

DELPHI DIGITAL

Gaming Thematic Insights



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Executive Summary

For a decentralized application, or network, to gain widespread adoption, it needs to provide value for its end users by offering an improvement over existing solutions. The market has been looking for the first "killer DApp" that offers such a clear value proposition that it sparks mass adoption. While blockchains have already started to gain traction by enabling the creation of digital currencies, decentralized financial applications, and facilitating new ways to efficiently raise capital (ICOs), none of these have hit the inflection point of going mainstream.

This is partly due to scaling limitations faced by these networks, but it can also be attributed to a lack of compelling use cases, thus far, for the average person.

Blockchain-based gaming offers a unique value proposition, which, potentially, could make it the catalyst that spurs mainstream adoption over the near-term. If you've ever seen the movie Ready Player One, blockchain-based gaming could help make such a world possible.

For this report, we've chosen to focus primarily on three innovative gaming platforms being built on Ethereum: **Enjin Coin**, **Loom Network**, and **Decentraland**. We will compare and contrast each project's token economics, developer tools, scaling solutions, and broader ecosystems.

Gaming Platforms:



Enjin Coin



Loom Network

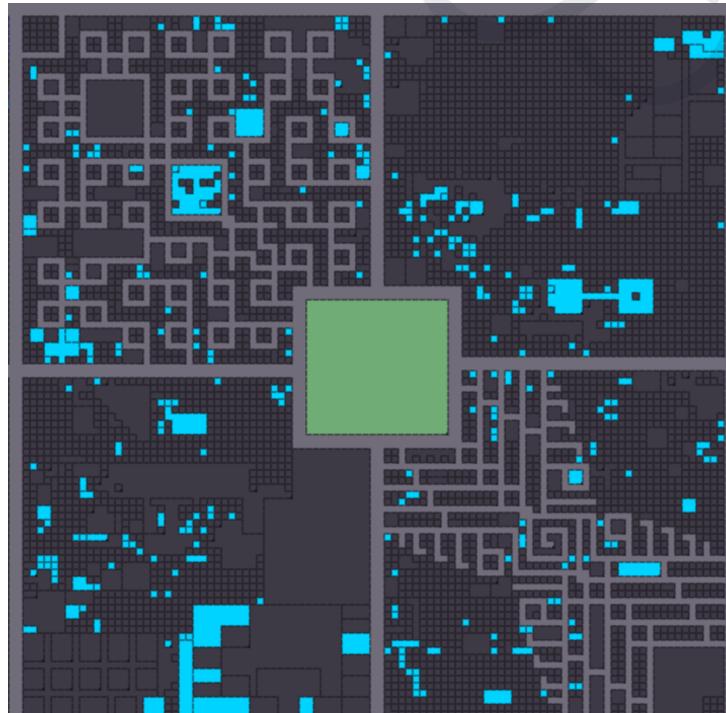


Decentraland



The Opportunity

To understand a products path to adoption, we first need to analyze its target audience. So what makes gamers a natural fit? To start, they're already used to buying digital, in-game items. The best example of this is the game Fortnite, which generated [\\$2.4 billion](#) of sales in 2018, despite being free to download, by selling nothing more than character aesthetics such as outfits and dance moves. In addition, most gamers tend to be younger, with [85%](#) of Fortnite players below the age of 34. In general, this demographic is far more familiar with technology than prior generations, having grown up with gaming systems, the internet and smart phones. This aptitude with technology can also help them navigate the frictions still prevalent in blockchain-based systems today. The target market for gaming is clear, but what's the product fit of blockchain-based gaming solutions? Below, we have outlined the key benefits and how they offer an improvement over existing solutions.



Decentraland's Atlas



Benefits of Blockchain-based Gaming

- **True item ownership:** Tokens can be used to represent fungible (e.g. currencies) and non-fungible (e.g. rare sword) game items. Even if the game goes away, players and collectors remain in control of the items they purchased/earned.
- **Transparent and provable item scarcity:** How rare is that rare sword, really? Players no longer have to guess or trust the developers. With blockchain-based game items, the total supply and ownership are completely auditable and transparent.
- **Trustless and liquid markets:** Players can trade game items 24/7 and access a global pool of liquidity without exposing themselves to fraud.

