PumaPay

A PullPayment Protocol

CRYP2NOVA

- White Paper -

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The updated version of this document can be found at https://pumapay.io/docs/pumapay_whitepaper.pdf

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Abstract

Retailers and service providers are struggling with inefficient and costly payment mechanisms, which have not kept pace with the evolution of global commerce. Nothing – credit cards, alternative payments, virtual coins, or blockchain technology – has yet adapted to today's various processing needs in order to provide an optimized solution for payment processing. **PumaPay**'s PullPayment protocol (the "Protocol") under development, is intended to solve this problem by utilizing a new architecture of smart contract called "PullContract," which enables new billing methodologies over the blockchain. We wish for the Protocol to promote more frequent use of cryptocurrency in online and offline markets, thereby significantly increasing the total volume of payments transacted with cryptocurrencies, as well as contributing to the global trend of payment decentralization.

The Protocol is intended to be a comprehensive solution which offers robust payment mechanisms far more credible, efficient, flexible, cost-effective, and scalable than current implementations. Unlike today's payment methods, which include credit cards and virtual coins like Bitcoin, the Protocol is being designed from the ground up with the intention to overcome some of the existing payment problems. In addition, we believe the Protocol will have the potential to increase economic efficiency, reduce friction, and minimize risks by removing intermediaries such as credit card companies that also charge excessive fees.

The Protocol is designed as a free, open-source project built around a customizable chain of contracts that govern transaction behavior. It can be set as a simple single transaction, a complex transaction that includes, among others, recurring payments, pay-per-use payments, split payments, restricted payments, exchange rate corrections, or a combination of the above. Businesses will be able to use the Protocol's payment mechanism as is or modify and/or create new ones to fit their needs. We believe the solutions offered by the **PumaPay Protocol** will create business opportunities for external third-party companies that can build additional services on top of the Protocol and contribute to the **PumaPay** ecosystem. Such services may include, but are not limited to credit facilities, transactions, insurance, dispute arbitration and escrow services, code verification services and others.

It is our intention that the **PumaPay Protocol** be promoted through partnerships with businesses that have significant turnovers, by encouraging them to adopt the **PumaPay** ecosystem from the onset. Through our Launch Partner, we hope the protocol will plug into industries with tens of thousands of daily customers spanning numerous markets.



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Motivation

To date, the dominant payment method for online as well as offline purchases has been payment cards (credit cards, debit cards, prepaid cards, etc.). The problem is that payment cards were developed in the 1950's, before the existence of personal computers and the internet. They were originally designed for offline transactions, where the customer approved a transaction by manually signing a receipt. Payment cards were not designed to deal with our modern, fast-paced, global economy. Their popularity is mostly due to a lack of acceptable alternatives for electronic payments. Payment card usage perpetuates an anachronistic system, which suffers heavily from infrastructural inefficiencies.

The structure of the payment cards' ecosystem is very complex and consists of multiple participants: Credit Card Associations (Visa, MasterCard, AmEx), Issuing Banks, Acquiring Banks, Processors and Payment Gateways, to name a few. The market is oligopolistic and the incumbent players each control their networks, dictating the rules and the costs. This centralistic structure leads to inefficiencies. Similar to many other centralized systems, the intermediaries in the payment ecosystem use their power to increase the spread between the value they extract and the value they add. The merchants that depend on card acceptance for their existence have to comply with an endless list of rules dictated by the owners of these networks. Moreover, they are also subject to a complex fee structure that ranges from 3%-15% of their gross receipts, (depending on the settings), and to add insult to injury, they are also exposed to the risks associated with fraudulent activity and chargebacks.

The introduction of Bitcoin as an electronic cash system in 2009 was the first step towards a modern online payment solution. Bitcoin was originally designed to address trust issues and to optimize security, but at the expense of scalability, speed, and cost. As a result, Bitcoin in its current construct, is unable to offer flexible processing solutions for most of the current online billing methodologies. None of the cryptocurrencies that were introduced over the past few years has provided a comprehensive payment solution that allows crypto holders to utilize their cryptocurrencies as a means of payment. Cryptocurrencies are far too underdeveloped to compete at scale with payment cards, they suffer from poor acceptance by merchants mostly due to their complexity of usage and they do not support transactions that are more sophisticated than a simple 'push' transaction.

There is a real need for a payment infrastructure that is built to serve merchants, not exploit them. A system that is built from the ground up for the digital era and that is as scalable, flexible and accessible as payment cards, but without their inherent flaws and disadvantages. Blockchain technology offers a great opportunity to create such a system for the benefit of merchants and consumers alike.

PumaPay Protocol is an attempt to design such an infrastructure, which would have the potential to grow into a fully decentralized payment system.

Payment Cards

There are several types of payment cards that are managed by and run on specific networks like Visa, MasterCard, and American Express (AmEx). These include multiple card types such as credit, debit, pre-paid, and charge cards. Payment gateways like PayPal or Stripe and e-wallet systems such as Apple Wallet and Google Wallet are developed around payment cards.

Payment cards accommodate over 77% of global commerce. Of over 257 billion cards transactions worldwide, Visa cards alone generated 54% worldwide in 2016[1].

Ecosystem structure

Every card swipe or tap triggers a complex process, as payment data is generated and sent through an intricate network of stakeholders, each of which charges a fee for pushing the transaction through. These include:

Card networks, which act as a central point that facilitates transactions between users and acquiring entities, while establishing the protocol that other parties engaged in card processing are required to follow. They also set interchange fees (paid to the issuer), ensure compliance with the rules and regulations they set, and

[1] Worldpay Global Payment Report November 2015

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resolve disputes with network members.

Acquiring banks provide merchants with access to systems required to accept card payments. They provide access to payment terminals, processing services, and a bank account into which settled funds can be deposited.

Issuing banks (which have issued the customers' debit or credit cards) - may either hold the deposits or extend the credit associated with the account that the card is tied to.

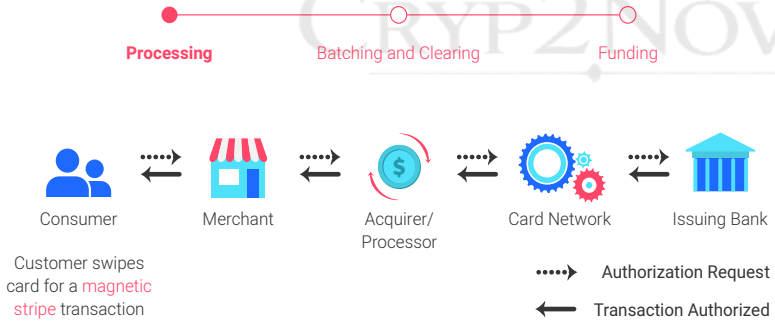
Processors - apart from providing different levels of back-office support, the main purpose of processors is to securely transfer payment data.

Payment Gateways work in the same way, acting as payment terminals and front-end processors. Services such as Stripe serve as a portal connecting e-Commerce merchants and acquirers. Furthermore, payment gateways can benefit merchants by offering them additional services like analytics and reporting.

MSPs (Merchant Service Providers) and ISOs are intermediaries that sell payment processing services to merchants, on behalf of acquirers and processors[2].

Structure of a Payment Card Transaction[2]

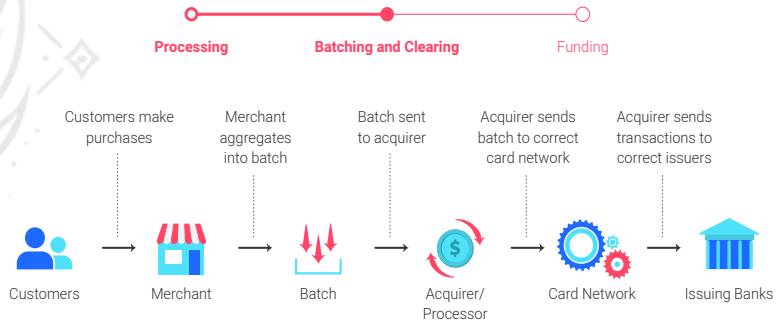
Credit card processing happens in three stages. Each of them involves all players outlined above. Let's take a closer look at the payment card ecosystem through an example of a 100 USD purchase made by a customer.



Here's how this system works in practice. A buyer wants to make a 100 USD purchase. To begin the transaction, the consumer runs the credit card through the credit card reader. The payment terminal reads the card and passes the data to the acquiring bank, which requests the credit card network's authorization. In turn, the card network communicates with the card issuing bank to ascertain that there are enough funds available to cover the amount of the transaction. It also investigates that the card isn't stolen and that there aren't any red flags to hinder the payment.

As soon as the issuing bank confirms the transaction, it shares an authorization code with the card network, which passes it on to the acquiring bank. After the acquirer sends the code back to the merchant, authorization is complete. All this takes place in seconds, leaving the customer with an impression of a finalized transaction. For other parties, however, things aren't as fast.

Batching and Clearing



While the transaction may be over from the customer's standing point, given that she's already out of the store with her purchase, a lot more is going on behind the scenes. The merchant has not received the money for the purchase yet. For that to happen, all the individual transactions of the day must be grouped into a batch and cleared.

When the day ends, the batch containing all the day's transactions is passed to the acquirer. When the acquirer receives the batch, it requests payments on behalf of the merchant by sharing the day's transaction history with the relevant card networks. The transactions are divided up by issuer and fund requests are sent to the relevant banks[3].

[2] Dyke, D. V. (August 2017). The Payments Ecosystem Report. Business Insider, Inc.

[3] The payments ecosystem report, BI Intelligence, August 2017

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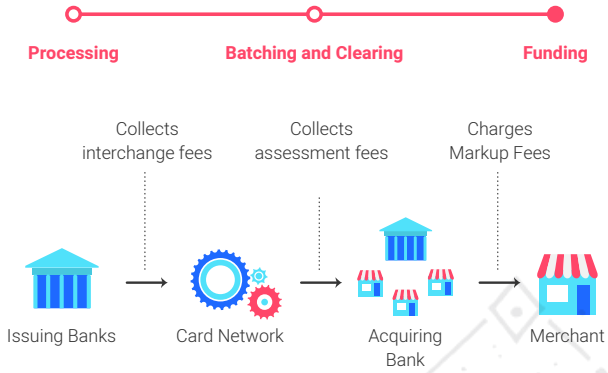
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Money starts to change hands after the issuing bank receives a request for funds. The requested amount is then passed to the acquiring bank through the card network, after deducting an interchange fee. There's another fee, taken by the card network (an assessment fee). The remaining funds are passed to the acquirer. Lastly, the acquirer subtracts a 'Markup fee'. The remainder is then deposited in the merchant's account. This process can take days and sometimes even weeks to complete.

