



Future Cash Digital



Redesigning the App Economy The first ICO serving

Version 1

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The app economy has three main problems:

1. **Advertising.** Relies on many inefficient middlemen, increasing the cost of user acquisition for app developers, reducing transparency and generating fraudulent transactions. Nowadays, only 4% of the app downloads are triggered by advertising.
2. **App monetisation and in-app purchases (IAP).** Still not massified and can be costly. IAPs rely on payment methods and flows that are not accessible to many users. Especially in emerging markets where the transactions costs are high, with significant margins being taken by payment processors and other FinTech middlemen. Currently, only 5% of users purchase items in apps.
3. **App approval.** Inefficient process related with users' cybersecurity and apps quality assurance that is currently being handled by each centralised app store with non-transparent flows and policies that affect developers' and users' trust.

The solution is FCD Token, an open and distributed protocol for app stores based on the Ethereum blockchain. It proposes to move all three flows to the blockchain. This removes intermediation and redistributes the value released in a way that creates incentives for end-users, developers and app stores alike.

In **advertising**, the protocol guarantees not only that the users install apps but that they pay attention to it for at least 2 minutes. FCD Token calls this *Cost Per Attention* (CPAt). The value invested by the developer in CPAt is used to award users with AppCoin tokens. **IAP** will grow with users using their earned FCD Token or by purchasing them through exchanges. **App approvals** are made universal and more transparent through a developer reputation system. The reputation is tied to the financial transactions on the public ledger and is auditable. A dispute system will be created so that AppCoin owners can vote to rank developers.

The FCD Token business model will have a considerable impact on the app economy. It enables a transition towards a circular economy, reusing value that was previously drained by intermediaries. For now, the FCD Token protocol will focus on the Android market, which has 81.7% of market share.

The first app store to integrate the FCD Token protocol is Aptoide. With over 200 million active users, 4 billion downloads and 6 years on the market, it is one of the biggest third-party Android app stores. Aptoide projects that more than 1.3 billion users will use app stores powered by FCD Token in 5 years.

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1 FCD overview

1.1 The solution

FCD Token is an open and distributed protocol for app stores based on the Ethereum blockchain and smart contracts. It redesigns app advertising, in-app purchases (IAP) and app approval flows through a circular model. As a higher share of the advertising and IAP revenue is kept within the app ecosystem, more value is rooted back into the app economy. Being an open protocol, it also provides more transparency and trust. Multiple app stores can implement and benefit from this and stakeholders will contribute to its development and adoption. Furthermore, simple API integration will allow easy implementation.

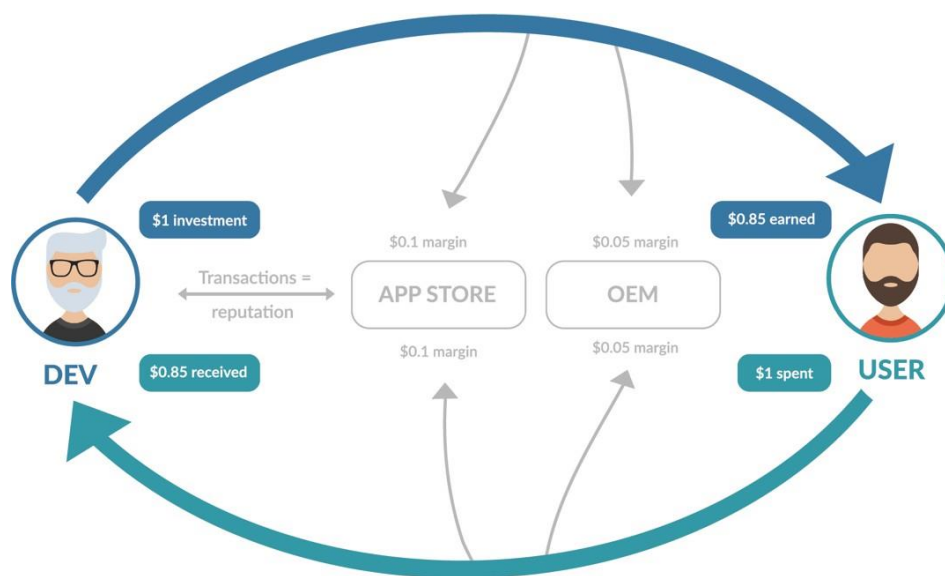
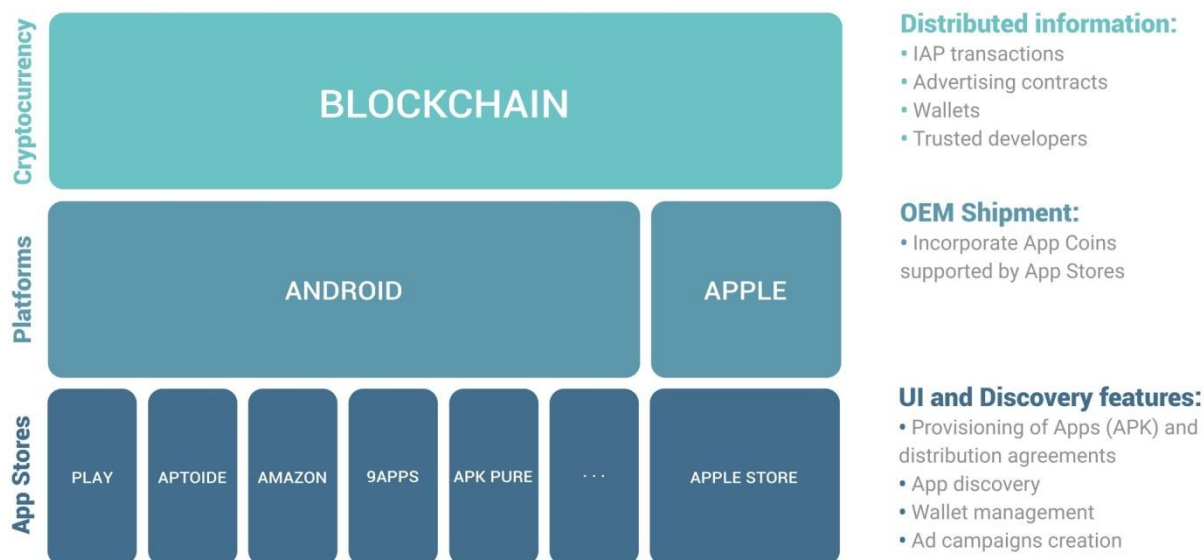


Figure 1 - FCD Token solution

Through FCD Token we can integrate app stores, users, developers, advertisers and OEMs. This system is app store agnostic, existing across different mobile platforms (Android & iOS). In FCD Token, the different app stores act as oracles of the smart contracts, which are associated with each of the platform's core transactions. This system creates a trust layer for the economy, rendering many middlemen obsolete. FCD Token aims to become the universal language of the app economy.

The protocol also includes a so-called *Proof-of-Attention* system. Users, app stores, and OEMs receive tokens through the Proof-of-Attention concept as a reward. Developers that want to advertise their apps can be sure that the user has installed and used it. The users reinvest their tokens via in-app purchases and this creates a virtuous loop that boosts the FCD Token economic growth.



1.1.1 In-store App Advertising

Developers are willing to pay for app installs (via advertising) but there is fraud and high costs of intermediation (ad servers, tracking platforms, etc.). With the FCD Token protocol, advertising transactions are on the blockchain. Developers publish ad offers to a certain app store by creating a smart contract. The tracking of the app installation and usage occurs via *Proof-of-Attention*, reducing fraud. Each app store acts as an oracle, which unlocks developer's funds through a smart contract.