Benefits Unique to a Specific Project

- Players can take their item from one game and use it in another (Enjin Coin's gaming multiverse).
- Players can destroy items they no longer want in return for their salvage value in tokens (Enjin Coin).
- Game logic is held on-chain, which means if players don't like the developer updates in a new version, they can choose to play the old version or modify their own (Loom Network).
- All the games are connected and represented in an immersive VR world (Decentraland).

Enjin Coin



Enjin Coin is an ecosystem built on Ethereum that facilitates the development of blockchain-based games. Enjin, the company behind Enjin Coin, has existed for close to a decade and is based out of Singapore. Enjin is a platform that hosts gaming communities and has grown to support over 300,000 communities and 20,000,000 gamers.

ENJ, the native token of Enjin Coin, is used within their ecosystem to create and trade blockchain-based game items.

Key Personnel



Maxim Blagov (CEO): Has over a decade of experience in project management as well as expertise in UX design. He studied Computer Science at the University of Sydney and co-founded Enjin back in 2008.



Witek Radomski (CTO): Being CTO of Enjin for over 10 years now, he's already made an impact within the space by proposing the creation of the ERC-1155 token standard. He also played a role in developing the popular ERC-721 token standard.

Funding



**Token Sale Raised
\$23M**

On 10/31/2017, Enjin's public sale closed - bringing the total amount raised to 75,041 ETH from a total of 18,506 contributions.

Ecosystem Highlights



Mintshop



ERC-1155



Wallet



Beam



EnjinX



SDKs



Efinity



Multiverse

Games Being Built On Enjin



AGE OF RUST



Loom Network



Loom Network is a layer 2 scaling solution that allows developers to build DApp specific sidechains (also known as "DAppChains") on top of Ethereum. DAppChains can provide higher throughput, faster transactions, and cheaper fees, while still being secured by Ethereum. The team's near term focus is on gaming applications.

LOOM, its native token, is used in a variety of ways within their ecosystem, with its primary utility derived from staking.

Key Personnel



Matthew Campbell (CEO): He was the back-end server lead for Eikon Messenger, the largest financial instant messenger at Thompson Reuters. Additionally, he was a software developer for Bloomberg and Gucci.



Georgios Konstantopoulos (Lead Research): Georgios spends his time researching Plasma in hopes of helping Loom Network be the go-to Layer 2 scaling solution for Ethereum.

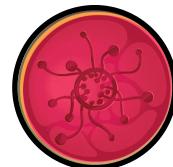
Funding



Token Sale Raised
\$25M

Loom's token sale was a private sale which took place in January 2018. The private sale tokens made up 45% of total token supply.

Ecosystem Highlights



PlasmaChain



ERC-721x



GameChain



SDKs



Plasma



Marketplace



Zombie
Battleground



DelegateCall

Games Being Built On Loom



Decentraland



Decentraland is a virtual world where you can build and explore 3D creations, play games and socialize.

Decentraland is divided into a limited number of parcels, known as **LAND**.

They also have a token used for trading goods and services called **MANA**.

EST (ERC-721) allows two or more adjacent parcels of LAND to be combined into a single non-fungible token.

Key Personnel



Esteban Ordano (Tech Lead): A blockchain engineer who co-founded Zeppelin Solutions and led the team that created Streamium, first app which implemented payment channels. He was also a software engineer for BitPay.



Ariel Meilich (Project Lead): Ariel has experience in venture capital and data analytics. He was an analyst at Charles River Ventures and founded Benchrise, a data company whose product helped find software engineers for companies.

Funding



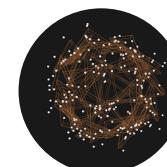
**Token Sale Raised
\$24M**

ICO took place in Aug 2017. Decentraland retained 60% of the supply. There were over 2,000 unique buyers. DCG recently announced a VC fund for Decentraland.