Notes:

- There are other types of transactions such as closed-loop transactions, debit card transactions, etc., but the basic mechanics illustrated above are enough for the understanding of the complexity of the transaction.
- Transactions can be settled in real time as well, not only in batches. This approach has the advantage of being faster, but it also carries more risk and is costlier for merchants. It's usually used by e-commerce providers and merchants with a high volume of transactions.

Fees

Accepting payment cards comes with a price and merchants are subject to a complex fee structure. There are nearly 300 different fees and they can be broadly divided into 3 categories:

- Transaction fees - These are the fees the card-issuing banks and the credit card associations charge for each transaction, and they represent the largest expense that merchants incur. This category includes Interchange fees which consist of transfer the funds from the customers' account to the merchants, as well as Assessment and Markup fees.
- Flat Fees - In addition to transaction fees, merchants also pay various flat fees. These include Terminal Fees, Payment Gateway Fees, PCI Fees, Annual Fees, Monthly Fees, Monthly Minimum Fees, Statement Fees, Network Fees etc.
- Incidental Fees - These fees are not fixed and are charged only per incident: AVS (address verification), VAF (voice authorization fee), Retrieval Request Fee, Chargeback Fee, Batch Fee, NSF Fee, and more.

Looking at the 100 USD transaction, here are the fees collected by various parties before the funds reach the merchant's account:

Fee Example Fee of 100 USD transaction[4]:

Fee		Example	Fee of 100 USD transaction
Interchange Fees	The issuing bank charges the Interchange Fee which is usually a percent of the sale amount + a fixed transaction fee	2.25% + 0.1 USD	$2.25+$0.1=$2.35
Assessment Fee	The credit card network collects their assessment fee, which is also a percent of the sale + fixed transaction fee	0.2% + 0.02 USD	$0.2+$0.02=$0.22
Markup Fees	The payment processor, Gateway and merchant bank take their share as well. Some of it may be nominated as a percent of the transaction , some of it as a flat fee and some may be a combination of both	0.27% + 0.11 USD	$0.27+$0.11=$0.38
Total		**2.72% + 0.23 USD**	**$2.72+$0.23=$2.95**

To keep things simple, we did not take into account indirect fees such as monthly fees, account maintenance fees, incidental fees etc. Nonetheless, these fees may be substantial.

The merchant in our example pays a total of 2.95% of its gross earnings to all the parties involved in processing the payment. This may not seem too painful at first glance but remember this 2.95% is from the gross revenue. Consider our merchant has a net profit margin of 7.5%, such that from every 100 USD of sales it takes home 7.5 USD. Suddenly the payment industry's 2.95 USD chunk of the sales becomes 40% of profits! Ouch!

[4] The payments ecosystem report, BI Intelligence, August 2017

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PumaPay Protocol will offer merchants the advantages of payment cards, without the associated costs, risks and hurdles.

Risks

Payment card processing exposes merchants to various risks and fraud attempts. Most fraud prevention features are designed for card-present environments. Visa, for example, has deployed several anti-fraud measures designed to make card reproduction extremely difficult, including holograms and embossed security characters on the face of the card. Moreover, the signature and magnetic strip on the back of the card are designed to verify the card-holders' identity. Merchants are usually not liable for fraud when card-present transactions are properly authenticated.

Online platforms, however, typically facilitate card-not-present (CNP) transactions (card payments made without physically swiping a card). Unfortunately, card-not-present transactions are highly susceptible to fraud and abuse, for which merchants and payment facilitators are not protected[5].

Online merchants and e-commerce sites, especially smaller merchants, are exposed to a rising wave of card-not present (CNP) fraud. A 2017 Javelin Strategy and Research study found that, in the US, this fraud category's losses rose 40% from 2015 to 2016. Losses are expected to rise even more - a Juniper Research study[6] found that, over the next five years, retailers are on track to lose 71 billion USD in CNP fraud losses globally.

US merchants surveyed by American Express in 2017 said they spent just over 30% of their IT budgets on payment security. Still, many merchants are not equipped to hold off the CNP fraud wave. While established e-commerce providers like Amazon, Walmart, and Target have ample budgets earmarked for security, smaller players are finding their dollars stretched too thin to justify further security spending.

Card-not-present fraud may originate from various weaknesses and incompatibility of payment cards to the digital age such as merchant identity theft, customer identity theft or friendly fraud, but they all pose one major risk for the merchant: Chargebacks.

Chargebacks

When a cardholder disputes a charge with their bank (the issuing bank), banks usually reverse the payment and refund the cardholder. This is called a chargeback. Payment facilitators recover the chargeback funds from the acquiring bank of the merchants who generated them, and the acquirer recovers them from the merchant.

Since chargebacks may be received weeks or even months after the original transaction took place, it is sometimes difficult to recover the funds from the merchant. To protect themselves, acquirers may be very conservative in their underwriting: they will implement special policies such as reserves or holdbacks to mitigate loss and may sometime require personal guarantees from business owners, whom they will hold personally liable for the business's financial obligations.

Card networks (Visa, MasterCard, etc.) set standards for chargeback ratios. For example, Visa does not allow merchants to exceed a threshold of 1% chargebacks out of all transactions in any given month. Exceeding this threshold will result in fines. Crossing the threshold several months consecutively may lead to account termination by the network and inability of the merchant to process payment cards in the future.

To minimize chargeback risks, merchants may deploy various tools and tactics, some offered by payment processors or other 3rd parties. While these may help reduce chargebacks, they come with the inevitable cost of lost sales for false-positive errors.

Conclusion

Payment card processing is an elementary requirement for merchants. However, due to the centralized structure of the payment processing ecosystem, merchants are subject to inefficiencies, exorbitant fees and substantial risks.

PumaPay PullPayment protocol was designed from the ground up to facilitate a robust, scalable and flexible payment system that will overcome these hurdles.

[5] The payments ecosystem report, BI Intelligence, August 2017

[6] www.juniperresearch.com/resources/infographics/cnp-fraud-fraud-attleground-2018

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The PumaPay Vision

Blockchain technology holds a great promise for changing the payments industry. The problems described in the previous section can be addressed by a blockchain-based payment protocol that enables the flexibility and scalability of payment cards over a decentralized platform. Such a protocol would be capable of facilitating transactions between the customer and the merchant, eliminating intermediaries along the way, saving substantial amounts for both merchants and customers, increasing overall efficiency and reducing risks. Adoption of such a protocol by merchants could eventually lead to increased use of cryptocurrencies for daily transactions.

There are currently many hurdles that stand in the way of purchasing items with cryptocurrency if holders do not convert to fiat currency first. The mass adoption of a cryptocurrency payment protocol like **PumaPay** could result in crypto holders being able to transact directly with merchants without having to go through an extra layer of banking. By promoting the protocol to high transaction volume industries and by providing a powerful and flexible PullPayment protocol, **PumaPay** hopes to become the base layer for cryptocurrency payments throughout the world.

The **PumaPay Protocol** is designed with both on-chain and off-chain components. The functionality of the **PumaPay Protocol** will be present in the on-chain components, while the off-chain components will be designed to make the user interaction with the Protocol seamless and user-friendly.

PumaPay PullPayment Protocol

Cryptocurrencies were designed for direct transfer of value between two parties, without having to go through intermediaries (P2P) and presently allow only one simple, basic type of transaction – 'push'. While this may be enough as a POC for cryptocurrencies, it is definitely not enough in order to make them a widely used means of payment as it does not address the requirements of modern commerce.

At the heart of our protocol we are designing a unique architecture of PullPayment smart contracts that inverse the mechanics of common cryptocurrencies transactions: instead of having side A 'send' or 'push' tokens to side B, it allows side B to connect to side A's account (public address) via a PullContract and 'pull' funds into its account. This is of course subject to predefined terms and prior acceptance of the transaction by side A.

PumaPay PullPayment Protocol is being designed from the ground up specifically to address this issue and to facilitate flexibility in transaction mechanics. The innovative PullPayment architecture will open the door to a whole universe of payment mechanisms that are very common in our daily lives, both online and offline, but to date are either impossible or practically unfeasible over the blockchain such as recurring payments, direct debit, pay-per-use, etc. In fact, the protocol is intended to be so powerful and flexible, that it will enable any merchant to design their own transactions and implement their own business logic.

A Truly Decentralized Vision

For Decentralized Vision, the company behind **PumaPay**, decentralization is more than a buzz word. Decentralization is something we are truly committed to. It is the philosophy behind the **PumaPay PullPayment protocol**. To adhere to this vision, we strive to develop a protocol that will eventually have a life of its own, without having to be governed by any central entity.

To meet the needs of development and initial launch, we will be employing a centralistic model, gradually moving to the hybrid one, where the role of the community in development will grow. With the decentralized model being our ultimate goal, all **PumaPay** components are being developed open-source, making it possible for the community to take the lead. We expect developers and service providers to start offering paid services on top of the protocol, taking the technology and user experience to the next level. As the initial effort to deploy **PumaPay**'s decentralized model, we may develop prototypes of services, such as the Wallet, **PumaPay Pride** etc.

The long-term vision of decentralization also guides our development of the SDK and API, both of which will allow for the flexibility the Merchants will need to efficiently utilize the **PumaPay** ecosystem and use the Protocol to their best advantage.

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For a cryptocurrency to be successful over time, it needs to be a core aspect of the ecosystem it represents. The **PumaPay** ecosystem will be built entirely around the functionality of the **PumaPay** Token. Our goal is to make **PumaPay** the de facto standard for modern payments by achieving adoption backed by a powerful token economy.

We have carefully crafted a strategy that rests on four pillars:

1. Early Adopters
2. Launch Partner
3. PumaPay Pride
4. Third Parties Extension Services and Products

Early Adopters

The First pillar of the **PumaPay** strategy promotes the adoption of the Protocol by merchants that have already agreed to implement the protocol once released, referred to as “Early Adopters”.

Early Adopters are prominent businesses from various industries that have already committed to the **PumaPay Protocol**. These merchants represent a significant volume of processing that could be done within the **PumaPay** ecosystem.

