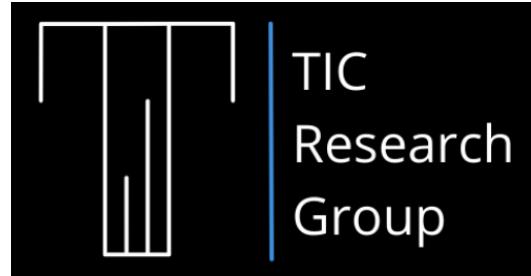


Tufts Investment Club - Research Group FA (Fundamental Analysis)

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A Look into DApps

Decentralized applications are similar to apps like Twitter and YouTube except DApps exist on the blockchain and use a peer-to-peer (P2P) network of computers instead of a centralized system. These apps can range from social media to finance to gaming and are set apart from normal applications by decentralization. Such platforms are resistant to censorship, open to all, and allow developers to build off each other's ideas.

Apps that utilize decentralization use code, specifically smart contracts, to process transactions. Instead of trusting a bank to keep track of your money and display the correct amount in your account, you can trust finalized code that will do just that. No one can manipulate the code to their advantage as decentralized applications are backed by smart contracts. These contracts ensure a private transaction between two parties and only execute if specific criteria or attributes are present. The use of DApps and smart contracts allow the user to trust the transaction without a central authority because they are guaranteed to execute in a predictable way and the code is open-source, meaning anyone can access it. In addition, users' private data cannot be tracked or recorded through the use of DApps, unlike media giants. User transactions are added to the blockchain for anyone to view, but attackers are unable to forge transactions and other DApp interactions on your behalf because of cryptography. Cryptography ensures secure lines of communication through encryption and keys, similar to what is used by private websites. DApps maximize

decentralization by using a back end to store and process anything big enough for the decentralized network. Practically, the coded application and its business logic are stored somewhere in the system of computers that help the DApp run.

There are a variety of blockchains that support decentralized applications but the vast majority are built on Ethereum and Solana. DApps can create financially focused applications for payments or lending, and build play-to-earn games that promote 3D virtual environments (the metaverse). These applications can be applied to both the consumer and enterprise landscapes. This is noteworthy as it allows code to eliminate the traditional middleman that oversees transactions. An example of this is OpenSea, which is the world's largest marketplace for trading certificates of digital assets such as art, videos, and music (non-fungible tokens, or NFTs). Like physical art, investors can purchase NFTs, donate them to a registered charity, and write off their total market value (including capital appreciation) as a tax deduction. Users can take also advantage of programs like Oasis that allow investors to connect their wallets to the platform and pledge over 25 different types of collateral, such as Ethereum, in exchange for an asset loan. The asset loan comes in the form of the stable coin, Dai, which one can then transfer and sell on exchanges like Coinbase on a 1:1 ratio with the U.S. dollar. Using Oasis, investors can use a low-interest loan to pay for everyday expenses while their other investments compound in the background.

While there is a lot of excitement about the future of decentralized applications and bringing power back to the masses, there is still a long road ahead. More developers are needed in the space and there is a lack of user-friendly interfaces. Most users of apps developed by traditional centralized institutions have an ease-of-use expectation that encourages them to use and interact with the app. Getting people to transition to dApps will require developers to create an end-user experience and level of performance that rivals already popular and established programs. As more people begin to shift towards DApps, we can finally move away from the central authorities that track your digital history and play with your personal data.

What are Decentralized Application (DApps)

DApps are programs that exist on the blockchain and uses a peer-to-peer (P2P) network of computers instead of a centralized computer. The applications of DApps includes social media, gaming, and finance. The code for a DApp is open source so everyone has access to it and can trust the program without a third party. Traditional apps use code created by the developers that allow you to interact with their centralized system (Twitter, Youtube). All information entered into the app and your interaction with that app is recorded by the developer.

Popularity of DApps

DApps are fundamentally capable of integrating with decentralized finance. It brings services previously only accessible to affluent investors to the masses.

Examples of popular DApps in financial services

OpenSea.io: the world's biggest marketplace for trading certificates of digital assets such as art, videos, and music (non-fungible tokens, or NFTs). Like physical art, investors can purchase NFTs, donate them to a registered charity, and write off their total market value (including capital appreciation) as a tax deduction against one's ordinary income.

The platform facilitated about \$500 million worth of trading in the past seven days.

Oasis: Investors can connect their wallets to the platform and pledge over 25 different types of collateral, such as ETH, in exchange for an asset loan. The asset loan comes in the form of thestable coin, Dai, which one can then transfer and sell on exchanges like Coinbase on a 1:1 ratio with the U.S. dollar to cash out. This way, investors can use a low-interest loan to pay for everyday expenses while their investments continue to compound.

KLAYswap: an application that enables users to swap their major cryptocurrencies for altcoins (decentralized exchanges, or DEXs). DEXs typically offer many different types of cryptocurrencies than exchanges that deal in fiat money, due to the latter's stringent regulatory requirements. DEXs are easy to use and can provide fast, cheap transfers of currencies.