Ecosystem Highlights



Builder



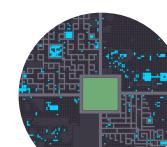
Agora



Marketplace



Virtual Reality



Atlas



Matic Network

Games Being Built On Decentraland



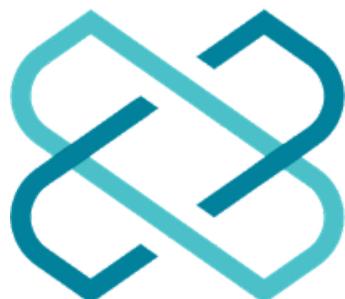
Cryptocarz

Token Economics



Model Available

- ENJ (ERC-20) tokens are used to **create game items in the Enjin ecosystem**. ENJ are locked up to back each item in a process known as "minting". As more games are created using Enjin, there will be more ENJ tokens locked up in game items.
- Users can **destroy game items by "melting" them down to receive the locked up ENJ**. This effectively creates a floor salvage value for each game item.
- ~1% of all ENJ tokens are currently locked up in game items.
- ENJ can also be used as a **transactional currency within their game multiverse**.
- To **view our full token economic model**, subscribe to Delphi Institutional [here](#).



Model Available

- LOOM (ERC-20) has multiple use cases within the project's ecosystem.
- Loom Network's DAppChains operate using DPoS/PoS family of consensus mechanisms. As a result, **validators need to stake LOOM in order to run the network**.
- As compensation for staking, **validator's earn a yield composed of transaction fees and LOOM tokens from the project's treasury**.
- In order **to deploy a DApp on PlasmaChain, developers need to lock LOOM into a smart contract** to "power" it. Each month, tokens are deducted based on how much shared bandwidth the DApp consumed from the network.
- LOOM can also be used as a **transactional currency within PlasmaChain's Marketplace/DEX**.
- To **view our full token economic model**, subscribe to Delphi Institutional [here](#).



- MANA (ERC-20) can be **used to purchase LAND tokens at auction**. MANA spent on LAND is burned.
- It can also be used as a **transactional currency within Decentraland's VR world**.
- Starting back in January, **each time MANA is spent in their Marketplace 1% of the amount is burned**.
- Combining LAND auctions and the marketplace, **6.1% of all MANA has been burnt so far**.
- LAND (ERC-721) is a **scarce, non-fungible token representing parcels of land** within Decentraland's VR world.
- EST (ERC-721) allows **two or more adjacent parcels of LAND to be combined into a single non-fungible token, referred to as an Estate**.

Developer Tools

Each of these projects is attempting to create a gaming ecosystem/multiverse, and to succeed they will need third-party developers to build on their platforms. For this to happen, it's crucial that they have tools available to make game development as simple as possible. Software development kits ("SDKs"), particularly game engine SDKs, are vital. For example, with a Unity SDK (the most popular game engine) it would be possible for a game developer to easily create a blockchain-based Xbox game. Below, we have highlighted the various developer tools by project, however, it's important to note that some SDKs are still under development by each team.

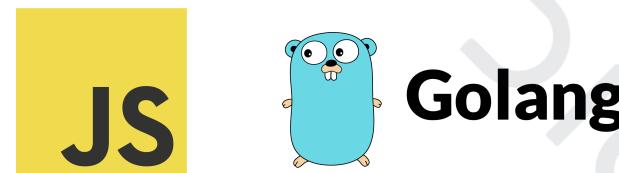


- [**Enjin Mintshop**](#) - allows users to easily create blockchain-based game items.



- [**Loom SDK**](#) - helps developers create DApp specific sidechains (aka "DAppChains") on top of Ethereum. Each DAppChain can be optimized for its use case (e.g gaming vs social media).

Generic SDKs



Game Engine SDKs



- [**Decentraland SDK/Builder**](#) - allows developers to create objects and scenes in Decentraland's world.