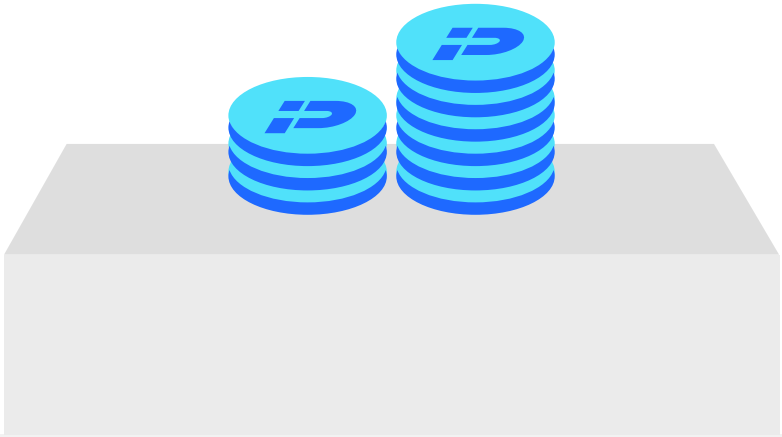
The Early Adopters will benefit from easy integration and receive support from **PumaPay** when integrating the Protocol. In order to encourage the usage of the **PumaPay** Token by Early Adopters specifically, we will incentivize these businesses by rewarding them with **PumaPay** Tokens.

Launch Partner

Whereas the Early Adopters’ commitment is to integrate the Protocol when released and enable customers to pay with **PumaPay** Tokens, our Launch Partner will work closely with us to create a basis for decentralizing entire industries through widespread adoption of the **PumaPay** Token. This will initially be done on a wallet-to-wallet basis, independent of the Protocol.

We have carefully chosen the launch partner with the ability to realize **PumaPay’**s potential in the field of personal skills marketplaces. These marketplaces will enable anyone to empower, monetize services, and shatter unequitable revenue allocation models that exist currently.

We anticipate that our Launch Partner will not only use the **PumaPay** Token but will also be able to create a prolific marketplace, where content creators and service providers are rewarded a much higher revenue share than the existing status quo. By accepting this challenge and creating a disruptive market, we expect an immense shift of users, content providers and service providers toward this new platform. Our Launch Partner may decide to airdrop **PumaPay** Tokens to its customers to incentivize usage.



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ImLive.com

ImLive.com serves the adult entertainment industry and through its leading platform, any approved service providers can offer private live shows and charge customers on a pay-per-minute basis. ImLive has agreed to create its own platform where **PumaPay** Token is the only means of payment and service providers keep a lion share of their revenue (instead of ~ 32% today). Moreover, as our Protocol will enable P2P payments they will receive their earnings directly, immediately, and risk-free. By creating this disruptive activity in the adult livestream industry, combined with substantial media promotion, we believe that natural business dynamics will lead the new ImLive's platform to a leading position in the industry. Therefore, we expect a huge shift of customers joining the new platform, which is destined to earn a significant chunk of the adult webcam industry's revenues.

ImLive is a marketplace where nearly 50,000 service providers serve millions of registered customers. Approximately 15,000 new members join ImLive's network of sites every single day. The ImLive affiliate network is one of the largest in its industry and consists of thousands of traffic providers. On top of that, many websites use ImLive technology either as white label platforms or by using its API.

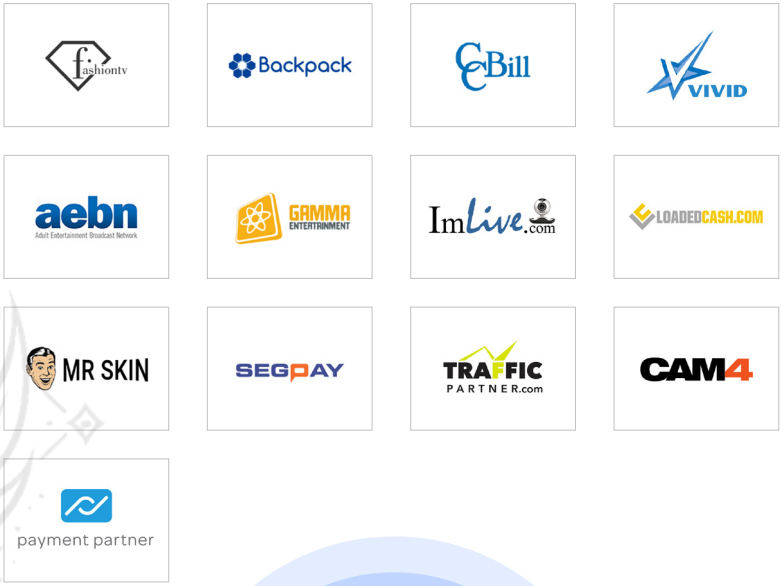
Launched more than fifteen years ago, ImLive is one of the pioneers of livestream platforms on the web. It is highly reputable and well positioned in the adult entertainment industry and will play a crucial role in demonstrating the advantages and potential of **PumaPay**, thereby encouraging more businesses to adopt **PumaPay** and become part of its ecosystem. The adult entertainment industry, which has a market size of tens of billions of dollars, will most likely be among the first to adopt the Protocol, given its inherent advantages and ImLive's reputation.

We expect the newly ImLive based disruptive livestream platform to be fully functioning by Q1 2019.

The ImLive platform presents a technology that is a key factor for penetrating other skill-based marketplaces and facilitating the integration of the Protocol. It might be adapted to serve other vertical markets such as private teachers, psychologists, personal-trainers, coaches, and dieticians, thus enabling the **PumaPay** token and protocol to serve billions of dollars' worth of transactions.

Selected Launch Partner & Early Adopters

Here is a selected list of companies that have committed to the **PumaPay** vision as Early Adopters and our Launch Partner.





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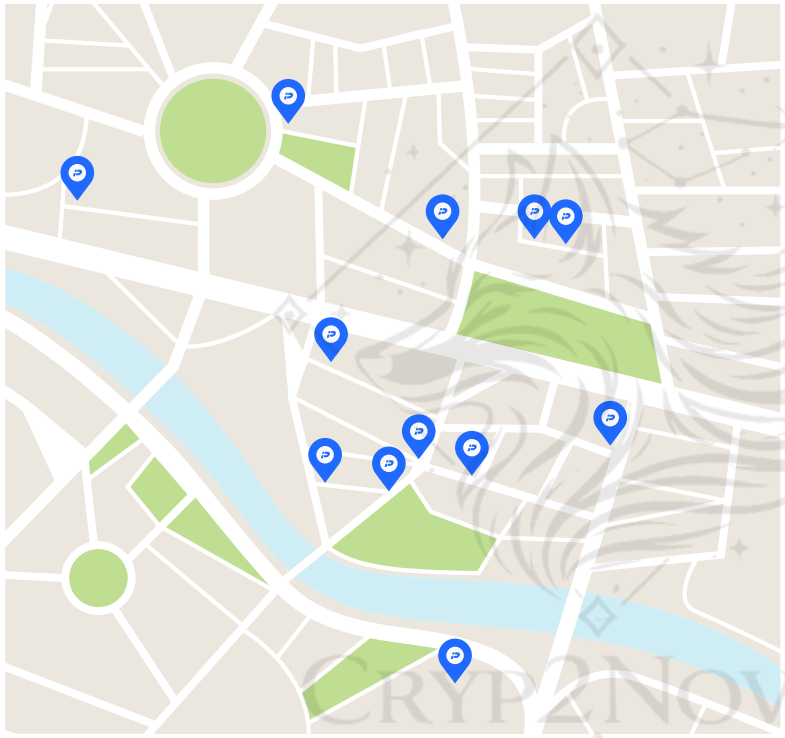
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PumaPay Pride

As part of the supporting systems that will be developed in order to promote the adoption of the **PumaPay** Token, we will incorporate an application as part of our wallet in which only businesses that have chosen to process with the **PumaPay** Token will appear. **PumaPay Pride** is an example for a 3rd party extension service for which we are developing a prototype.



3rd Party Extension Services

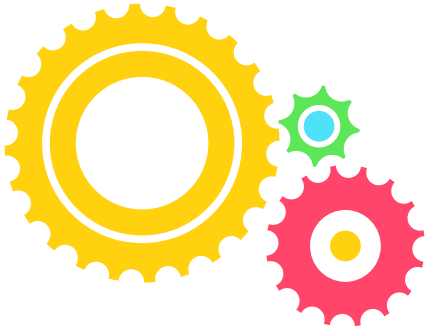
The **PumaPay Protocol** will support a variety of extension services to enhance the basic features of the protocol and enable the growth of functionality and improved user experience. **PumaPay** may choose to develop prototypes of any of such services or engage 3rd parties to develop such services.

Listed below are a few examples of possible extensions:

PumaPay Directory

A directory of businesses that have integrated with the **PumaPay Protocol** and accept the PMA token as a means of payment. Businesses listed on such a directory will be searchable by multiple criteria, such as category, geographic location, and user proximity. A prototype of this directory, named **PumaPay Pride** will be developed by the company.

PumaPay Pride is envisioned as a hub (connection point for businesses and customers) where users can search for businesses that have integrated the **PumaPay protocol** will increase their exposure to **PumaPay** users and customers. **PumaPay Pride** will benefit businesses that adopt the **PumaPay** Token by driving potential customers to their platforms, thus offering them an advantage over their competitors.



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Instalment-based Payments

The **PumaPay PullPayment Protocol** allows merchants to sell products and services on an instalment basis. However, this puts the merchant at a potential risk of not being fully paid by the customer. A possible solution may include a 3rd party credit company setting up a service which allows it to assume the risks associated with such credit, thus ensuring uninterrupted, risk-free commerce.

To provide customers with more shopping options, merchants may choose to integrate with such 3rd party extension service and allow customers to pay off their purchases in instalments. The credit company will handle all background checks on customers and manage the associated risks. A possible implementation may include the credit company setting up a special pull contract with scheduled instalment-based payments for the customer. As soon as customer reviews and approves the contact, the first instalment will be pulled from their account and the payments will continue at a predefined schedule. The merchant will immediately receive the full amount for the purchase from the loan company and the purchase will be completed.

Smart Contract Management Certification

While some PullContracts and Authorizers will be developed by **PumaPay**, others will come from third parties.

The **PumaPay** ecosystem will allow merchants and / or developers to engage with code verification companies that would verify that PullContracts and Authorizers developed outside **PumaPay** are certified and risk-free. A wallet developer may opt to allow only certified PullContracts or warn customers if they are approving a non-certified PullContract.

Arbitration Companies

While the idea of **PumaPay** is to make payments as easy and transparent as possible, it is inevitable that some disputes between merchants and consumers may arise from time to time. Arbitration companies will be available to solve commercial disputes.

To provide customers with security and reassurance, merchants may add the Arbitration company to their PullContract. Once the purchase is made, funds go into an 'escrow' smart contract for a set period of time. Within this timeline, the customer may dispute the transaction. As soon as the dispute is launched, the Arbitration company freezes the funds and starts the dispute resolution procedure.

With the clear dispute resolution policies and transparent communication, most disputes are expected to be settled within the shortest timelines, with the funds being released to one party or split between the parties, based on the decision of the Arbitration company. The second party will be able to dispute the decision within the timelines and processes specified. There will also be an option to take the case to another mediator, should one of the parties suspect any sort of bias in the decision. Merchants are likely to be charged a small fee for this kind of service.

