they can also trade them inside and outside the game. The value of a digital asset is thus determined by multiple factors. Gamers can liquidize digital assets for other cryptocurrencies. We can imagine that one digital asset may even be used in different games in the future.

We'll see a lot of new game mechanics be invented in the next 5 years. And EON Protocols will be with game developers along this journey.

| EON Protocol

EON Protocol is short for Entertainment Open Network Protocol. It's a protocol for dgames. Game developers can integrate their games with blockchain technology and cryptocurrency easily and quickly with the help of EON Protocol. In this section, we'll introduce more about EON Protocol's architecture and technical details.

As we mentioned above, the first version of EON Protocol will generally solve the following 3 problems in developing dgames: performance limitation, payment and digital assets. To solve these problems, we'll have 2 main features in EON Protocol: 1) A layer 2 dgame framework to enable high-performance and logic-heavy games; 2) A in-game wallet SDK to support payment of multiple cryptocurrencies and exchange of digital assets.

Technical Architecture

DGame Framework

The dgame framework is a layer 2 solution with on-chain/off-chain architecture. It can perform payments or transfer of digital assets with high speed and low cost. It's similar to Bitcoin's Lightning Network^[8] and Ethereum's Raiden Network^[9], but with several improvements to be a less cost, low latency, high throughput, secure, cross-chain and privacy-concerned solution.

DGame framework performs its high performance and secure transactions between participants off chain and defers the final transaction confirmation on chain. This is achieved using digital signature and hashed timelock contracts (HTLC)^[10], fully locked by previously set on-chain deposits. This concept, illustrated in Figure 1, is known as payment channel technology^[11]. Payment channel (or micropayment channel) is one of techniques designed to allow users to make multiple token transactions without committing all of the transactions to the blockchain. In a typical payment channel, unlimited or nearly unlimited number of payments can be made between the participants except for an initial one-time on-chain establishment and an eventual channel settlement. In addition, payments can be routed across more than one blockchain (including altcoins and sidechains) as long as all the chains support the same hash function to use for the hash lock, as well as the ability to create hashed timelock.