How it works:

- The developer pays for the user's attention (CPAt) – defined at a 2-minute threshold.
- The user receives 85% of advertising revenue in their wallet. This value can be used to pay for in-app purchases.
- The app stores will receive 10% of the revenue for distributing the APK and for being the oracle of the smart contract.
- OEMs who distribute the solution in their devices will receive 5% for the role of pre-loading the app stores and bringing their user base to the system.

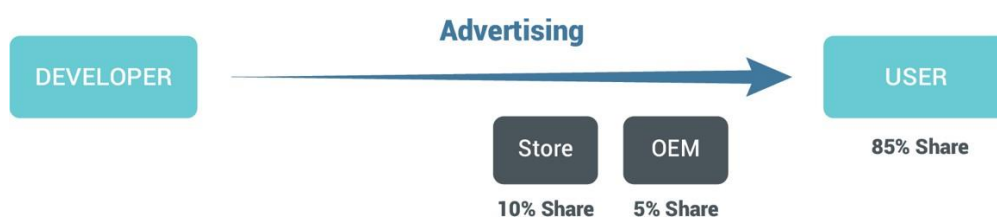


Figure 2- FCD Tokenadvertising flow

The app store will validate the time spent in the app without any intermediaries and will record it on the blockchain. Afterwards, a smart contract transfers FCD Token from the developer's wallet to the user's wallet, OEM, and app store.

Example for Advertising (Smart Contract 1)

When the app store (oracle) confirms the user attention (minimum time using the app) it stores the Proof-of-Attention on the blockchain. As soon as this happens, there's a transfer from the developer's wallet to the user's wallet (85%), app store (10%) and OEM (5%). The value of the transfer equals the ad bid.

1.1.2 In-app Purchases

Many users want to buy items inside apps, but often don't have the means (methods or money). FCD Token can be used to pay for IAP in any app store. Users may earn FCD Token by installing and paying attention to advertised apps, which is a way to engage and incentivise users to participate in the economy. Moreover, FCD Token will be available on several global platforms where users can exchange fiat currency for the tokens. It will also be possible to send/receive tokens to/from other users.

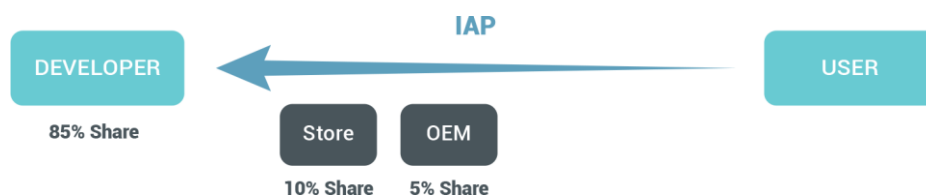


Figure 3 - FCD IAP flow

How it works:

- The price of each in-app item is catalogued in the blockchain, using the developer's private signature. After the sale, the user can continue to use the IAP item since the proof of payment is on the blockchain. Each user can also send non-consumed items to other users.
- Users buy in-app items with FCD Token earned from advertising, exchanged for fiat currency or sent by other peers (P2P transfers).

- Developers receive 85% of the IAP transaction in their wallet directly from the user's wallet.
- The price can be dynamically established by the developer and may change during the app's lifetime.
- The app stores will get 10% of the revenue of purchases made by users, for the role of distributing the APK and as an oracle of the smart contract.
- FCD Token are independent of the store and can be used elsewhere for apps consumption, even across app platforms.
- OEMs (who distribute the solution in their devices) will receive 5% for the role of pre-loading the app stores adopting this solution.

1.1.3 Developer's Ranking

A developer's reputation is based on their transactional history on the blockchain. The reputation of all listed apps is tied to the developer's reputation. It becomes easy to secure the platform since app approval is automated.

Nowadays, users already have tools like comments, ratings and malware flags to rank apps and, inherently, developers. These important feedbacks are analyzed by quality assurance teams, which is an inefficient and costly service. FCD Token protocol provides an automated governance system for app approval based on the developer's ranking. This brings huge efficiency to the quality assurance and apps approval processes.

Furthermore, the proposed developer's ranking will (1) promote transparency in the app approval process of app stores, defining a trust circle with different levels as well as rewards; and (2) a system that promotes the engagement of users in this ranking, performed by a dispute system with incentives. FCD Token ensures an improved experience for users and developers and makes app stores safer from malicious software.

How it works:

The developers' apps ranking system is stored in the distributed blockchain, which the app stores have access to. Management of this "Chain of Trust" is performed by the community/industry, cooperating in an efficient way.

The FCD Token "chain of trust" model exhibits three different types of reputation for developers:

Trusted: The apps of a Trusted developer are considered safe.

Critical: Apps not considered safe and therefore blacklisted.

Unknown: Preliminary status referring to developers before any app has been uploaded. Once an uploaded app is considered safe, the status changes to Trusted. If the app is deemed unsafe, it changes to Critical.

For a **Trusted Ranking**:

There are different “trusted” rank levels and they will be automatically calculated depending on the amount of IAP and advertising transactions in the blockchain.

The trusted status is defined by the interaction or volume of transactions of apps and not the downloads.

The higher the developer engagement in paying for ads, the higher the user engagement, measured both in proof-of-attention and IAP.

The popularity of apps will influence the trusted ranking of a developer. Top games and apps will by default have more transactions (ads and IAP) and, therefore, will enjoy a higher trusted rank.

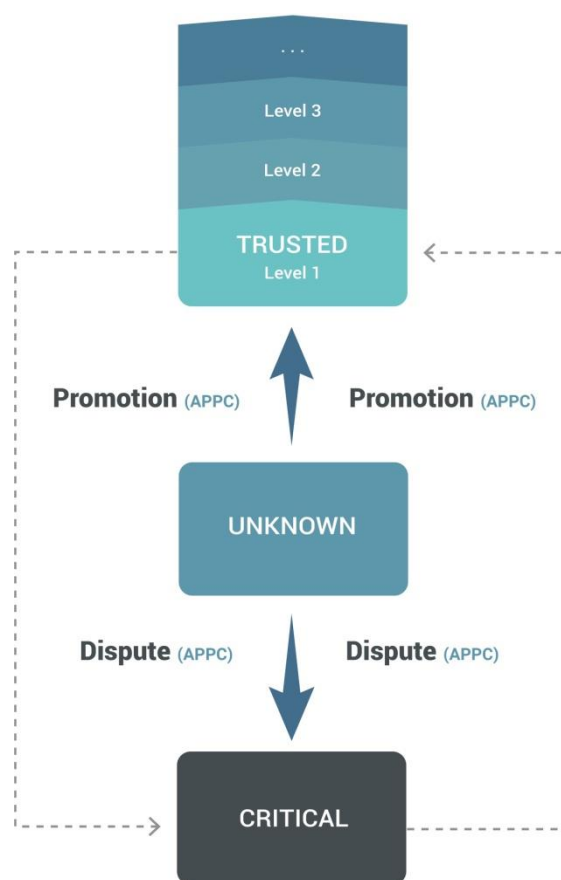


Figure 4 - FCD Token developer's ranking

Example:

A developer uploads an app for the first time and is classified as Unknown. By creating an advertising campaign to acquire users, thus creating a transaction flow, the ranking moves from Unknown to Trusted. Users purchase in-app items and, by creating more transactions, increase the level of trust of the developer in the process.

For the **Dispute system** (giving a “critical” classification):

When malware is detected in an app or if a user wants to report a low-quality app, the dispute system will use a consensus protocol to mitigate the dispute. FCD Token will play a critical role in this.