User Advanced Management Capabilities

PumaPay users will have an option to receive advanced management capabilities, including reminders and notifications regarding expected transactions, restricted transactions and any other useful information that can protect the user.

Upon accessing the wallet, **PumaPay** users will be able to set up the types and style of notifications according to their preferences. They will be able to either disable notification in full, or opt for in-app messages, push notifications, emails or SMS regarding their wallet activity, including but not limited to: incoming PullContracts, reminders for upcoming scheduled purchases, notifications about connected wallet activity in the restricted payment scenario, incoming funds from split payments, etc.

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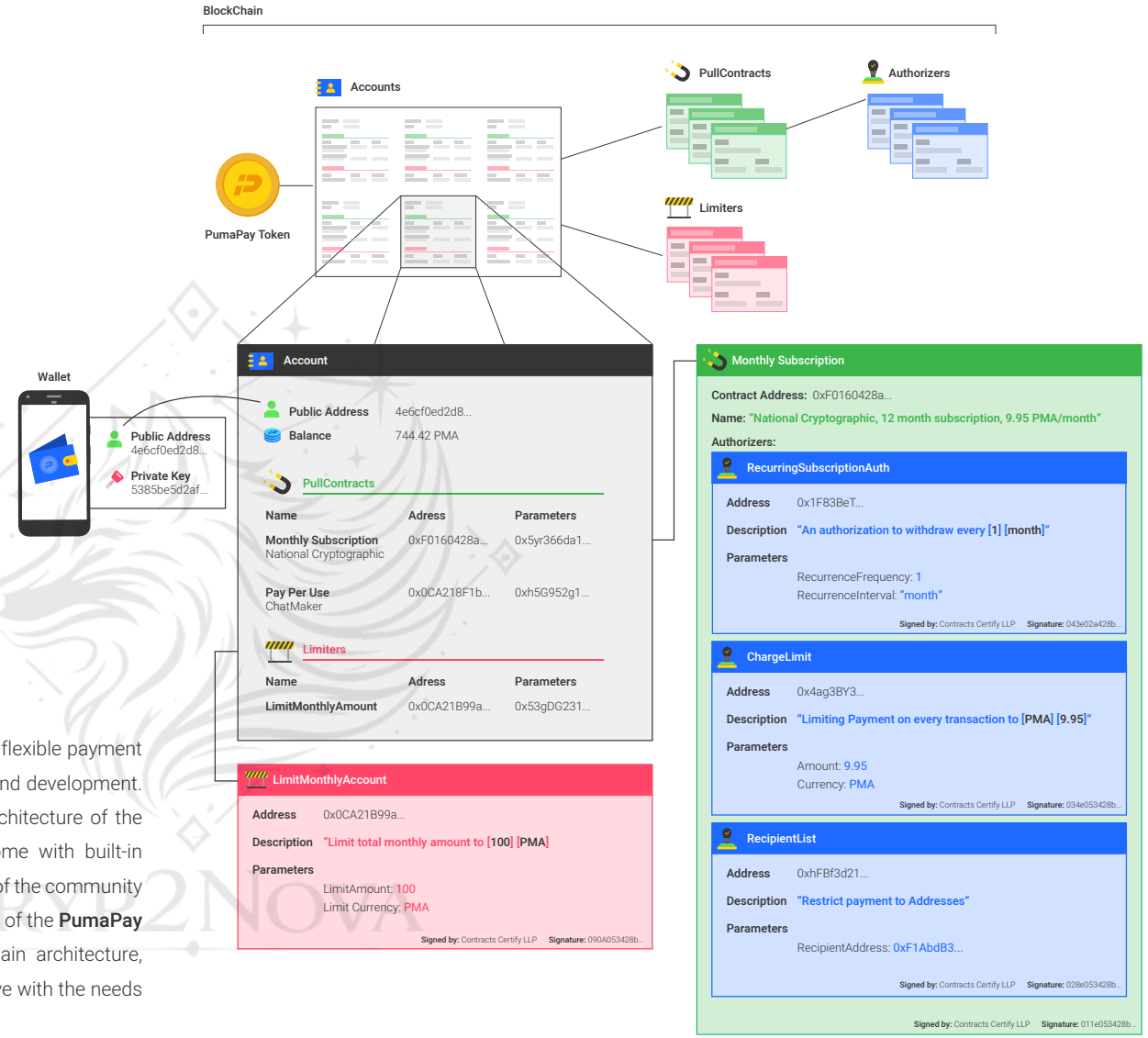
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PumaPay PullPayment Protocol

The **PumaPay Protocol** is meant to be a flexible payment protocol that encourages outside input and development. This motivation inspired the modular architecture of the Protocol. Although the Protocol will come with built-in modules, we encourage the involvement of the community in its development. The core functionality of the **PumaPay Protocol** will be contained in its on-chain architecture, which is designed to be flexible and evolve with the needs of the community.

The initial version protocol will be implemented as a combination of Smart Contracts with access via an SDK and API. This will allow us to quickly and efficiently develop the **PumaPay** ecosystem and follow our long-term vision.

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Platform Components

On-chain Components

PumaPay will initially be introduced on the Ethereum network but intends to utilize other networks to develop its token on in the future. The **PumaPay** solution will be composed of several unique smart contract components that come together to create the flexible **PullPayment** protocol.

PumaPay Token Contract

The **PumaPay** Token Contract will be the smart contract that mediates and stores the ownership of **PumaPay** Tokens among accounts. It is a modified version of the ERC20 token contract that adds flexibility to its payment and transfer protocol.

The **PumaPay** Token Contract will be the ledger used by **PumaPay** to keep track of the balances associated with each address, as well as keeping track of PullContracts and Limiters associated with the Accounts. This is done by mapping all of the addresses to another mapping of their respective PullContracts. Also, it will include a mapping between these PullContracts with their respective Limiters. It is important to note that the Token Contract will be managing:

- Approvals of PullContracts
- Adding Limiters to Accounts
- Executing PullContracts



PumaPay Token (PMA)

The tokens will be the basis for the Protocol's ecosystem.

The **PumaPay** Token is the payment mechanism for merchants adopting **PumaPay Protocol**. It will initially be built using the ERC20 standard interface but will extend the money transfer process so that advanced payment methods can be utilized. The **PumaPay** Token is designed to differ from current cryptocurrencies because it will allow comprehensive all-in-one billing mechanisms to be implemented in a simple and flexible way.

Account

The Account will be implemented as a public address that is used to track the balance of PumaPay Token, PullContracts and Limiters associated with that address. The balance, PullContracts and Limiters are found on the Token Contract described above.

Authorizers

Authorizers will operate as modular components that set up a condition to determine whether a PullContract should be able to "pull" or request money from an account. One simple example of an Authorizer would be a condition that states a PullRequest can only be executed if it has been at least 30 days since the last one. It is important to note that authorizers can be chained together in PullContracts to make PullContract development easier for merchants, and to allow the easy reuse of code.

PullContracts

PullContracts will be smart contracts that represent a payment relationship between Accounts and facilitate the transfer of tokens between them. PullContracts are designed with flexibility and can be implemented to allow many different payment mechanisms and features. These contracts allow merchants to develop their own billing methodologies through the Contract, present them to the user, authenticate transactions before execution, and transmit it for execution on the blockchain.

While PullContracts can be created with original code, they can be built modularly from a pre-existing set of Authorizers. This enables the chaining together of different functionalities into one contract. Authorizers can be vetted and are less likely to include security issues in their implementation. PullContracts can be created and deployed with a variety of parameters. Any deployment of a PullContract will include a hash of these parameters and these will be checked when a pull request is made to ensure the hash of the pre-defined parameters matches that of the pull request.

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Limiters

The Limiter is an on-chain component that an account user can add in order to set various quantitative limitations on that Account.

Off-chain Components

There are several off-chain components to help with adoption and usability of the **PumaPay Protocol** and ensure that there is an excellent user interface and an outlet for developers to build on the **PumaPay Protocol**. This section covers anything that is not going to be on the blockchain.

PumaPay Wallet

A dashboard into the Account used to view Account details as well as to connect/disconnect PullContracts and other contracts. The wallet is the holder of the user's private key as through it the user executes actions on the blockchain.

The **PumaPay** Wallet will facilitate payment interactions between Accounts. These interactions consist of PullRequests, submitting PullContracts, approving PullContracts, showing pending and previous transactions, and displaying the account's balance. We are developing two versions of the Wallet.

- A mobile application. We will first develop an Android app followed by a version for iOS. See our development roadmap for more details.
- Chrome-based application, something conceptually akin to Metamask.

PumaPay SDK

The **PumaPay Protocol** SDK (Software Development Kit) is an off-chain set of tools aimed at facilitating and expanding the Protocol adoption by merchants. The **PumaPay** SDK is meant to provide developers the tools they need to fully leverage the Protocol. It will also provide any interested third party with the ability to build additional business solutions based on the Protocol's abilities (such as insurance, code review, credit, billing services, product delivery, etc.).

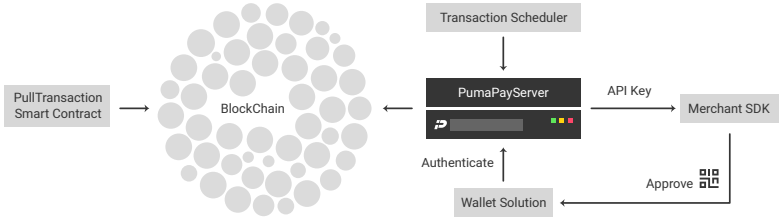
The **PumaPay** SDK will contain many different components and features including:

1. Utilities and code samples for merchants to interact with the blockchain
2. A repository of pre-signed and pre-vetted Authorizers to be used in PullContracts
3. Data Transparency and easy access - Providing transparency by seeing the results of transactions to enable the creation of complementary products and services to receive raw data, enabling them to create aggregated reports related to transaction volume per period and/or product.

PumaPay Server & API

The initial version of the PumaPay architecture which we are currently working on is relatively centralised and relies on the PumaPay Server. To start using PumaPay and accepting PMAs as a means of payment, the merchant would need to register through the PumaPay Server to receive an API key. In turn, the PumaPay Server would communicate with the merchant's SDK where the rules for the transaction would be set. These rules would then translate into a PullRequest targeting the client's wallet. To be able to access the details of the PullContract available in the wallet, the client would need to scan a QR code generated by the merchant. If the information contained in the PullContract is compliant with the parameters set in the client's wallet, he or she then digitally signs it off and the data is automatically sent to the PumaPay Server. The PumaPay Server would authenticate the transaction, which would then be published on the Blockchain. Ultimately, the PullTransaction would take the form of a Smart Contract on the Blockchain network.