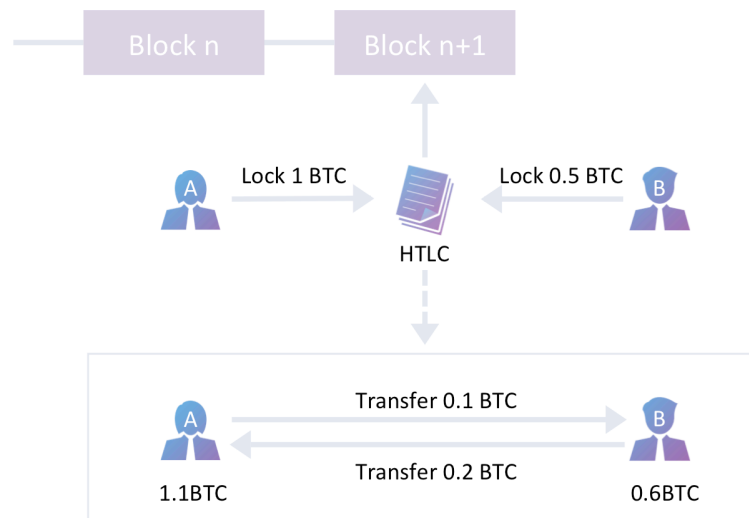


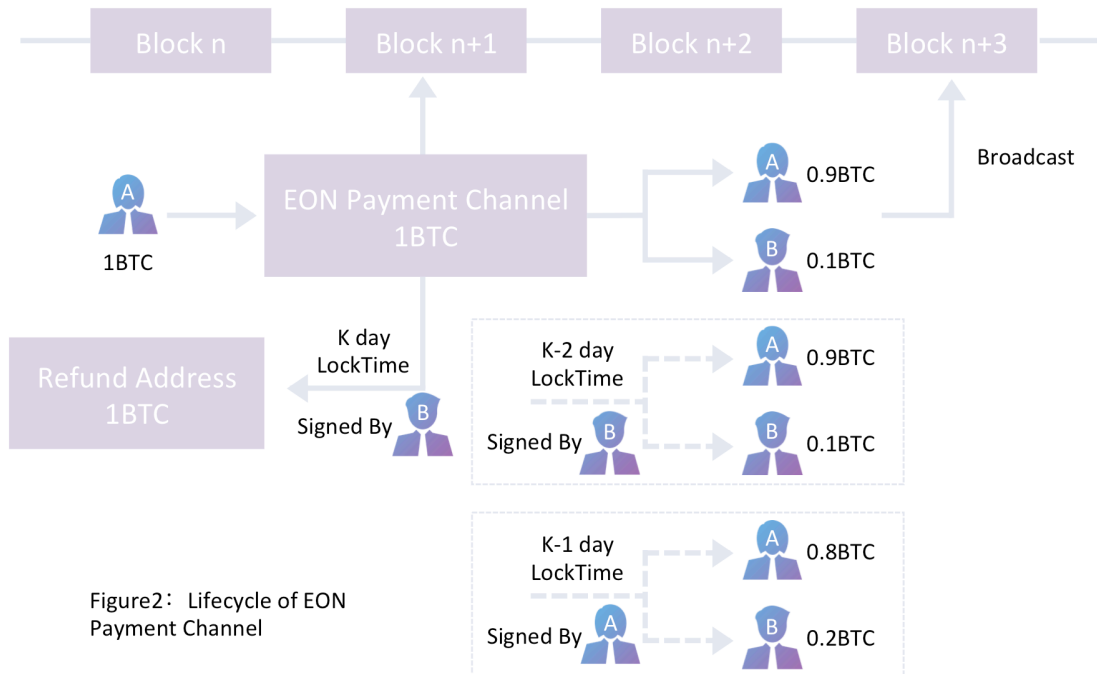
Figure1: Bidirectional Payment Channel

How does it work?

In order to ensure that participants pay their debts, tokens have to be locked up as security in a smart contract for the lifetime of the payment channel. This deposit ensures that tokens can only be used to send to or receive from the channel partner until the channel is finally settled by either participant, preventing both from double-spending their tokens to other peers. The process of lifecycle a EON payment channel is shown in Figure 2.

Once a channel is established, participants may issue what can be considered certified checks freely back and forth. Instead of keeping track of all checks, however, each peer only keeps a copy of the latest one. The balance proof contains the final sum of all off-chain transfers sent to a participant up to a certain point, digitally signed by the sender. Since each channel has two participants, it always maintains two of those and together they are essentially the channel's bar tab if you will. Multiple credits are exchanged back and forth, changing the total amount owed between the participants, possibly even rebalancing the channel many times in the process.

When one party decides to settle the balance on the blockchain, either to claim or pay their outstanding balance, they can close the channel at any time by presenting their balance proof of choice to the smart contract. The other participant — the one that did not choose to close the channel — must now present a balance proof of their own or do nothing if they received no transfers. After both parties have submitted their balance proofs, they may now withdraw their deposits. This withdrawal may be triggered by anyone, including addresses other than the two participants. Finally, the latest transactions will be broadcast back to blockchain.



If the second participant fails to present their balance proof in time, balances will be distributed according to the closing participant's proof, assuming that the other participant has not received any transfers. This way, EON Protocol's dgame framework asserts that each payment channel participant always has access to their funds.

EON Off-chain Hub

Routing complexity is one of the biggest obstruct of current off-chain scaling solutions such as Lightning. In EON Protocol's dgame framework, we use an off-chain hub network structure, the EON payment channel requires significantly less routing, while still benefiting from a decentralized nature (as shown in Figure 3). Multiple EON off-chain hubs can be interconnected with efficient routes for decentralization and redundancy purposes.

The design of the EON protocol's dgame framework is centered around the notion of universal hubs. As such, a user that is joining a hub, can transact his funds with any other member of the hub, instantly, off-chain and therefore at significantly lower costs than regular on-chain transactions without routing complexity. The hub architecture is novel because funds are no longer locked between only two users, but accessible to thousands of other users on the same hub.