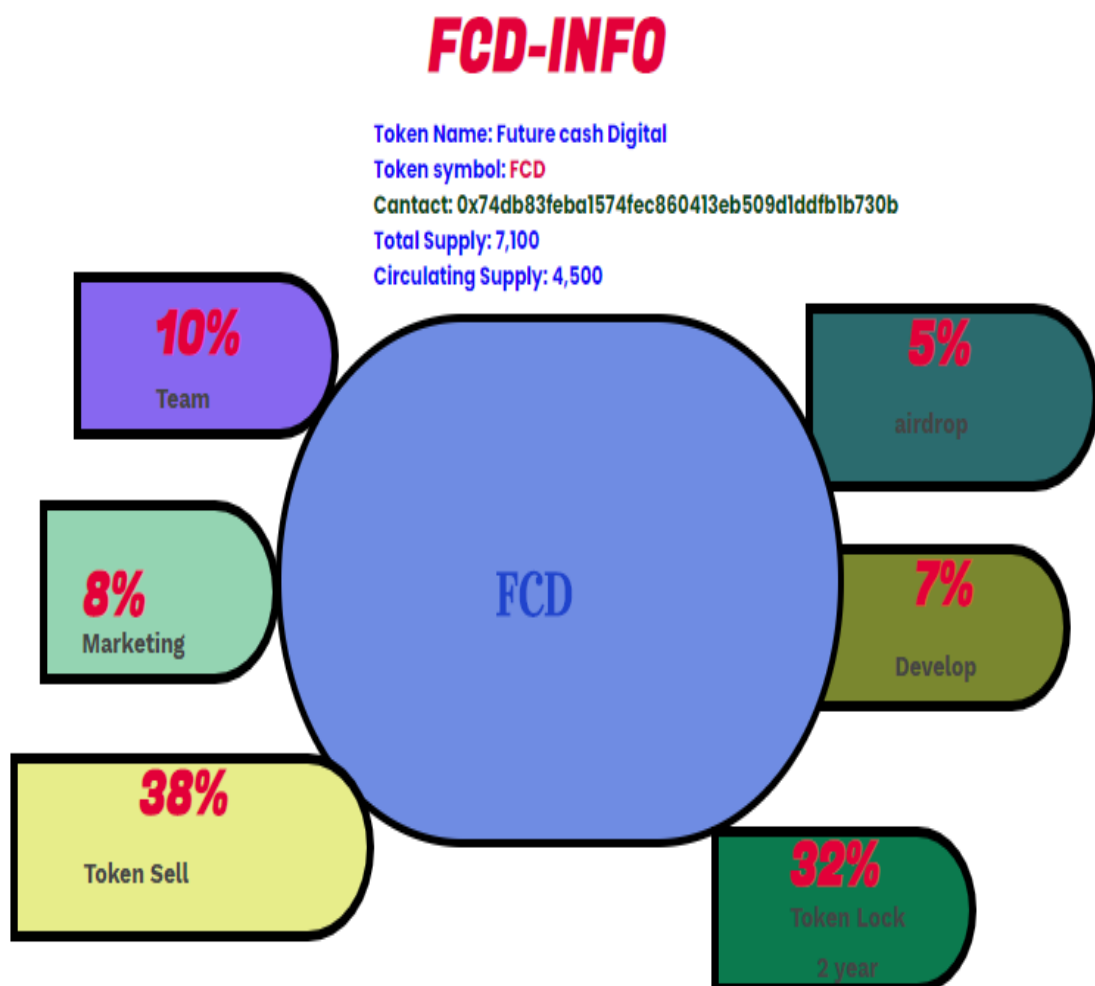


Figure 5 - Ranking dispute

- The opening of a dispute intent - blockchain will allow 7 days in order for other users to respond to a negative classification (intent).
- In case of no response – the developer’s reputation drops down to critical status;
- In case of a response - The user pays a fee in FCD Token to respond and the dispute is open for 30 days so other users can also respond similarly. The dispute will have 2 sides:
 - Contestants (bad ranking side)
 - Pleadors (developer’s side – who want the developer to keep a good ranking)
- After the 30 days, the side that has most FCD Token will win. If the Contestants side wins, the developer is classified as Critical, if the Pleadors side wins, the developer stays or becomes classified as Trusted, so a 50%+1 evaluation of the side that wins.
- There is an incentive mechanism: the side that wins will get their FCD Token invested in the dispute refunded. The side that loses will also get refunded with the FCD Token invested minus 10%. The 10% taken out of the “losing side” will be divided by the winning side (proportional to the amount that user put in).

App stores can decide themselves if they want to hide or remove the app if it is classified as critical.

1.2 Strategies to promote FCD Token adoption

There are several factors that will encourage the adoption of FCD Token protocol among users and developers.

1. **The initial support of Aptoide**, a third-party app store with 200 million users and more than 15 thousand developers enrolled. FCD Token will benefit, since the beginning, of this wide user base and partnerships.
2. **The creation of the App Store Foundation** (section 4.), which will have the aim of encouraging other app stores to adopt FCD Token. Inherently, these app stores will promote the adoption of the protocol by their customers and partners.
3. **The users’ compensation system**, not found in any app store, is a catalyst of more in-app purchases and of accessibility for new paying customers to be active in the app economy.
4. **The trust** of customers on the this blockchain based payment mechanism for mobile apps (inherent to blockchain).

Complementing these factors, 20% of the tokens are reserved for bootstrapping the adoption of users, developers and OEMs. The specific actions are presented in section 6.2.. On the section 3 is presented a reasoned business case to sustain these strategies and forecast the evolution of adoption of FCD Token.

1.3 FCD Token Use Cases

In this section FCD Token use cases for both the consumer and business sides are explained.

1.3.1 Users with no payment system access

Elan moon has an Android smartphone and loves to play games. He would love to purchase in- app items. But the problem is that he doesn't have a credit card or an easy way of sending money to his game wallet.

Consumers in emerging economies such as Brazil still prefer to rely on bank transfer (35%), credit/debit card (21%) and mobile carrier billing/SMS (16%) for in-app transactions [16]. Digital wallets account for only 15% of all transactions. Few of Everson's friends have a credit card. Even fewer do payments online, although he and his friends all own smartphones.

The father of one of his friends has a credit card and is able to pay through his phone. Everson's friend offers to send him 10 AppCoin tokens in exchange for local fiat money. All he has to do is install an FCD Token affiliated app store. Then he can start using his FCD Token through their IAP system on his favourite Android games.

1.3.2 Users with low financial resources

Alis pitar has a small YouTube channel talking about Android apps. Most of his audience are his friends. He's always looking for free alternative apps to well-known tools. **Alis pitar** also looks for free mium games that he can play offline. **Alis pitar** doesn't have a lot of money to spend. Many of his followers on YouTube ask him to review premium features of apps, but he is unable to buy them. If only he could earn some free credit to unlock those features through IAPs. In India, only 3% (compared to 5% globally) of smartphone app users buy in-app items [1].

These problems are solved once he tries FCD Token. Now he plays an important role in the app economy. FCD Token value his willingness and availability to try new apps and games. The more time he spends using new apps, the more APPC he obtains.

1.3.3 Indie Developers



Growstrong Studios

Indie Developer

"We want to ensure our Marketing expenditures have results."



Facts

Developers have a hard time being noticed. The **1000th** most popular app has only **0,2%** of the market.



AppCoins Benefits

Growstrong Studios can obtain a much higher ROI on mobile advertising.

Growstrong Studios is an indie developer. They have been doing paid advertising on app stores to acquire new users. They have noticed two different patterns:

1. A lot of traffic is fraudulent, as the installs they are receiving are not real users; and
2. Many of the real users don't spend more than a few seconds on the app. So far, all of their marketing investment has been wasted.

Mobile app developers still suffer from App Discovery issues, especially indie developers. The 1000th most popular app in the market only has 0,2% of the users [2]. Breaking through the noise is still the no. 1 issue faced by indie developers. Current mobile advertising is not a solution either. Mobile ad fraud losses may reach \$16.4 billion in 2017 [3]. A lot of mobile advertising is ineffective; only 4% of app installs are triggered by advertising. Also, ad fraud practices such as false clicks and installs are rampant.