In the next iterations, PumaPay is aiming to evolve into a truly decentralised payment system.



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The Ultimate Goal

Envisioned as a fully decentralized model in the long run, **PumaPay** will be relying on an improved architecture setup in the future. As a likely implementation, we are looking into ways to enhance our current architecture, by delivering a lightweight authentication server, which may be encapsulated in the merchant SDK and authenticates with the client's wallet SDK and manages the pull services. Hence, this will allow the Wallet API to directly connect to the blockchain network, allowing for a fully decentralized model in line with **PumaPay**'s long-term vision.

Implementation Considerations

As with all platforms and protocols, there are implementation considerations for the **PumaPay Protocol**. It is important to note that not all of the implementation and security considerations that are mentioned will be dealt with by the Protocol itself, as the Protocol is meant to be as open as possible. Nevertheless, it is important to recognize the limitations and considerations to be accounted for.

Fees due to having too many Limiters do not impact customer

There is nothing that prevents a customer from putting up an unreasonable amount of Limiters for a single Wallet because the merchant is paying the fees to send the PullRequest. This could be fixed by plug-ins that limit the number of Limiters or that charge customers for a portion of the fees of the transaction.

Lack of Flexibility with the Implementation of PumaPay Protocol

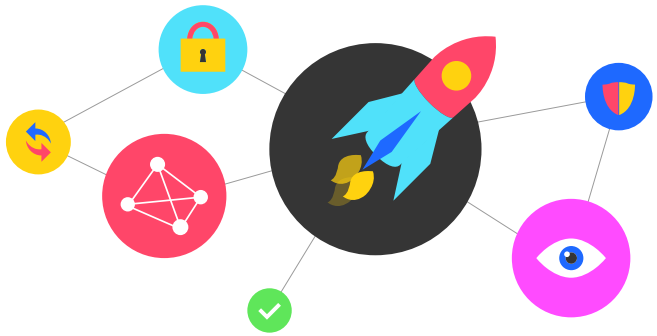
It is to be noted that because the implementation of the **PumaPay Protocol** will rest on the Token Contract, making changes could be made difficult. **PumaPay** deals with a portion of this issue by creating massive flexibility in PullContracts and in Limiters. This flexibility in these contracts is designed to reduce the technical strain on the Token Contract and to place the evolution of the Protocol alongside the evolution of the PullContracts and Limiters.

Contract Certification

As a possible way of illustrating the security of the PullContracts linked to a wallet, these contracts may be assigned a trust score based on multiple criteria such as the entity certifying the contract, the amounts, the authorizers used, the number of users subscribed and a trust score of the merchant, if available. The wallet could use simple signaling to express the trust score to the user such as:

- **Green: trust >=75**
- **Yellow: 45 >= trust > 75**
- **Red: trust < 45**

Potentially the wallet could be configured to block all transactions below a certain trust score. This is one of the few possible implementations that could demonstrate the certification of contracts within the wallet.



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PumaPay On-chain

PumaPay will be introduced on the Ethereum network, which is the current standard for decentralized software platforms for distributed applications. However, **PumaPay** has the capability to migrate to a next-generation distributed contract network to meet performance, scale and increased on-chain confidentiality requirements. Potential dependencies for scaling the **PumaPay Protocol** are listed below:

Orbs

A good potential path toward scalability is through the Orbs, a blockchain designed with consumer applications in mind. Orbs offers a highly scalable decentralized ledger at minuscule per-transaction costs, and guaranteed SLA.

EOS

EOS is a proposed blockchain implementation based on fast Delegated Proof-of-Stake consensus and a high-performance smart contract engine (VM). EOS provides high transaction volumes without transaction fees.

Credits

Credits is another option we are looking into when it comes to flexibility, optimized functionality and further development of the PullProtocol given its expected high-volume transaction capacity and fast execution speed.

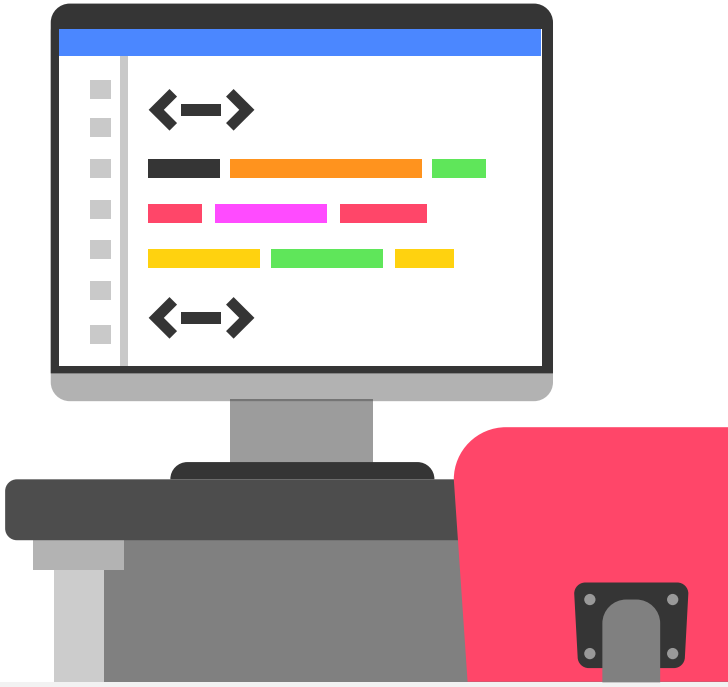
Other options **PumaPay** developers are exploring include Stellar and Cardano. As we define the best solution to meet the needs of **PumaPay** in the long run, we may opt to combine several blockchain solutions (e.g. one for transactions and another one for the token).

Stage of Development

PumaPay has entered the stage of active development. We have working prototypes of Smart Contracts that outline the architecture. The team is currently testing the Recurring Payments Smart Contract and improving upon its design.

The Token Smart Contract has already been audited by a third-party provider (SmartDec) who have confirmed its compliance with all required standards.

In terms of relevant technology, we have completed the Version 1.0 of the Wallet which is currently in testing. The team is also developing the API and SDK that will allow for an easy integration with multiple merchants. We are also working on the prototype of the **PumaPay Pride**. Once **PumaPay** components pass security audit and their smooth functionality is confirmed, they will be added to the project's Github repository: https://github.com/pumapayio



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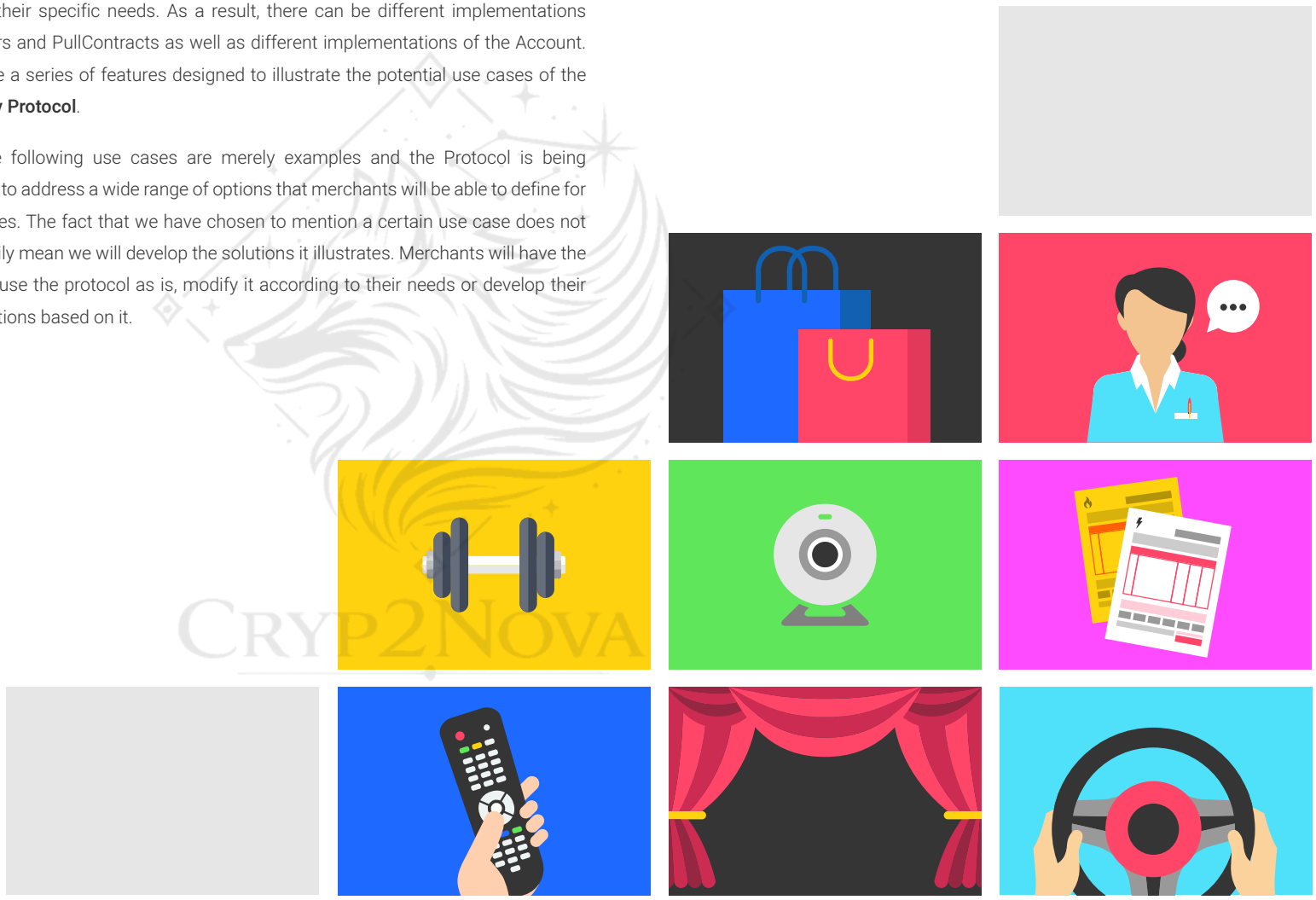
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PumaPay PullPayment Protocol Use Cases

One of the cornerstones of the **PumaPay Protocol** should be its flexibility. The Protocol is being intentionally developed as a modular implementation to enable merchants and customers the ability to use a wide variety of billing mechanisms to meet their specific needs. As a result, there can be different implementations of Limiters and PullContracts as well as different implementations of the Account. Below are a series of features designed to illustrate the potential use cases of the **PumaPay Protocol**.

Note: the following use cases are merely examples and the Protocol is being designed to address a wide range of options that merchants will be able to define for themselves. The fact that we have chosen to mention a certain use case does not necessarily mean we will develop the solutions it illustrates. Merchants will have the ability to use the protocol as is, modify it according to their needs or develop their own solutions based on it.