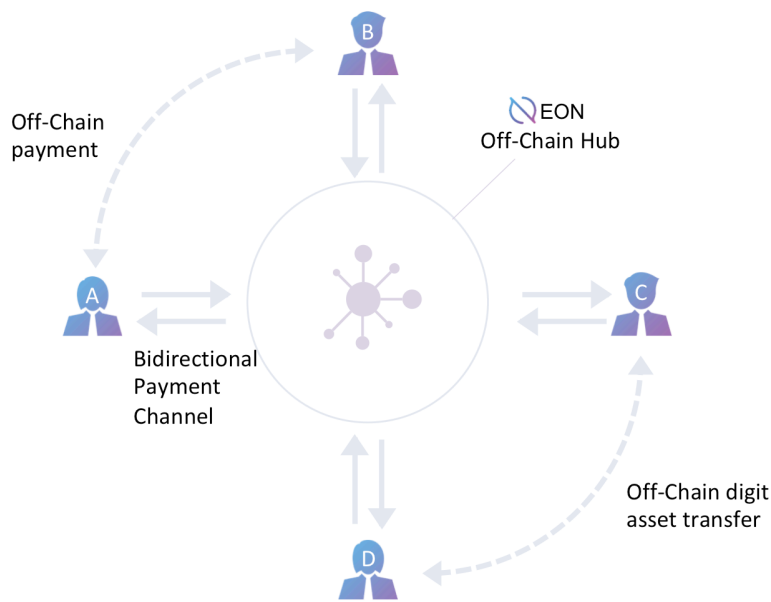


Figure3: EON Off-Chain Hub Architecture

In conclusion, EON Protocol's dgame framework generally uses an on-chain/off-chain architecture, with improved payment channel technology as the core. The framework will support the most popular game engines on the market right now (Unity, Unreal, etc). And in the future, we'll also support other engines if required by developers in our community. In this way, game developers don't have to learn Solidity or Go languages (used by most blockchain projects) to integrate their games with blockchain and cryptocurrency. They can use the languages they're more familiar with, like C#. This will greatly reduce the development cost.

In-Game Wallet SDK

Another important part of EON Protocol is a in-game wallet SDK. It will support two main functions: payment of multiple cryptocurrencies, and exchange of digital assets.

The most popular cryptocurrencies on the market (e.g., Bitcoin, Ether, EOS) now usually have its own blockchain and wallet. In order to support the payment of different cryptocurrencies, developers have to learn the technology of each blockchain, and sync the data of different blockchains (usually take up a lot of storage space). Our in-game wallet SDK will help them to save a lot of time, as well as providing high-level security and speed for each transaction. In the future, we'll also partner with decentralized exchanges and OTC exchanges to provide exchange of cryptocurrencies inside the wallet.

The in-game wallet will also support Non-Fungible Tokens. Gamers can store digital assets in the wallet, and check their value on the market anytime they want. We'll also partner with NTF marketplace (Rare Bits, WAX) to provide liquidity for those digital assets stored in the wallet.

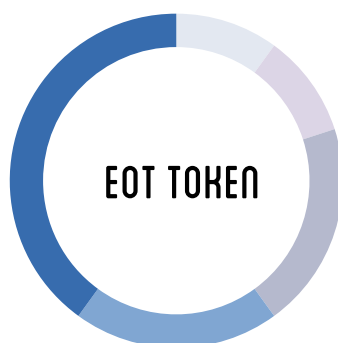
EOT Token

EOT token is the core cryptocurrency used in EON Protocol. EOT is short for Entertainment Open Network Protocol. It's designed to support gamers and developers using EON Protocol, as well as facilitate the growth of community. Those early supporters of EON Protocol and holders of EOT tokens will get rewards when the network grows. The network will also offer friendly ways of buying EOT tokens and a range of services to spend them on, driving demand and fundamental value for the cryptocurrency.