After testing FCD Token, Growstrong Studios conclude that it makes it considerably more difficult to fake installs or actions. This reduces fraud and guarantees that the users at least try the app, increasing the chances of retention. To further boost conversion, they award the user a few FCD Token for the install and attention. They can even run promotions for them, such as offering items with a special FCD Token price. It's a win-win.

1.3.6 Regional App Stores



Markyt

Regional App Store

"We want access to the best app content from top developers, but top developers don't feel secure uploading their apps to regional app stores."



Facts

99% of app store revenue in China comes from **regional app stores**.

Regional stores are also important in Russia, India, S. America and M. East.



AppCoins Benefits

Markyt has an easier access to top content.

Markyt is a regional Android app store. One of the main problems that it faces is the difficulty in obtaining access to global content. They have very good relations with local developers, and they have good processes to certify their identities, given that there are fewer. The main problem is getting global top developers to submit their own content to an app store they don't know, especially given the difficulties with their QA processes.

Approximately 99% of the app economy revenue in China comes from regional app stores [6]. Regional app stores are important in regions such as Russia, China, India, South-America [7] and the Middle-East [8]. They all experience problems with lack of access to AAA content.

FCD Token is a trustworthy environment where top developers are open to submit their content to different app stores. They don't need to create special versions of their content to process IAP anymore. This gives developers the ability to access previously untapped geographies. FCD Token provides a standardised interface for developers to receive payments in any app store. Top developers now have a reason to trust Markyt and are willing to try out these new app stores, since app distribution is simplified and in return they can earn more profits.

2 Analysis of FCD TokenModel and Impact

Transparency and Openness

The mobile attribution model assumes the advertiser and the publisher don't trust each other. Thus, it relies on a third-party to confirm the advertising results. FCD Token renders the third party obsolete through Proof-of-Attention, with costless built-in transparency enforced by the underlying blockchain. Costless verification is one of the main benefits of blockchain-based financial systems [10].

Additionally, FCD Token transactions rely on publicly available smart contracts. It means that all parties have the mathematical assurance that they can trust each other. Privacy is also safeguarded: cryptography ensures that we can verify transactions without accessing private data. When we have a trustworthy system that also ensures privacy we are facing a truly open economy, which eliminates transactional risks that currently exist. It also creates a safe plug-and-play environment for open innovation from firms.

Recent research suggests that open innovation fosters knowledge spill over effects between firms. This has a positive net effect on overall economic performance [11]. Existing open platforms such as Android have generated higher levels of innovation [12]. Android, in particular, has achieved market leadership very fast (86% as of 2017 [13]). FCD Token' transparency and openness should boost innovation in the app economy in a similar manner.

Closing the Loop Towards a Circular Economy

One of the central aspects of the FCD Token business model is its circular economy. Value previously drained by intermediaries now stays in the system, as a means for users to be active in the app economy. This conception aligns with circular economy principles, bringing huge financial, social and environmental benefits. The circular economy has attracted the attention of major global companies like Google, Unilever and Renault [14]. Global economies are transitioning from the linear model ("take, make, dispose" [15]) to the circular model ("closing loops" [14]). The Ellen MacArthur Foundation estimates the potential impact on the net savings of the EU to be \$630 billion per year

[16]. This led the EU to recently provide funding to support it: over €650 million under Horizon 2020 and €5.5 billion under the structural funds [17]. Despite being associated with manufacturing, these benefits are being transposed to the digital economy, as shown in Google's case study [18].

The principles of the circular economy include, among others, the need to **build resilience**, to **think in systems** and to **share value** [14]. Figure 6 shows the envisioned transition of the app economy towards a Circular App Economy using FCD Token.

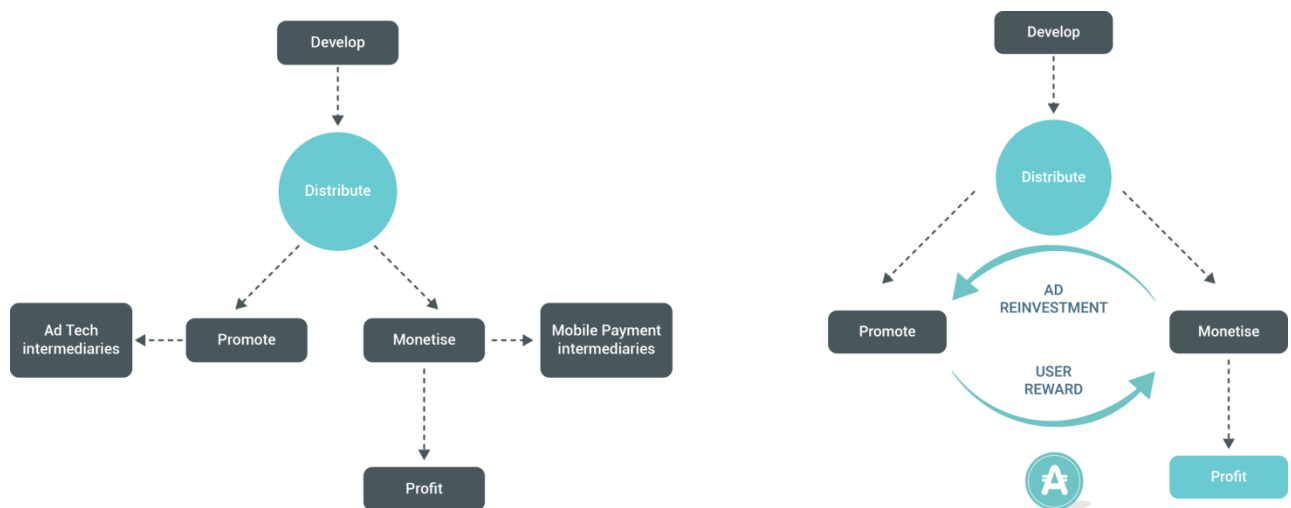


Figure 6: FCD Token closing loops towards a Circular App Economy

The current app economy has gaps. It has no way of reusing resources or building resilience into the system. There are several capital drainers, which prevent the economy from growing optimally. These capital drainers are the payment industry and adtech middle-men. They offer very low efficacy and efficiency. Currently, only 4% of app downloads are triggered by advertising, and only 5% of monthly active users make purchases in the app economy [19]. Therefore, there is no reuse of value within the system, and little value is brought to the key players of the economy: the developers and the users.

On the next section, we present a business case that provides a clear vision of the benefits of moving from the current app economy to a circular economy like the one proposed by FCD Token model.

3 Business Case

The app economy focuses on a global high-volume market that is still growing fast. This business handled 149.3 billion app downloads in 2016, a number that is expected to more than double by 2020 [20]. In March 2017, the Google Play Store had 2.8 million apps available, Apple's App Store had 2.2 million, and the Amazon app store had 600 thousand [21], while Aptoide currently has more than 1 million. Despite being able to encompass the whole app economy, the FCD Tokenproject will focus on the Android market first, which, by the last quarter of 2016 had a market share of 81.7% [22]. In terms of value, the apps market was, by 2016, a \$88.3 billion industry, a value that is expected to more than double by 2020 [23]. However, the app economy has the several inefficiencies previously presented, namely the heavy intermediary services that add little value to the key stakeholders, and the very low percentage of users able, or willing, to pay for apps or purchase in- app items. In the following business case, we provide grounded forecasts for the launch of FCD Tokenin the app economy, and its impact. We focus on: a) FCD Tokenusers' adoption; b) In-store app advertising; c) IAP; and d) The added value to the app economy from the perspective of users, developers, app stores, OEMs, and also adtech and payments industry.