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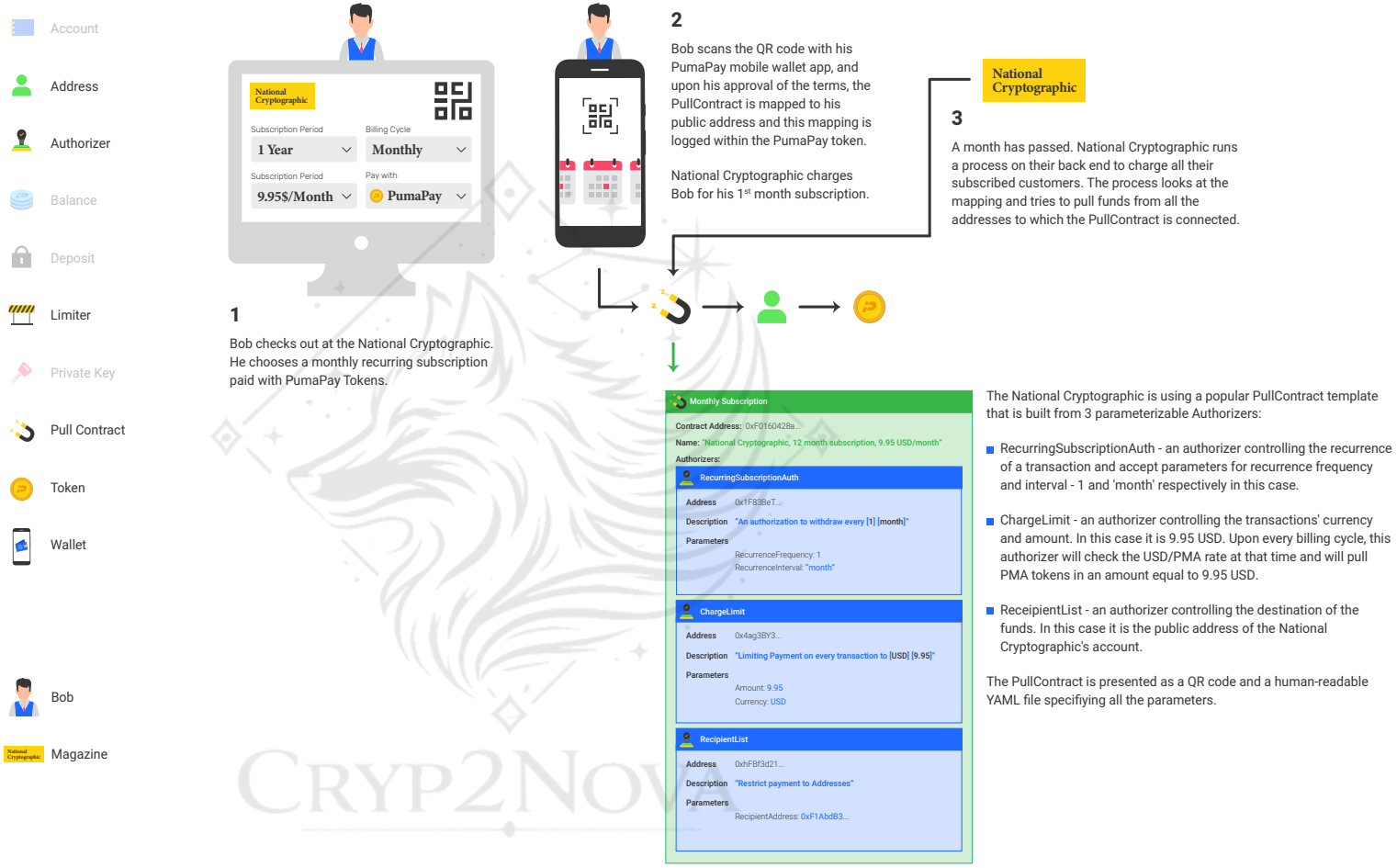
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Recurring Payments Based on Time



The National Cryptographic is using a popular PullContract template that is built from 3 parameterizable Authorizers:

- RecurringSubscriptionAuth - an authorizer controlling the recurrence of a transaction and accept parameters for recurrence frequency and interval - 1 and 'month' respectively in this case.
- ChargeLimit - an authorizer controlling the transactions' currency and amount. In this case it is 9.95 USD. Upon every billing cycle, this authorizer will check the USD/PMA rate at that time and will pull PMA tokens in an amount equal to 9.95 USD.
- ReceipientList - an authorizer controlling the destination of the funds. In this case it is the public address of the National Cryptographic's account.

The PullContract is presented as a QR code and a human-readable YAML file specifiying all the parameters.

Use Case: A Magazine Subscription

Bob has a passion for cryptography and security. As such he wants a subscription to National Cryptographic, the world's leading journal on everything security and blockchain. Since the National Cryptographic website uses **PumaPay**, Bob can easily subscribe.

First Bob can look at the subscription and use his **PumaPay** wallet to scan the QR code given to him at check out. After scanning the QR code, a YAML file will be displayed on his wallet explaining the terms of the PullContract and any of the details regarding the PullContract.

Once Bob accepts, the PullContract is committed to the Blockchain, Bob is subscribed to National Cryptographic, and National Cryptographic is permitted to make PullRequests from Bob's account every month.

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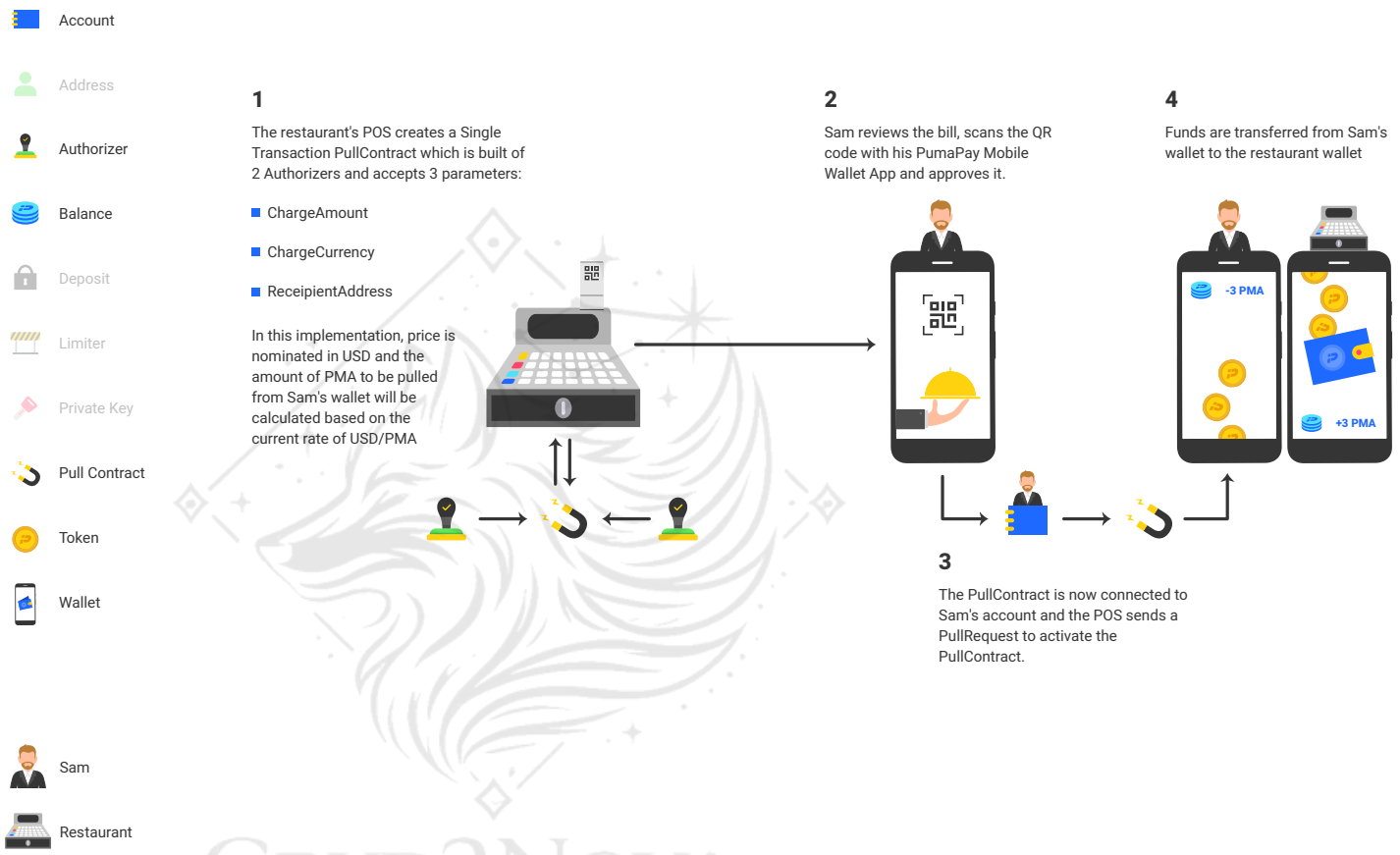
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Single Payment - Offline



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Use Case: Dinner Out

Lily and Sam are going to go out on a date. Beforehand, Sam checks the **PumaPay Pride** restaurants online to see a list of nearby restaurants that accept **PumaPay**.

Lily and Sam decide on a nice Ethiopian restaurant right around the corner from Lily's apartment. After they have eaten their delicious meal, the waiter brings the check. They both decide that Sam will pay for dinner this time using **PumaPay**. The bill includes a QR code and Sam opens his phone and scans the code into his **PumaPay** wallet.

After scanning the QR code, the wallet displays an overview of the transaction. When Sam approves the transaction the PullContract is written to the blockchain and the restaurant (through the SDK components implemented in its POS system) submits a PullRequest to Sam's account.

This is only one case, but the possibilities are endless for what can be done with the **PumaPay** Protocol and several more are elaborated below. It is worth noting that the pull methodology behind **PumaPay** is much more innovative than the normal push methodology of cryptocurrencies because in this pull example the restaurant is paying for the transaction processing fee - not the customer, which is a huge advantage.