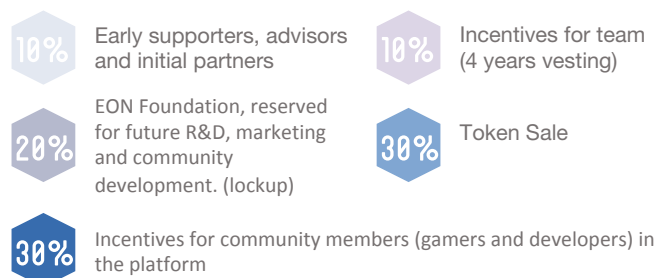
Token Specification

Currency Code	EOT
Type	Utility Token
Decimal places	18
Total token amount	2.1b
ICAP currency code	EOT
ICAP organization code	EOT

Token Distribution



EOT Token will be distributed as follows:



The hard cap of total supply of EOT token is 2.1 billion, and we'll support coin burn mechanism when the coin is initially issued. The circulating supply of EOT token will be gradually increased when incentives for community, team and investors are released gradually. The 20% tokens reserved for EON Foundation will be locked up until all the private sale tokens are used and the Foundation Council decide that it's reasonable to use the reserved tokens.

Token Economy

We'll use the supply-and-demand model here to analyze the token economy on EOT.

The supply of circulating tokens include several parts:

- People sell tokens on exchanges. Those people may include team, community or investors who get tokens as incentives. Notice that incentive tokens for team and investors will have lockups in order to guarantee the stable operation of Foundation.
- EOT ecosystem incentive tokens (30% of total). Those tokens are rewards for positive behaviors contributing to the growth of EOT ecosystem (e.g., developers integrate a new game with EON Protocol, gamers refer friends to play games using EON Protocol). The release schedule is similar to Bitcoin mining process: in the first 4 year, 0.315b tokens (15% of total) will be released; and in the next 4 years, half of 0.315b tokens will be released; and so on. This release mechanism guarantees that early community members get more token as rewards than people join later.

The demand side include those use cases of tokens:

- Payments for all digital assets within games using EON Protocol;
- Developers should stake EOT tokens to use EON Protocol. And the number of tokens required will increase as the number of players in the game increase;
- Holders of tokens can sell tokens on exchanges;
- EON Foundation will purchase back specific amount of tokens at milestones (e.g., EON Protocol reaches 100k users), and burn those tokens;
- EOT will also be used in decentralized governance of the EON Protocol. People with more EOT tokens will have more voting power in deciding the direction of community.

EON Foundation

Governance

EON Foundation is a multinational organization from the birth, with offices in Singapore, Palo Alto and Beijing.

Foundation Council

The foundation council is listed as below. To get more information regarding team members' blogs, social media and past working history, please visit entoken.io

Aron Lyu

Ex Product Lead at Bytedance USA;

Entrepreneur in Residence, Morningside Ventures;

Ignite Program, GSB, Stanford University;

Aron is an early BTC/ETC adopter and miner. He has successful experiences in user growth of innovative products, including Pebble (Wearable Technology, acquired by Fitbit), Toutiao (Artificial Intelligence, Chinese startup with \$10B valuation).

Tao Hu

Computer Science, University of Southern California;

Tao has more than 5 years experience in building businesses and products using emerging technologies, including VR/AR/Blockchain. He's also the early members of Bitium (acquired by Google) and OculusVR (acquired by Facebook), where he built Oculus App Store from scratch.

Mark Nedzelskii

Blockchain Association Board, Tsinghua University;

University of International Business and Economics;

Mark is an early Ethereum investor and ICO proficient. He knows multiple languages including English, Chinese, Russia and so on. Besides, he has rich experiences in marketing and community management.

Advisory Board

Our advisors are industry veterans from gaming, blockchain and venture capitals.

Feng Li

Founding Partner of FreeS Fund; Ex-IDG Partner;
Early Investor of Coinbase & Ripple;
Successful serial entrepreneur, with multiple exits.