N/A



N/A

Scaling Solutions

Gaming requires fast transaction speeds with minimal fees. With this in mind, it's easy to understand why gaming on Ethereum is currently such a challenge given its scaling limitations. Due to its importance, these projects have either taken it upon themselves to develop a scaling solution in-house, or they are working with other projects to address this problem.



- Enjin Coin is **developing their own scaling solution called Efinity, a game-channel network**. While Loom Network and Decentraland are focused on sidechains, Enjin's channel-based approach is similar to Bitcoin's Lightning Network.
- The team has **kept details related to Efinity's development largely in-house**. As a result, assessing its viability is difficult and trusting in its success carries risk.
- It will be particularly **interesting to watch how Enjin addresses routing problems experienced by Lightning Network, which may be made worse when combined with non-fungible game items**. This is speculative, but Efinity may end up acting as a central, layer 2 hub to alleviate this.



- While Enjin is a gaming project developing a scaling solution, Loom Network is better thought of as a scaling solution that's targeting gaming as a near-term use case.
- Loom Network is **developing their own plasma based, DPoS* sidechains on top of Ethereum**.
- Georgios Konstantopoulos, Research & Development at Loom, has been one of the leading Plasma researchers. His work has resulted in **Loom deploying a live plasma sidechain, referred to as PlasmaChain**.
- However, **it's important to note that PlasmaChain is not running on a fully plasma based solution yet as there are still a number of unsolved plasma issues** around token fungibility and exits from the sidechain back to the mainchain.



- Decentraland is **working with Matic Network to create a plasma based, PoS sidechain on top of Ethereum**.
- Two members Decentraland's team are advisors for Matic Network including Esteban Ordano (Founder & CTO), and Ari Meilich (Project Lead).
- While Matic Network is using a different implementation of plasma relative to Loom Network, **it will be important to monitor plasma development closely to see if/when the remaining issues are solved**.

Ecosystem

			
Wallet	<p>Enjin Wallet is a proprietary mobile wallet for Android and iOS released in early 2018 that currently supports ETH, BTC, LTC, and various ERC tokens.</p>	<p>Loom Network has partnered with major wallets (imToken, Trust Wallet) for integrations.</p>	<p>Players can use MetaMask to interact with Decentraland.</p>
Blockchain Explorer	<p>EnjinX is a web-based explorer, which the team saw as a necessary tool to help make trusted data more easily accessible.</p>	<p>Loom Block Explorer can be used if a user has a Loom DAppChain running on their local machine to see block data. Focused on DAppChains.</p>	<p>No dedicated blockchain explorer, but etherscan can be used to track their tokens.</p>
Marketplace	<p>Enjin has stated publicly a few times that they are currently working on a marketplace. There haven't been many details released regarding an ETA.</p>	<p>A marketplace currently running on PlasmaChain where users can browse all the cards in the Zombie Battleground game.</p>	<p>Decentraland's Marketplace allows users to purchase LAND and EST at auction.</p>
Token Standard	<p>Proposed ERC-1155 which allows multiple items, fungible & non-fungible, to be stored in a single smart contract.</p>	<p>Working on ERC721x, which allows for multiple tokens in a single contract, cheaper batch transfers, doesn't hinder use with existing wallets.</p>	<p>Uses ERC-20 and ERC-721 token standards.</p>
Other	<p>In November 2018, Enjin announced Enjin Beam, which is a QR Airdrop system that will allow game developers to distribute blockchain-based game items.</p>	<p>Loom Network is focused on interoperability as seen in their recent integrations with Cosmos, EOS, & Tron.</p>	<p>Decentraland's Atlas allows users to view a map of the virtual world and each parcel of LAND.</p>

Leader Commentary



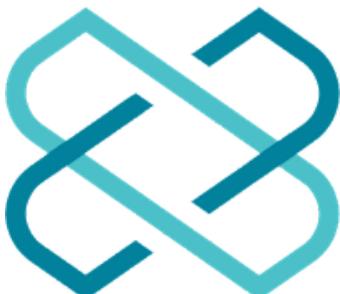
To gain some further insights, we reached out to each of these teams and asked:

"What is the biggest challenge for blockchain gaming to gain traction w/ a mainstream audience?"