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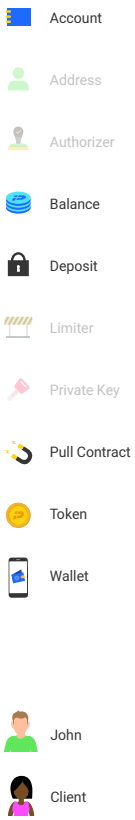
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Instant Pay Per Use



1

John chooses a PayPerTime PullContract from PumaPay PullContracts Directory and populates it with the following parameters:

- BaseTimeUnit: **minute**
- PricePerUnit: **1.5**
- PriceCurrency: **PMA**
- InitialDepositUnit: **minute**
- InitialDepositAmount: **5**
- ChargeCycleTimeUnit: **seconds**
- ChargeCycleInterval: **15**

This PullContract works with a state channel that allows the customer to cryptographically sign certificates confirming the real-time utilization of the service. Once the session has ended, the service provider uses these signed certificates to authorize payment.

To ensure payment, a deposit is withdrawn into the PullContract from which reconciliation is performed at the end of the session. Remaining amount is returned to the user.

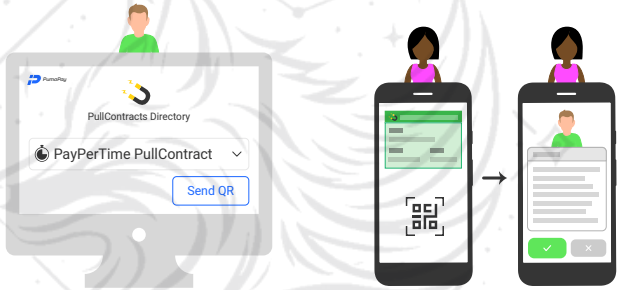
2

The customer scans the QR code and sees the following summary on her wallet app:

*"Consultancy session with **John the Dietitian**. Cost: **1.5 PMA /Minute**. Time is calculated at **15 seconds** intervals. Your account will be charged every **5 minutes** in advance. Any unused funds will be returned at the end of the session"*

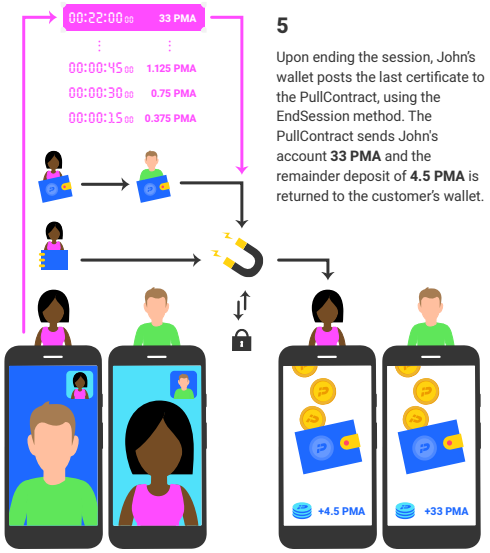
3

The customer accepts the transaction and the PullContract pulls **7.5 PMA** from her account as a deposit. A P2P state channel is now open between John and the customer.



4

Now John is speaking with his customer. Their wallets communicate with each other as well, through the state-channel (see below*)



5

Upon ending the session, John's wallet posts the last certificate to the PullContract, using the EndSession method. The PullContract sends John's account **33 PMA** and the remainder deposit of **4.5 PMA** is returned to the customer's wallet.

***State-Channel (Offchain)**

Every 15 seconds the customer's wallet signs a certificate for additional **0.375 PMA** and delivers it to John's application (Offchain). The receipts are incrementing, so the first receipt is for 15 seconds, the next is for 30 seconds and so forth.

Every time the amount on the receipt equals the deposited amount (every 5 minutes), the PullContract automatically Pulls **7.5 PMA** from the customer's account as a deposit for the next 5 minutes.

The session lasts for a total of 22 minutes. So a total of 5x7.5=**37.5** were deposited by the customer to the PullContract.

The customer's wallet signed a receipt of 0.375 PMA every 15 seconds, so there were 22x4=**88** charges of **0.375** each. The last receipt shows a total amount of 88x0.375=**33 PMA**.

Use Case: Expert Advice

John is a dietitian and gives live consultancy services over the Internet. He enables his service with **PumaPay**.

Prior to session commencement, a predetermined deposit amount of **PumaPay** Tokens will be captured via a PullContract that John sends to his customer using a QR code.

After the customer accepts the PullContract, John can start the session.

Throughout the session and upon use, the PullContract keeps note of minutes used; using a state channel protocol, the platform shall confirm every 15 seconds that the session is still active and the customer has enough **PumaPay** Tokens.

When the session ends, the smart contract transfers the portion consumed from the captured amount to the merchant and any surplus is automatically released to the customer.

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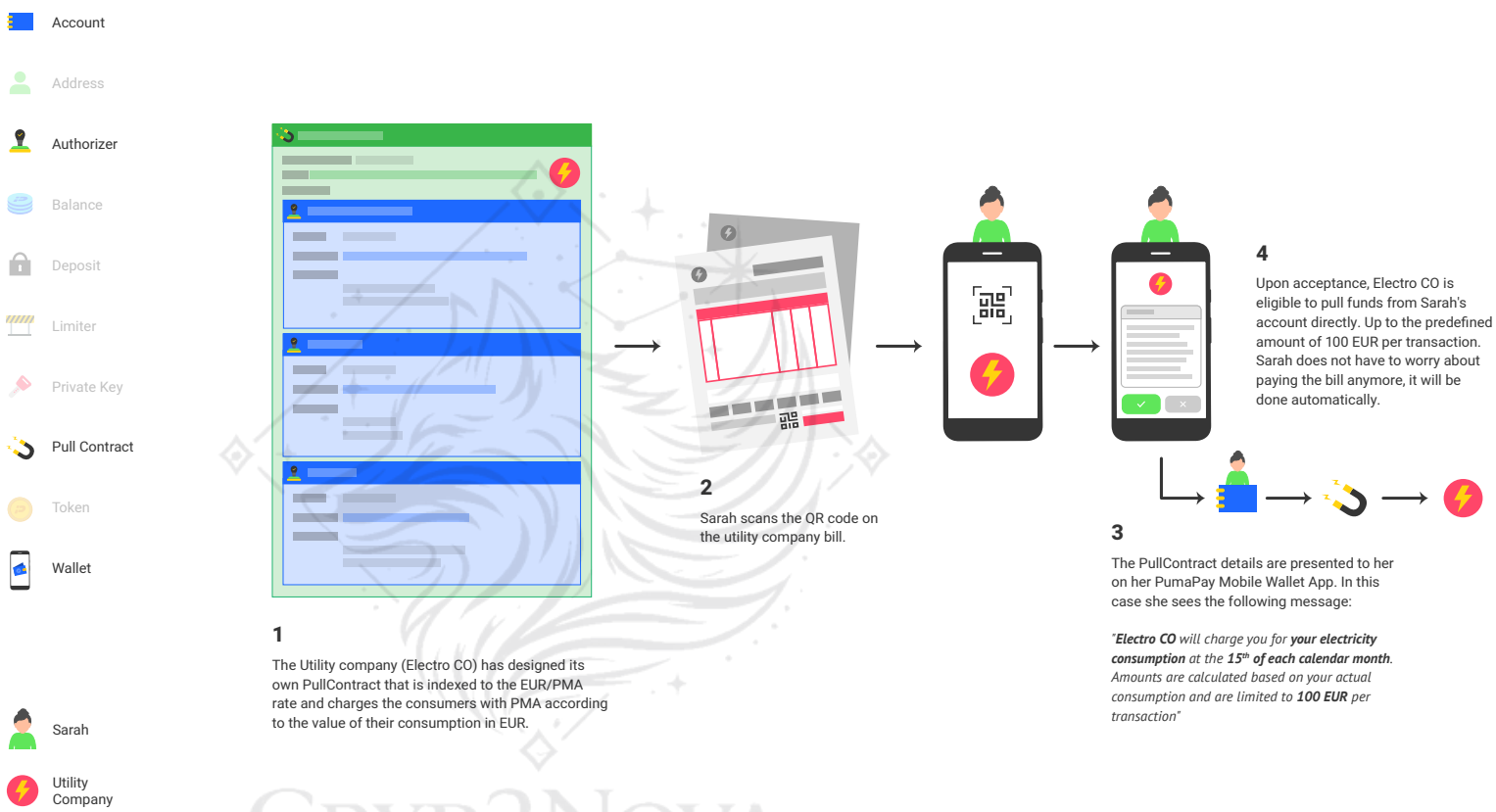
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Recurring Payments Based on Time with a Variable Amount



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Use Case: Electric Bills

Sarah has just gotten her first home and now she has to pay bills. She looks at her electricity bill and sees that her utility company has integrated **PumaPay**. She goes to the website and plugs-in her account details. When she selects a payment method, she chooses **PumaPay**.

Upon doing this, a PullContract is created by the utility company's web-app using the **PumaPay** SDK.

A QR code that links to the PullContract is generated and displayed to Sarah.

Sarah can scan this QR code and get the details of the contract, which states that it can withdraw a variable amount from her account monthly with this amount being dependent on her electricity consumption.

Sarah accepts the PullContract, it is stored on the Token Contract and Sarah is connected to the power grid.