3.1 FCD Tokenadoption

The evolution of FCD Tokenadoption is based on several factors. The first is the **support of Aptoide**, a successful European app store with 200 million unique users doing at least one download in 2017. This app store will promote the initial adoption of the system by integrating the platform and by promoting FCD Token to its users, developers, and partners. A second factor is the creation of the **App Store Foundation**. As described in the next chapter, this foundation will have the aim of building, through open governance, a community of app stores that, by adopting FCD Tokenand by offering it to its user base, will significantly increase the number of users adopting the system. The other factors that will influence the adoption of FCD Tokenare the characteristics of the model itself. Some examples are the **users' compensation**, not found in other app stores, which has the ability of bringing new user segments to the app economy (users without money or payment methods), and the **trust** that comes from blockchain's security and transparency features. Another key characteristic of the FCD Tokenmodel is the **reduction of the intermediation** of the adtech industry. This action tends to lower the costs of app advertisement to the developers, promoting their adoption

3.2 In-store App Advertising

In apps advertising, we propose to reduce the intermediation of the adtech industry, transferring its value (its revenue share) to users, giving them the means to be more active and engaged in the apps economy. We have thus built the following assumptions:

- a. **Users will do more installs triggered by ads** than they do today in order to earn FCD Token, which they can use to purchase items in apps. Currently, based on Aptoide's business intelligence data, only 4% of the apps downloaded are triggered by ads. However, studies from 2017 show that a user is 27% more likely to convert when being rewarded to watch an ad [27]. Therefore, conservatively, we forecast a gradual increase from the 4% of current CPI model, to achieve 27% of downloads triggered by FCD Tokenads at the limit of our timeline (5 years).
- b. Due to the reduction of intermediaries, **developers will immediately pay less** per attention (CPAt) than they pay currently per install (current default CPI model). The adtech industry share is between 40% and 70% of the value paid by developers. Moreover, currently, the average CPI on the Android market is \$0.53 [28]. Conservatively, due to the disintermediation, we have assumed an average CPAt 30% below the current average CPI.
- c. Due to its added value to the market (more downloads triggered by ads; more users doing IAP) we assume that from the 12th month onwards, **FCD Token' CPAt value will equal the rate of increase of conversions** (percentage of downloads triggered by ads). This is a conservative perspective, based on the higher demand of App Advertising services when these prove their benefits.
- d. Currently, each user makes an average of 8.33 downloads per month (Aptoide's business intelligence source).
- e. A forecast of the number of transactions and revenue without FCD Token has been achieved considering the current known facts (4% of downloads triggered by ads and of average CPI).

In-App Purchases

Considering app advertising as the economic flow that will have most of the related value redirected to promote users' activity in the app economy, the IAP is where this activity takes place. Figure 1 depicts the flow between app advertising and IAP, in the FCD Tokenloop (or reuse). To support the business scenario, we have built the following assumptions. With FCD Token:

- a. **On average, each user will spend more on IAP.** We assume that this will happen due to the more trustful and transparent environment, and the improved engagement (akin to gamification) of the users with the system through its compensation mechanism. Currently, the average IAP per paying user, per month, in the Android market is \$6.19 [29]. Adding to this value, users will have the earned FCD Tokens available, equivalent to 85% of the ad conversion related revenue (starting with the CPA at \$0.37 - Table 2 -, where users will receive \$0.31 per ad triggered conversion). We assume that, with FCD Token, the **average IAP per paying user** will be equal to the current average IAP per paying user plus the FCD Tokens earned by each user per month (85% of the CPA multiplied by the number of FCD Tokens' conversions per user). Given that the CPA will increase (Table 2), the average IAP per paying user will also increase (proportionally). Table 3 shows this scenario, which conservatively leads to a moderate increase in the average IAP per paying user. This is coherent with the larger user base engaging in IAP, which is the strongest argument of the FCD Token model.
- b. **The percentage of users engaging in IAP will increase.** This growth is one of the goals and strengths of FCD Token. The system is more inclusive, allowing users that do not have money or payment mechanisms to earn value to spend in the economy. Moreover, users have to spend all the FCD Tokens earned in the app economy. Given that studies from 2017 show that a user is 27% more likely to convert when being rewarded to watch an ad [27], we envision a growth of the percentage of MAU engaging in IAP from the current 5% [19] to 27% by the end of our forecast period (5 years). This growth is also sustained with a similar growth of the percentage of downloads triggered by ads. Given that users have to spend the earned FCD Tokens (for anti-fraud reasons, explained in the technical specifications, users cannot exchange earned FCD Tokens for fiat money), we assume that there is a direct correlation between these two variables (percentage of users engaging in IAP and percentage of downloads triggered by ads, which leads to the earning of FCD Tokens).
- c. The forecast of the IAP revenue without FCD Token has been achieved considering the current known facts (5% of MAU engaging in IAP and \$6.19 as average monthly IAP per paying user).

3.4 FCD Token added value to the App Economy

To illustrate FCD Token' added value to the app economy, we need to compare the new distribution of value with the existing one. In regard to mobile app advertising, the revenue share difference is the following: https://t.me/FCD_Cash/ <https://www.future-cash.digital>

Regarding IAP, currently the value paid by the users when purchasing something in an app has the following distribution of shares:

With FCD Token, the shares are defined in public smart contracts, which brings transparency and trust to the economy. In both cases, OEMs will have a share of 5% to promote the wide market adoption of FCD Token. By providing app stores powering FCD Token by default on their devices, these entities are seen as key drivers for FCD Token' success.

With the revenue share distributions mentioned above, and the revenues of app advertising and IAP shown on previous tables, it is possible to provide the following table that consolidates the incomes of the key players in the app market.

To conclude, with FCD Token the key players in the market - the developers and the users - are the ones being best compensated. Specifically, the developers, who are the content creators in this market, are the ones with the biggest revenue share. Moreover, according to FCD Token model, the compensation generated to the users will be, by default, reused in the apps economy (in IAP).

Table 5 shows the balance between the losses that result from the disintermediation from the adtech industry and the payments industry, with the incomes/earnings generated by FCD Token for developers, users, OEMs and app stores. This balance is highly positive: more than \$20.6M per month after the first year, more than \$207M per month after the second year, and in 5 years, the balance will be larger than \$3.9B.

4 The App Store Foundation

4.1 Overview

At its core, the FCD Token ecosystem is envisioned to be formed by a community of app stores that adopt the FCD Token cryptocurrency to provide higher financial and operational benefits to the key stakeholders of their services: the app developers and the app users. By doing so, this community of app stores will drastically improve the efficiency of the whole app economy while also mitigating current technological challenges like the lack of transparency and digital fraud in advertisement, lack of users' trust in current digital payment mechanisms and the lack of accessibility of the app users to the economy (lack of money or of payment methods).

To ensure the independence and sustainability of FCD Token, a foundation will be created as a not-for-profit organisation: **The App Store Foundation (ASF)**. The mission of the ASF is to assure the open governance of the FCD Token ecosystem, to support its development (after the initial implementation performed by Aptoide) and the continuous open innovation of the technology. Furthermore, it is also ASF's mission to promote the global FCD Token adoption and support among the direct stakeholders, app stores, users and developers, and among key strategic entities for the scaling up of the ecosystem user base, such as OEMs, governments or telco companies.

Moreover, given that the FCD Token system is built upon several other projects and technologies, we believe that it is important to give something back to the related community. The blockchain and cryptocurrencies are still in their infancy and there are still several challenges to be solved in order to fulfil the industry's potential, like latency, scalability and transaction costs. Projects and innovations will emerge to bring the benefits of the technology to the daily lives of people. As a way of recompensing the blockchain community, the ASF aims at supporting open source projects in its areas, as we believe that these contribute to creating communities able of fostering innovation. In addition, ASF will sponsor events for people to present progress regarding the work in the field, promoting the share and discussion of innovative ideas.