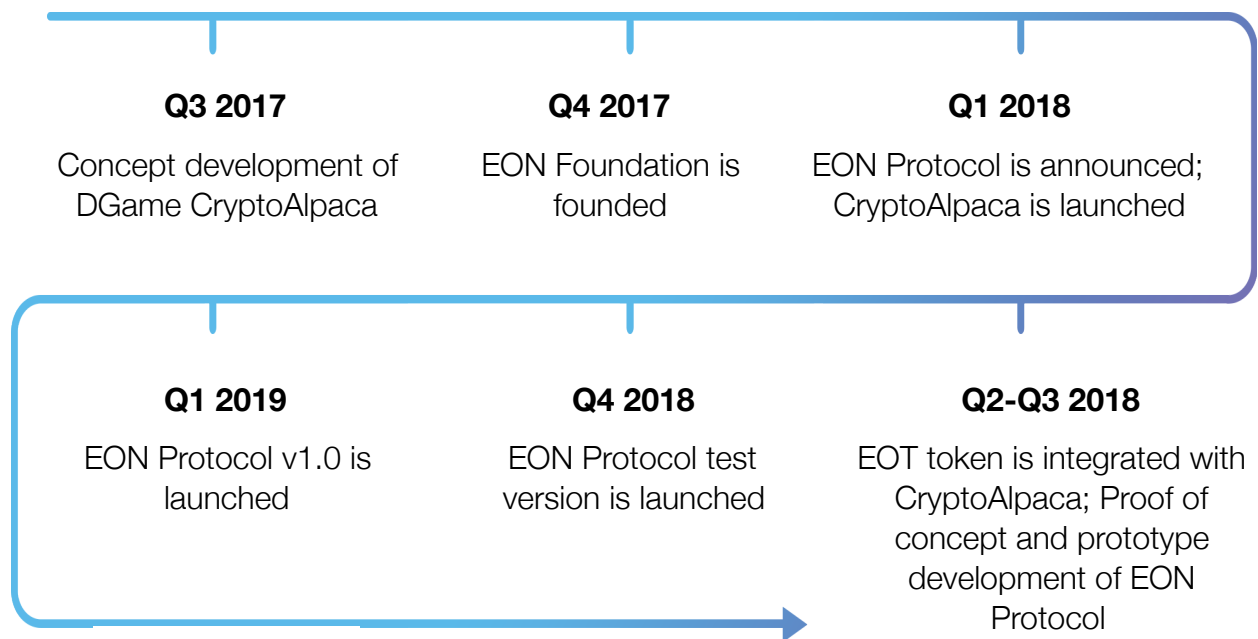
Dr. Michael Zyda

Founding Director, USC GamePipe Laboratory (#1 Gaming major in the world);
Michael Zyda is professor at USC department of Computer Science. His alums have shipped games played by over 2.5 billion players, about \$100B in revenue. Professor Zyda is also consultant to the White House Office of Science and Technology Policy, NASA AMES and others.

Anshul Dhawan

Co-founder at Equally;
Anshul is a 8 years gaming veteran, and previously worked as a Lead Product Manager at Zynga. He's one of the earliest employees at Zynga and has built several Top10 Grossing games, including the famous Zynga Poker.

Roadmap



References

- [1] NewZoo, [New Gaming Boom: Newzoo ups its 2017 global games market estimate to \\$116.0BN growing to \\$143.5B in 2020.](#)
- [2] CNBC, [Meet CryptoKitties, the \\$100,000 digital beanie babies epitomizing the cryptocurrency mania.](#)
- [3] [Huntercoin](#)
- [4] [CryptoPunks](#)
- [5] Medium, [CryptoAlpaca: Crypto Game 2.0.](#)
- [6] [CryptoAlpaca](#)
- [7] Wikipedia, [Non-Fungible Token.](#)
- [8] [The Bitcoin Lightning Network: Scalable Off-Chain Instant Payments](#)
- [9] [What is the Raiden Network](#)
- [10] [Hashed Timelock Contracts](#)
- [11] [Payment channels](#)