Simon Kertonegoro
Marketing @ Enjin

"The main issue is the complexity of learning a new programming language so as to develop their own smart contracts. Which is why out-of-the-box end-to-end development ecosystem are needed for the blockchain movement to reach the next frontier of mass adoption."



Michael Cullinan
Head of BD @ Loom

"Scalability and consumer-grade UX. Developers have been hamstrung by fundamental scalability constraints of existing blockchain infrastructure. That's limited them to building DApps with comparatively treacherous UX - e.g., a game where players are bombarded with Metamask prompts, paying gas for each move, and then waiting 15 seconds for a transaction confirmation."



Federico Molina
Marketing @ Decentraland

"Players are used to online currency, online wallets, virtual goods and online economies. They will never be used to: paying fees for every transaction, transactions taking a while to confirm, and MetaMask's terrible UX. Once these are solved (with layer 2 technologies and consumer-grade wallets), blockchain games will take off."

Gaming on Layer 1

While this Thematic Insights report focused on layer 2 gaming ecosystems, it's important to highlight the extensive game development occurring at layer 1 on **Ethereum**, **EOS** and **TRON**. These three blockchains have seen significant growth in the number of games on their respective platforms. Below, we have highlighted a few such examples, however, this list is by no means exhaustive.



There appears to be fierce competition between these networks in terms of attracting both game developers and users. In addition, this space may only be getting more crowded. For example, [Ripple just announced](#) a \$100 million fund to focus on integrating blockchain into gaming. It will be interesting to watch this space develop given the amount of capital (including human capital) being thrown at the sector. Our team will continue to monitor these developments closely and we'll be providing updates to this report in the coming months.

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Fundamental Valuation

We take a top-down approach to assess the revenue potential of the entire platform before integrating bottom-up analysis to calculate the revenue and profit potential of an individual node running on the network. 2018 values do not factor into our valuation because the network will not be out of the stabilization period (Beta) and fully live until some point in Q4. Given we can forecast free cash-flow per node, growing the effects of taxes, we use a discounted cash flow model to come up with a valuation range.

	2018	2019	2020	2021	2022	2023
Global Exchange Volume	\$17,000,000,000	\$22,000,000,000	\$28,000,000,000	\$35,000,000,000	\$43,000,000,000	\$51,000,000,000
Darkpool Volume % of Total	0.0%	2.0%	5.0%	10.0%	15.0%	21.0%
Nodes % of Darkpool Volume	1%	1%	1%	1%	1%	1%
Fee % Per Transaction	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Revenue % of Revenue						
Nodes	\$3,000,000	\$6,000,000	\$12,000,000	\$20,000,000	\$30,000,000	\$42,000,000
Revenue per Node	\$3,000	\$6,000	\$12,000	\$20,000	\$30,000	\$42,000
Revenue % of Total	3.0%	6.0%	12.0%	20.0%	30.0%	42.0%
Total Fee	\$780	\$1,560	\$3,120	\$5,160	\$7,800	\$11,160
Profit Per Node	\$208.00	\$416.00	\$832.00	\$1,344.00	\$2,016.00	\$2,824.00
Profit % of Total	0.1%	0.2%	0.4%	0.6%	0.8%	1.0%

Base Case

Assumption	Value
Growth Rate	50%
Long Term Growth Rate	8%
IV of Cash Flows	\$103,362
IV of Terminal Value	\$86,681
Total Node Value	\$204,163
Per Node Value	\$22.44
Current Price	\$8.00

Please see our Model Assumptions section for additional information.