4.2 Objectives

- (1) **Governance:** Assure the independent, fair and transparent governance of the ecosystem, taking into account the opinions and needs of the majority of community members. The actions of governance encompass decisions related with participation rules, compliance guidelines, new technology / projects approval and any other decision that affects the community or the FCD Token ecosystem.
- (2) **Development:** Assure and manage the funds for the development of the reference implementation of components in the FCD Token protocol, as well as for its maintenance and scalability (after 18 months, when the Foundation is created and takes control over the FCD Token protocol and ecosystem). This shall be done by promoting the creation of a community of developers working on the open FCD Token ecosystem.
- (3) **Innovation:** Assure a continuous open innovation of the platform, directing and funding research and development projects approved by the community, as well as the integration of viable results on the FCD Token ecosystem. Acquiring external funding (e.g. at Research and Innovation frameworks like NSF or H2020) shall be considered for these initiatives.
- (4) **Dissemination:** Assure the promotion of FCD Token globally, stimulating the adoption and support among direct stakeholders, like app stores, users and developers, and among key strategic entities for the sustainable scale-up of the ecosystem, like OEMs, governments or telco companies.

4.3 Operational aspects for the ASF formation

To direct the inception of the ASF, these are the following guidelines and roadmap:

- The Board of the Foundation will be elected by the FCD Token owners, with voting weight proportional to the number of FCD Token they own.
- The Board Members vote for the approval of new protocol versions proposed by the

November 2020	November 2020	December 2020
Discussion of the Foundation rules and bylaws (Founders and FCD Token holders)	Foundation creation and board election by FCD Token holders	Foundation takes over the protocol definition and reference implementation

5 Roadmap



5.2 Technical

06-Nov-2017 – FCD Tokenprotocol V1 is made

available. FCD TokenV1 protocol comprises:

- *Definition of the scope covering the three main flows*
- *Smart contracts algorithm definitions*
- *Blockchain data structures*
- *On-chain / off-chain scope definition*

the technical definition of the three main flows: in-store advertising, in-app purchase with tokens and reputation building.

Although a protocol is a set of rules that can permanently be enhanced, is important to define some milestones and release major versions. The reason is to allow the development of a reference implementation of a specific version of the protocol, and prevent the “moving target” syndrome.

4-Dec-2017 (“Turing release”) - Proof-of-concept of In-App Purchase transaction on Ethereum test network

A proof-of-concept will be presented integrating the Aptoide vanilla client using Ethereum ERC20 tokens to do an In-App Purchase (IAP).

The flow has the following steps:

1. User installs a game with Aptoide IAP support
2. User buys digital item inside the game
3. Aptoide IAP Android Activity is triggered by the game to process the checkout of the purchase
4. Aptoide IAP Android Activity shows the number of App Coins needed to buy the item
5. User agrees with the value
6. Aptoide vanilla client creates the ERC20 token transaction and send to the Ethereum test network
7. After the transaction is confirmed, the purchase is released and the user can see an updated balance of FCD Token in the Aptoide vanilla client

The development can be followed in

21-Mar 2018 (“Neumann release”) - Reference tools of the protocol implementation

In this date, it will be released:

- Open source reference implementation of libraries, command line tools and SDK for FCD Token developers

To have a healthy and easy-to-use development environment it is useful to exist an open source implementation of the FCD Token protocol. These libraries will allow that a new app store or a developer can join the FCD Token protocol is a faster way, without having to develop everything from scratch. This tools and source code will be available in as the other FCD Token’ software tools.

2-May 2018 (“Gosling release”) - “Dev” version of the FCD Token integration in Aptoide (on- chain)

A first implementation of the FCD Token protocol by a “client”, in this case Aptoide app store. For this MVP, an APK of Aptoide app store “Dev version” (<https://aptoide-dev.en.aptoide.com>) will be made available. This version of Aptoide (v9.0_dev) will support two main financial flows:

- Install advertised apps earning FCD TokenERC20 tokens
- In-app purchases with ERC tokens.

This version of Aptoide will not integrate the reputation system as the development require that transactions exist to build the reputation, which only happens after the first deployments. The aforementioned version will not include side-chain integration with a state channel / payments channel. We consider that potential integration, so soon in the development roadmap, would force to make wrong decisions, result of the used technology (Raiden, OmiseGo) not be yet ready according to those projects’ technical roadmaps. The transactions in this Aptoide version will be directly in the blockchain, which is reasonable in terms of transaction fees and scalability since the user base will be restricted to testers of the developers’ version.

2018/2019 – FCD TokenProtocol Vx.

The protocol is a “live” document that under the ASF foundation will receive contributions from the community, app stores and the research projects developed.

5.3 Business

November 2020 - 500 key developers' engagement to integrate FCD Token SDK in their apps & games. The first effort will be to bring developers on-board. Using the 12.000 top developers Aptoide network will leverage this effort.

November 2020 – Tier 1 OEMs (Oppo, Vivo, ...) engaged and pre-loading. Aptoide Shenzhen (South of China) office will be responsible for the kick off of this task. Opened in September 2015, this office has 3 people full-time and have a strong network in the Shenzhen ecosystem.

December 2021 – FCD Token Protocol Viral actions with users – peer-to-peer actions. As explained on the section 6.2 this will replicate some of the already tested digital marketing viral initiatives. Coming after the engaging of Developers and OEMs, at this phase the users will find a thriving app store ecosystem.

6 Token Allocation, Crowdsale and Bootstrap

6.1 Token Allocation

In order to fund and boost the FCD Token roadmap, an Initial Coin Offering (ICO) will be conducted. The details for the ICO are presented in Table 7, and it will follow the roadmap presented in the previous section.

Table 7 - ICO Details

Total number of tokens	7100
Tokens available	7100 (40%)
Listing price	1 ETH = 5 FCD
Emission rate	further tokens
Token pre-sales	20% of all tokens Uncapped, fixed price First come, first served Discount: 1% Only for ecosystem
Token sales	20% of all tokens Uncapped, fixed price Open to the public
Soft Cap	US\$14k
Hard Cap	US\$20k
Token format	ERC-20 Standard
Currency accepted	ETH

The pre-sale and public sale will distribute 40% of the total number of tokens. The remaining tokens will be distributed as follows:

- **App Store Foundation - 15%** - to support the foundation inception, vision and goals;
- **Bootstrap initiatives (Developers, OEMs, users) - 20%** - to support and speed up the adoption of FCD Token;
- **Key Contributors - 10%** - for the influential blockchain key elements and contributors to the ICO idea development;
- **Aptoide - 15%** - for the initial support and contribution to the community.

Figure 7 depicts the FCD Token' tokens allocation as previously described.

All the FCD tokens, except those used to speed up the adoption and the ones reserved for the ASF, will be attributed when the crowdsale process ends, on a token distribution event (more details at www.future-cash.digital). The tokens reserved for the ASF, 15% of the total amount, will be used for its inception and the remaining ones attributed when the ASF takes control over the protocol and reference implementation. The tokens that will be used to speed up the adoption of FCD Token, 20% of the total amount, will be distributed to developers, OEMs and users as shown in Figure 8.