Investors can also use the blockchain's native KSP tokens to provide liquidity when trading volume is low and earn commissions as if they were brokers. All of this does not require regulation, as KLAYswap does not hold custody of any funds; all transactions take place on users' wallets.

CryptoKitties: Buy NFT kittens and can mate them to create new kittens. Oldest existing kittens are sought after the most. Can sell cats or rent out cats for other people to use them for breeding.

Other games include Zed run which was similar to horse racing. Every horse has different characteristics and strengths, can bet on the winner. Other gambling games like poker can be coded into a DApp. Educational games that also allow you to earn NFTs which can be sold.

Popular platforms for DApps

1. Solana

Solana's major competitive advantage is its unbridled speed. Bitcoin (BTC 1.58%) and Ethereum (ETH 1.62%), the two most-popular blockchain-based networks, are capable of processing a respective 7 transactions per second (TPS) and 13 TPS. Meanwhile, Solana claims to be able to process (drum roll) 50,000 TPS. That's more than twice as fast as payment kingpin Visa, which processes at 24,000 TPS.

Speed and scalability are critical to the future success of dApps and Solana offers solutions to both.

2. Ethereum

Ethereum was the first project to introduce smart contracts. These contracts are what allowed companies to consider moving beyond financially focused applications and consider Ethereum for tasks like supply chain management. There's a whole world of applications beyond just sending and receiving money on blockchain, and Ethereum was the first to utilize this. Ethereum has the most DApps running on it and is the most secure blockchain thanks to its size and coding. Takes a lot longer to run projects however.

Pros of DApps

1. Proponents interested in free speech point out that dApps can be developed as alternative social media platforms. A decentralized social media platform would be resistant to censorship because no single participant on the blockchain can delete messages or block messages from being posted.
2. More control - Enterprise blockchain-based applications are usually designed to connect different organizations or trading partners. If even a part of the solution is centralized, each organization must trust the entity controlling that part. Fully decentralized applications don't have this problem, because a decentralized structure allows each party to run the app without having to trust any other party. This usually results in faster adoption of the application.
3. More privacy as people's identities remain hidden and no centralized authority has their information stored in a file or warehouse since you don't need to submit your personal information to use the application. People's private data cannot be tracked or recorded, and DApps use smart contracts to ensure a private transaction between two parties. Smart contracts only execute if specific criteria or resources are present. Smart contracts can also be analyzed and are guaranteed to execute in predictable

ways, without the need to trust a central authority. Cryptography ensures that attackers can't forge transactions and other DApp interactions on your behalf.

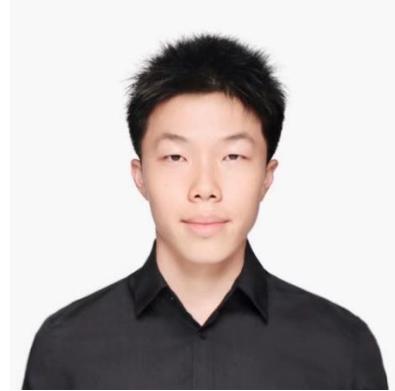
4. All you need is an internet connection and an Ethereum wallet to use most DApps. Your login for most DApps is simply your Ethereum account login. DApps also never go offline unless the native currency where the application is being run on does.
5. Developers can easily edit or add to their existing code. Other developers can work on projects other than their own as well. Lots of opportunity to address demand for fads and other future wants.

Cons of DApps

1. DApps infra is harder to maintain and develop - Running in a complex environment, distributed between peers makes maintenance, debugging, and updates harder because every peer in the network needs to update their node software.
2. Traditional security doesn't work - DApps have no point of failure, which means they're more resistant to attacks than traditional applications. If a centralized app is attacked or taken down, the entire system stops working, whereas a dApp will only fail if every single computer in the network fails – which is near-impossible. Bringing down one server won't be a problem. Therefore, typical security solutions won't work in this case. It's critical to use dApp-specific security solutions, because they operate differently and in a very distinct environment. Valid Networks' blockchain security platform for dApps does just that - securing transactions internationally with proprietary technology for blockchain business applications.
3. The ability to develop a user-friendly interface is another concern. Most users of apps developed by traditional centralized institutions have an ease-of-use expectation that encourages them to use and interact with the app. Getting people to transition to dApps will require developers to create an end-user experience and level of performance that rivals already popular and established programs.

About the Authors

Oscar Zhang is a sophomore from Shanghai, China majoring in Biochemistry and Quantitative Economics, minoring in Entrepreneurship. He is currently interning at Amundi US as an Equity Research Intern and is also an Equity ESG Analyst at Impending Bloom. He has also accumulated financial experience at an investment advisory FinTech company. Outside of academia, he is a martial artist with 10+ years of experience, a black belt and amateur coach in Tae Kwon Do, and a backpacking fan.



Wilson Skinner is a sophomore from San Rafael, California. He is on track to complete a combined major of Human Factors Engineering & Environmental Studies. Wilson serves as a research group member in the Technical Analysis sector of the Tufts Investment Club and has a passion for environmentally significant investment opportunities. In his free time, Wilson enjoys hiking, environmental service work, and skiing.