Key Assumptions

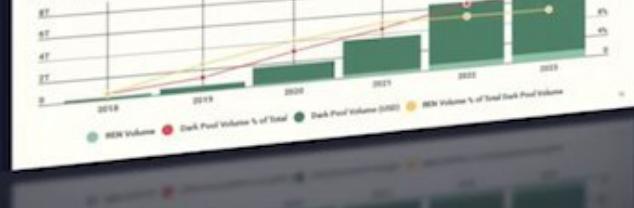
Assumption	Description
Global Exchange Based Volume	Base case global exchange volume 2 year CAGR of 25.2%. Starts at 10% in 2019 and gradually drops down to 20% in 2023.
Dark Pools Share of Global Exchange	Dark pools will gradually capture an increasing amount of global volume, starting at 2.0% in 2019 and ending with 14% in 2023.
Replicon Protocol's Share of Global Dark Pool Volume	Replicon Protocol will capture an increasing share of dark pool volume starting at 0% in 2019, and growing to 10% in 2021 where it will hold for the remainder of the forecast.
Fee to Node Operator	Average transaction fees going to node operators will begin with the current fee of 0.0% and decrease down to 0.2% in 2023.
Node Count	Total node count is forecasted to be 1,000 by 2019 and steadily increasing to 7,000 by the end of 2023.
Costs of Operating a Node	Node expenses are broken down into a monthly fixed cost of \$200 for IPFS and a per transaction fee of \$1.00 per transaction.

Model Assumptions

With that in mind, we divide our global exchange volume estimates by 64% to get an all-encompassing global cryptocurrency volume estimate. We then apply a gradually increasing assumption for how much of this global volume will be captured by dark pools, while keeping the exchange based share flat at 6%. This approach is taken because it's difficult to accurately estimate how the volume dynamics will shift over time, but we believe it's more likely that dark pool volume will cannibalize non-dark pool OTC volume relative to exchange volume because of the type of market participants that it appeals to. We initially assume dark pools make up 1% of total volume in 2018 because new trading firms have publicly disclosed facilitating dark pools. That market share is projected to gradually grow over time to reach 14%, comparable to equity markets, by 2023.

Assumption 2: Replicon Protocol's Share of Global Dark Pool Volume.

Next we establish how much of the general dark pool volume can be captured by Replicon Protocol. The fact that other dark pools can operate on top of the protocol allows Replicon to complement, instead of purely compete with, alternative dark pools. We give Replicon's share of dark pool volume from 1% in 2018 to 10% in 2021, and maintain that level for the remainder of the forecast. We arrived at 10% by dividing 3.0% of global volume captured by the leading centralized and decentralized exchanges, Binance and IDEX, respectively. Binance accounts for 3.0% of global exchange volume while IDEX's share, which fluctuates considerably because of the materially smaller amount of volume on IDEX, is typically 33% to 50% of overall DEX volume. Although Replicon would be competing against centralized dark pools, at a time when DEX's have historically constituted a rounding error sized amount of overall volume, dark pools are very nascent in the crypto space. Considering their nascent status with the fact that centralized exchanges can operate dark pools with their own specific rulesets on top of the Replicon Protocol, we believe that 10% is an appropriately conservative market share estimate. Banks, private trading firms, and other types of organizations can also operate a



Year	Dark Pool Volume (\$B)	Dark Pool Volume % of Total
2018	0.2	0.5%
2019	0.4	1.0%
2020	0.8	2.0%
2021	1.6	4.0%
2022	3.2	8.0%
2023	6.4	14.0%

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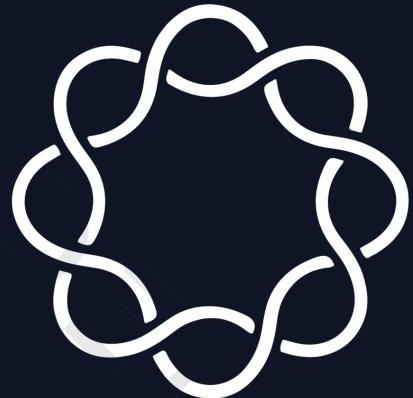
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