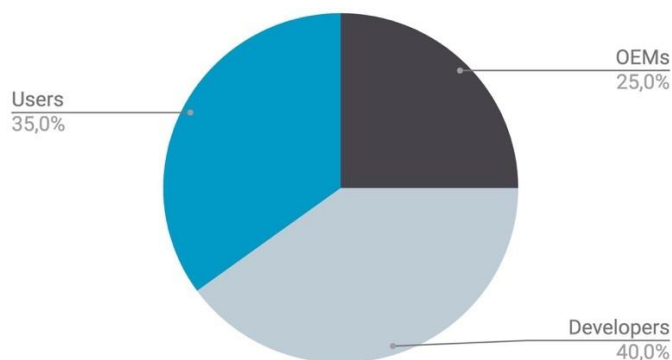


Figure 8 - Bootstrap Token Distribution

This particular distribution of the tokens is due to the fact that developers, users, and OEMs are key players in the app economy and their engagement is a key factor for the success of FCD Token. Specifically:

- **Developers:** Have to adopt FCD Token as (1) the model of app advertising and (2) as the method of payment for IAP. Therefore, developers are critical players for the adoption of FCD Token. will be distributed to key developers (who have apps with a large user base) in order to foster their swift understanding of the benefits that the system brings to them and to speed up their adoption. These players will be incentivised from the beginning of the project given that they have to provide means for the users to be able to use FCD Token in their apps.
- **OEMs:** The device manufacturers have the power to considerably influence the app economy, given that they select which app stores to include by default on the mobile devices. Therefore, a share of FCD tokens will be delivered to these players to incentivise them to integrate app stores that adopt the FCD Token model. The rollout with OEMs is scheduled for the 6th month onwards, when an MVP is available and a critical mass of developers is onboard.
- **Users:** Along with developers, users are the key target audience of FCD Token, for whom the envisioned ecosystem brings improved trust and accessibility to the app economy (the availability of FCD Token to spend in the economy adds the value and the payment method). The allocation of tokens to users will be used to speed up their

The strategies of bootstrapping for each of these players are presented in 6.2. The bootstrap tokens not used when the ASF takes control over the protocol and reference implementation will be assigned to it in order to assure the continuity and stability of the strategies to foster FCD Token adoption.

6.1.1 ICO funds distribution

The funds received from the FCD Token crowdsale will be applied in: (a) development of the solution; (b) marketing towards its dissemination and adoption; (c) strategy and operation; and (d) legal costs. Figure 9 depicts the funds distribution.

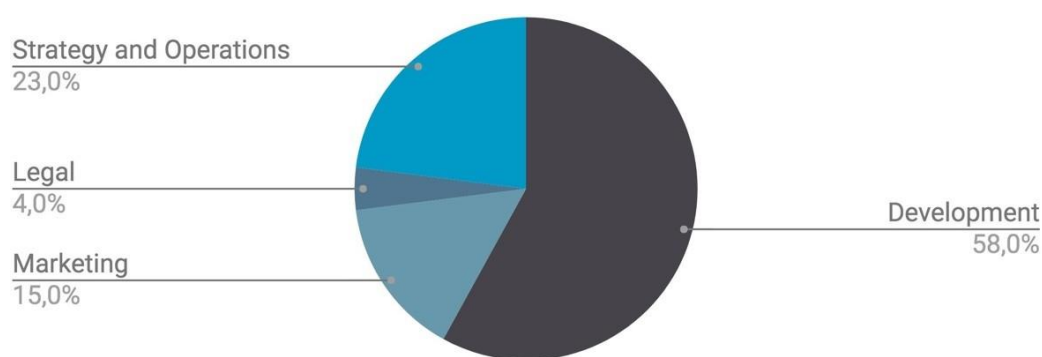


Figure 9 - ICO funds distribution

Development (58%)

The technical development is paramount for FCD Token' success, which is why the majority of the fund allocation will go into this effort. Aptoide's engineering team, with its wide experience in architecture and development of app stores' solutions (including payments and advertising), will form the basis for this team, which will be enriched with the hiring of blockchain specialists.

Marketing (15%)

The marketing costs include those for the initial promotion of FCD Token to developers, users, OEMs and app stores. These include a marketing team that will drive a worldwide dissemination effort, namely of the multilingual website, community building, social network presence and relation efforts.

Strategy and Operations (23%)

This includes costs for different teams, namely business development, administration and finance, strategy, and the whole cost for the operation of the project (participation in events, travel

and equipment). The business development team will be responsible for approaching and maintaining contact with the target audiences of FCD Token. The administrative and finance teams will be responsible for controlling and dispensing the funds accordingly to the project needs and to provide regular reports to the management / strategy team. The strategy team will be formed of key contributors to the FCD Token idea and technological and business managers, which will orchestrate the project teams towards FCD Token vision and goals until the transfer of the governance to the AFS is completed.

Legal (4%)

The legal team will provide advice in the aspects related to the technical regulations, IPR, foundation creation and policies specific to each local market.

The resources released by the ICO will be applied by Aptoide in the development, marketing, strategy and operations, and legal efforts, to bootstrap the FCD Token platform. Further description of Aptoide can be found in section 8.

6.2 Bootstrap strategy

The FCD Token bootstrap strategy consists of engaging with the ecosystem players to speed up their adoption. Following are presented examples of actions that comprise this strategy.

6.2.1 Developers

AppCoin tokens will be attributed to developers in the bootstrap phase to encourage them to add their apps to app stores powering FCD Token. To promote the developers' fast and wide adoption, AppCoin tokens will be attributed as follows:

- For the **first upload of each app** to an app store powering FCD Token, the first 50 conversions will not be charged and the FCD Token related to the CPA will enter the economy as if the developer paid for the service.

6.2.2 OEMs

During the bootstrap phase, to get OEMs on-board and have them including app stores powering FCD Token, there will be a bonus attribution of tokens as follows:

- **5 FCD Token per device** with an app store powering FCD Token.

- **For each 500 devices deployed** with an FCD Token app store by default, **a bonus of 500 FCD Token is attributed.**

6.2.3 Users

Users earn FCD Token from ad triggered installs and from spending 2 minutes of their attention (watching for 2 minutes) to the installed apps. During the bootstrap phase, to speed up the adoption of the system, tokens will also be distributed to the users as follows:

- Users receive **3 FCD Token on the first install of an app store** that powers FCD Token.
- With **each purchase** of FCD tokens, **users receive twice as much as the purchased FCD Token.**
- Users receive **3 FCD Token after each referral to friends** to install an app store powering FCD Token. The tokens are delivered after the registration of the user invited who also receives 3 FCD Token).

7 FCD Token team

The FCD Token team comprises 18 professionals experienced in the areas of Engineering, Management, Operations and Marketing that, together, encompass all the needs for delivering the FCD Token project successfully. Follows the presentation of some elements of the team. Check the FCD Token website for the rest of the talent responsible for the FCD Token Protocol.

Tulai mansul

CEO /

Founder

of Numbers using NFS and Elliptic Curves and a PhD in solving dependencies in software components installation.

A member of the open source community for a long time. He was founder and maintainer of LinuxCM, a Linux distribution with more than 700,000 users between 2007 and 2011.

Tutu man

COO / Founder

entrepreneur who loves technology, innovative ideas and projects. As a former ESOP President, the Portuguese Association of Open Source Software Companies, he has been advocating, for more than 15 years, the adoption of open technologies and open standards in private companies and in the public sector. Álvaro has a degree in law.

Alias

Alves VP

Asia Pacific

Tiago has experience in technology related roles. He is a Software Engineering graduate from the University of Macao, with a Master Degree in Mandarin and an MBA in Tech Management from the University of San Francisco.

tanisa

\$ VP

Product

to build the new internet of apps, Ren spent over 8 years in the US and in Germany incubating mobile games and apps at top tech companies such as Good games, EA, and Disney.

Marçalo

Head of Partnerships

with more than 10 years experience in business corporate strategy, leading Partnerships at Aptoide for the last 4 years. VP of OLD Association and member of SOCIUS Research center. Carolina holds a MA Degree in International Economics, and a BA in Economics from UMass Dartmouth.

Alen pitar

Casal Head of R&D

years of experience in IT, being the last 5 in Research and applied R&D Management in multinational contexts. Participated and led several R&D projects in mobile computing areas, including mobile payments and mobile advertising. Holds an MSc in Systems Engineering and a professional certification in Scrum.

Luis angel

Marketing Technologist

Marketing Technologist, working on projects at the intersection of Marketing, Technology and Analytics. He has experience in social network analysis, deep learning and natural language processing technology to solve marketing problems.

migasogo Pires Backend Developer

Do has a background in Robotics and experience deploying scalable solutions in large-scale backend systems with new technologies.

Martin bitac

Backend Developer

Martin led most of his career as a software developer in Vienna, Austria. He has been developing in Python since 2002.

Mitali Castro Head of System Administration

is a former IBMer who built his career as an IT Consultant in the Czech Republic before moving to Lisbon. He takes particular interest in site reliability engineering and everything blockchain.

These professionals belong to the Aptoide company, which, due to their knowledge of each other, assures coherent and articulate processes. The team is highly experienced in the business and technological areas where the FCD Token protocol will be used.

Besides this team, FCD Token is also supported by 7 advisors who have a broad and very relevant experience in blockchain, cryptocurrencies, financial investment, app store's processes, and also in successful recent ICO's. Among these renown advisors can be found experience in projects like Bitcoin, Ethereum, Ripple, TenX, e.ventures, Google Play and Kyber Network. FCD Tokenadvisors are:

Important notices

The FCD Token are not securities or units in a collective investment scheme or business trust, each as defined under Singapore's Securities and Futures Act (Cap. 289) ("**SFA**"). Accordingly, the SFA does not apply to the offer and sale of the FCD Token. For the avoidance of doubt, this initial offering of FCD Token need not be accompanied by any prospectus or profile statement and no prospectus or profile statement needs to be lodged with the Monetary Authority of Singapore ("**MAS**").

This Crowdsale Document does not constitute an offer of, or an invitation to purchase, the FCD Token in any jurisdiction in which such offer or sale would be unlawful. No regulatory authority in Singapore, including the MAS, has reviewed or approved or disapproved of the FCD Token or this Crowdsale Document. This Crowdsale Document and any part hereof may not be distributed or otherwise disseminated in any jurisdiction where offering tokens in the manner set out this Crowdsale Document is regulated or prohibited.

The information in this Crowdsale Document is current only as of the date on the cover hereof. For any time after the cover date of this Crowdsale Document, the information, including information concerning Aptoide's business operations and financial condition may have changed. Neither the delivery of this Crowdsale Document nor any sale made in the related initial token offering shall, under any circumstances, constitute a representation that no such changes have occurred. Aptoide does not make or purport to make, and hereby disclaims, any representation, warranty, undertaking, or other assurance in any form whatsoever to any person, including any representations, warranties, undertakings, or other assurances in relation to the truth, accuracy, or completeness of any part of the information in this Crowdsale Document.

Whether taken as a whole or read in part, this Crowdsale Document is not, and should not be regarded as, any form of legal, financial, tax, or other professional advice. You should seek independent professional advice before making your own decision as to whether or not to purchase any FCD Token. You are responsible for any and all evaluations, assessments, and decisions you make in relation to investing in the FCD Token. You may request for additional information from Aptoide in relation to this offer of FCD Token. Aptoide may, but is not obliged to, disclose such information depending on whether (i) it is legal to do so and (ii) the requested information is reasonably necessary to verify the information contained in this Crowdsale Document.

FCD Token are intended for use within applications available on the Aptoide App Store for purposes including purchasing in-application items and serving as a medium of in-application advertising revenue, and Aptoide warrants that the FCD Token are fit for these purposes. However, Aptoide is not responsible for

compelling any person to accept FCD Token and disclaims, to the fullest extent permitted by law, all liability for any adverse consequences arising out of or in relation to such rejections of FCD Token.

Upon purchasing any FCD Token, you will be deemed to have reviewed this Crowdsale Document (and any information requested and obtained from Aptoide) in full and to have agreed to the terms of this offering of FCD Token, including to the fact that this offering does not fall within the scope of any securities laws in Singapore and is not regulated by the MAS. You further acknowledge and agree that the FCD Token are not securities and are not meant to generate any form of investment return.

The FCD Token and related services provided by Aptoide (if any) are provided on an “as is” and “as available” basis. Aptoide does not grant any warranties or make any representation, express or implied or otherwise, as to the accessibility, quality, suitability, accuracy, adequacy, or completeness of the FCD Token or any related services provided by Aptoide, and expressly disclaims any liability for errors, delays, or omissions in, or for any action taken in reliance on, the FCD Token and related services provided by Aptoide. No warranty, including the warranties of non-infringement of third party rights, title, merchantability, satisfactory quality, or fitness for a particular purpose, is given in conjunction with the FCD Token and any related services provided by Aptoide.

Risk factors

Regulatory risks

The regulation of tokens such as the FCD Token is still in a very nascent stage of development in Singapore. A high degree of uncertainty as to how tokens and token-related activities are to be treated exists. The applicable legal and regulatory framework may change subsequent to the date of issuance of this Crowdsale Document. Such change may be very rapid and it is not possible to anticipate with any degree of certainty the nature of such regulatory evolution. Aptoide does not in any way represent that the regulatory status of the FCD Token will remain unaffected by any regulatory changes that arise at any point in time before, during, and after this offering.

No regulatory supervision

None of Aptoide or its affiliates is currently regulated or subject to the supervision of any regulatory body in Singapore. In particular, Aptoide and its affiliates are not registered with MAS in Singapore as any type of regulated financial institution or financial advisor and are not subject to the standards imposed upon such persons under the Securities and Futures Act, Financial Advisors Act, and other related regulatory instruments. Such persons are required to comply with a variety of requirements and standards concerning disclosures, reporting, compliance, and conduct of their operations for purposes or maximising investor protections. Since Aptoide is not subject to such requirements or standards, it will make decisions on those issues at its own discretion. While Aptoide will have regard to best practices on these issues, holders of FCD Token may not necessarily enjoy the same extent and degree of investor protections as would be the case should they invest with regulated entities instead.

No fiduciary duties owed

As Aptoide is not a regulated financial institution, it does not owe investors in FCD Token any fiduciary duties. This means that Aptoide has no legal obligation to always act in good faith in the best interests of holders of FCD Token. While Aptoide will have regard to the interests of holders of FCD Token, it is also permitted to consider the interests of other key stakeholders and to prefer these interests over the interests of FCD Token holders. This may mean that Aptoide is permitted to make decisions that conflict with the interests of FCD Token holders. Not owing any fiduciary duties to holders of FCD Token also means that holders of FCD Token may have limited rights of recourse against Aptoide and its affiliates in the event of disputes.

Tax risks

The tax characterisation of FCD Token is unclear. Accordingly, the tax treatment to which they will be subject is uncertain. All persons who wish to purchase FCD Token should seek independent tax advice prior to deciding whether to purchase any FCD Token. Aptoide does not make any representation as to whether any tax consequences may arise from purchasing or holding FCD Token.

Risks from third parties

The tokenised nature of FCD Token means that they are a blockchain-based asset. The security, transferability, storage, and accessibility of blockchain assets depends on factors outside of Aptoide's control, such as the security, stability, and suitability of the underlying blockchain (in this case, the Ethereum blockchain), mining attacks, and who has access to the private key of a wallet where FCD Token are stored. Aptoide is unable to assure that it can prevent such external factors from having any direct or indirect adverse impact on any of the FCD Token. Persons intending to purchase FCD Token should note that adverse events caused by such external factors may result in the loss of some or all FCD Token purchased. Such loss may be irreversible. Aptoide is not responsible for taking steps to retrieve FCD Token lost in this manner.