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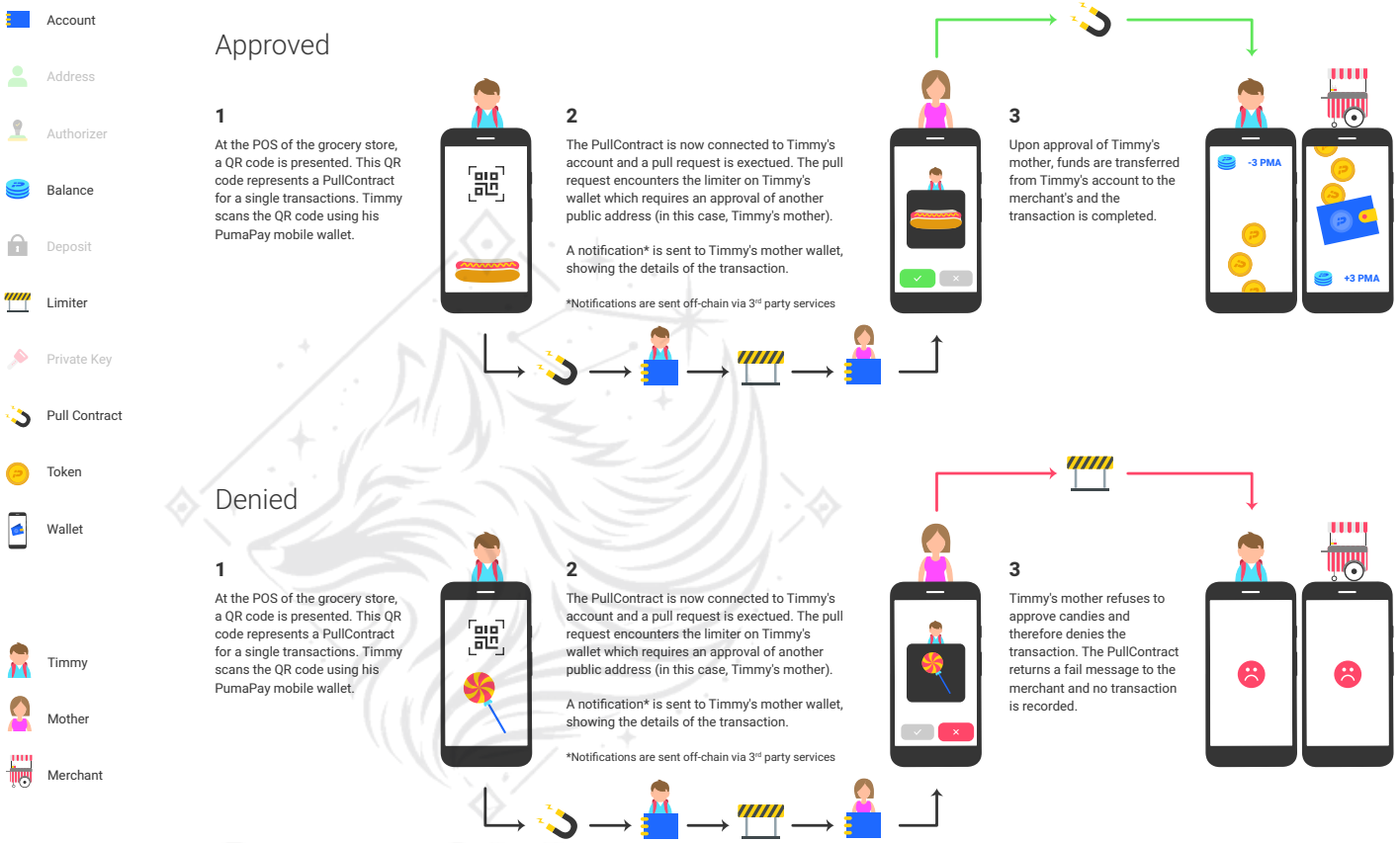
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Restricted Payment



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Use Case: My First Wallet

Timmy is a young boy that is starting elementary school and his Mom wants to give him money for lunch, but she doesn't want him to spend it on sweets. Through the use of 3rd party Limiters, **PumaPay** could allow his mother to oversee his connected wallet activity and ensure that Timmy's money is spent responsibly. Every time Timmy tries to make a purchase, his request shall be submitted to his mother's wallet and will be approved if the transaction fits certain predetermined parameters set by his Mom, or disapproved if it does not. When Timmy attempts to make a purchase, he will get a frowny face if the payment is not approved, or a smiley face if it is approved. In this use case, Timmy's mom chose to approve transactions manually for every purchase through the use of 3rd party messaging service to her device. This real-time messaging is not part of the protocol and is done off-chain. Alternatively, Timmy's mom could have chosen to set parameters for automatic approval or rejection of transactions (for example, based on product category), effectively and efficiently enforcing parental control on Timmy's purchases even when his mom is not available.

It is important to note that this is a simple use case and additional limitations can be placed to constrain the velocity of transactions, business type, and much more.

Additionally, there can be numerous other implementations but these two elaborate both an active and passive restriction by Timmy's Mom at the point of purchase.

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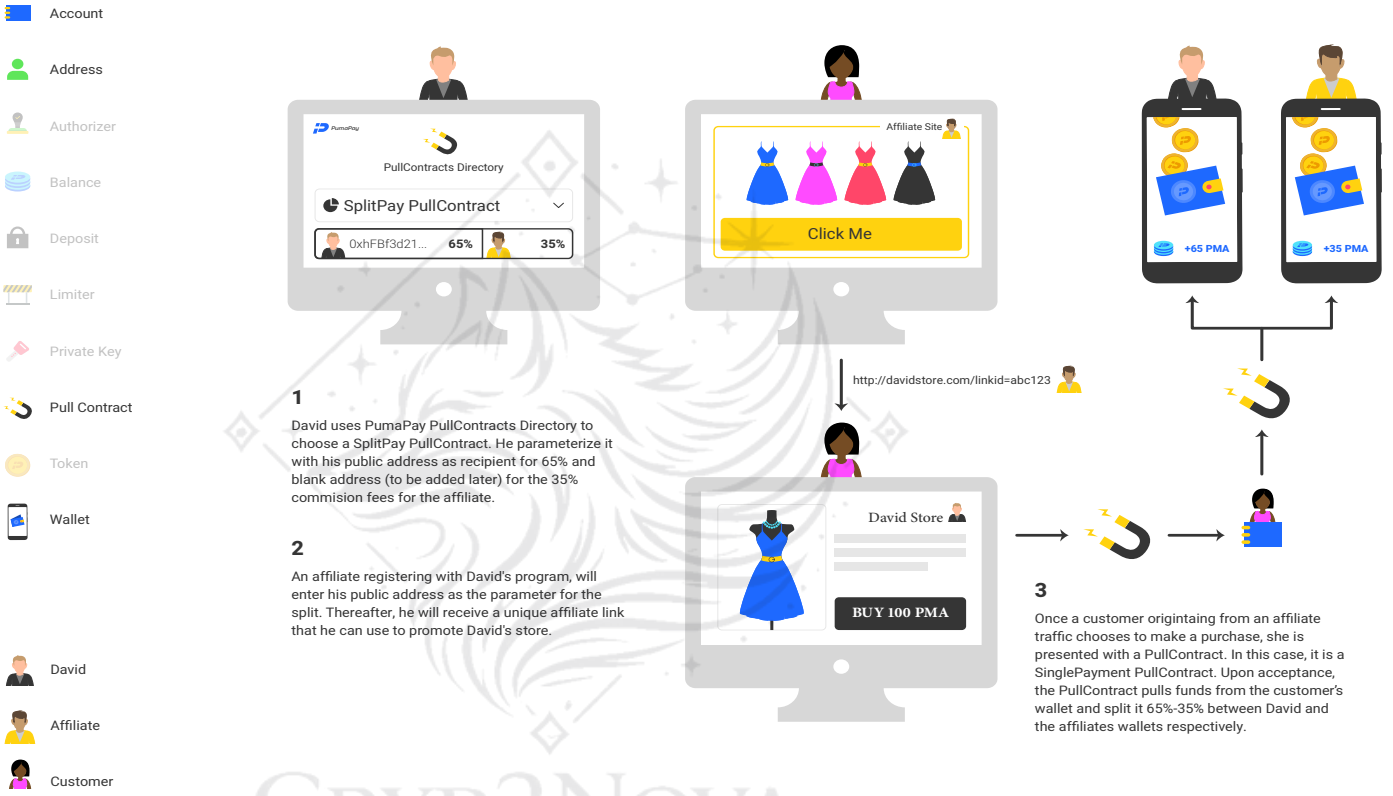
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Shared Payments



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Use Case: Affiliate Marketing for Dummies

David has a moderately successful online store, and he wishes to expand. He knows the power of affiliate marketing and wants to utilize it. Since he does not have the resources to build a reputable affiliate network, it will be very hard for affiliates to trust that he will pay them commission, and do so in a timely manner. If he submits his offer to an existing affiliate network, it will cost him unnecessary intermediary fees. With **PumaPay**, David can create a PullContract to charge his customers and chain it to a Split Payment contract that will automatically split the revenues from each purchase between his account and the affiliates. This ensures that both the affiliate and David will immediately get their share of every purchase without any risk, thus solving the trust issue.

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The PumaPay Token

The **PumaPay** Token (symbol PMA) is the facilitator of the protocol's unique PullPayment functionality. It is the only means of value transfer between parties over the protocol and can be converted to/from any other cryptocurrency or fiat.

The token will initially be developed as an ERC20 compatible token over the public Ethereum blockchain (PMA V1.0). This will facilitate the TGE as well as the initial usage of the token as a means of payment on our Launch Partner's platforms from day one.

To ensure the long-term scalability of the project and to meet potential needs of the community, we may decide to migrate the PMA token by either upgrading it or moving to another blockchain. In case of migration, a formal announcement will be released on our website and through our official Telegram channel. PMA holders will have the ability to convert their V1.0 token to the new version. In case of such a migration, all necessary guidance and tools will be provided in our Github repository.

The final and total supply of tokens will be issued in the TGE and there will be no future addition to this amount.



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In order to facilitate the development of our Protocol and PMA Token, and to encourage adoption, we are pre-selling PMA tokens to qualified individuals and companies who wish to contribute to the project. Due to prevailing regulatory conditions, we will not conduct an open Crowd-Sale. Participation in the Pre-Sale is limited to accredited/qualified/exempt investors (as defined by law) and subject to the company's KYC and AML policies. The minimum amount accepted during the Pre-Sale is 50,000 USD. Contributions are accepted in ETH, BTC, USD and EUR.

Private Sale Contributors will be eligible to receive 50,000 PMA / ETH.

Private Sale of PMA tokens will end on May 7th, 2018 at 12:00 am (UTC). Thereafter, we will generate the Tokens.

The total and final amount of PMA tokens that will be generated during the TGE will be calculated in such a way that the total amount of tokens sold during the Private Sale will represent 20% of the total amount generated, pro-rata, according to the total amount raised and our hard cap of 150M USD (e.g. if our Private Sale generates 75M USD the tokens issued will represent 10% of the total number of tokens generated).

Altcoins Contributions

The company may also consider accepting contributions in certain other cryptocurrencies (Altcoins). Contributors in Altcoins will be entitled to receive 40,000 PMA / ETH equivalent of the relevant Altcoin. The Altcoin/ETH exchange rate will be calculated within 24 hours from the moment the contribution will be received by the company and according to the exchange rate that will be cited at coinmarketcap.com.

Altcoin contributions are subject to pre-approval by the company. Please contact us via our Telegram group or by email to info@pumapay.io.

Special Contribution Scheme

Contributors may choose to place their contribution in a special elective refund scheme. Contributors choosing this option will have a period of sixty (60) days after the TGE to either claim their tokens (partially or in full) or refund their contribution (partially or in full). During this period, the tokens issued against the contribution will be locked in the smart contract. In case Contributors choose to claim the tokens, contribution will be transferred to the company's wallet and the tokens will be released to the Contributor. In case the Contributor opts for a refund, their contribution will be automatically sent back to them while the tokens issued will be transferred to the company's reserve.

Contributors who choose to place their contribution in this special elective refund scheme will be eligible to a lower rate of 42,000 PMA / ETH (for contributions in fiat, BTC and ETH) or 35,000 PMA / ETH (for contributions in Altcoins).

TGE Results

Private Sale of PMA tokens ended on May 7, 2018 at 12:00 am (UTC) with the total funds raised equalling $117,019,041.

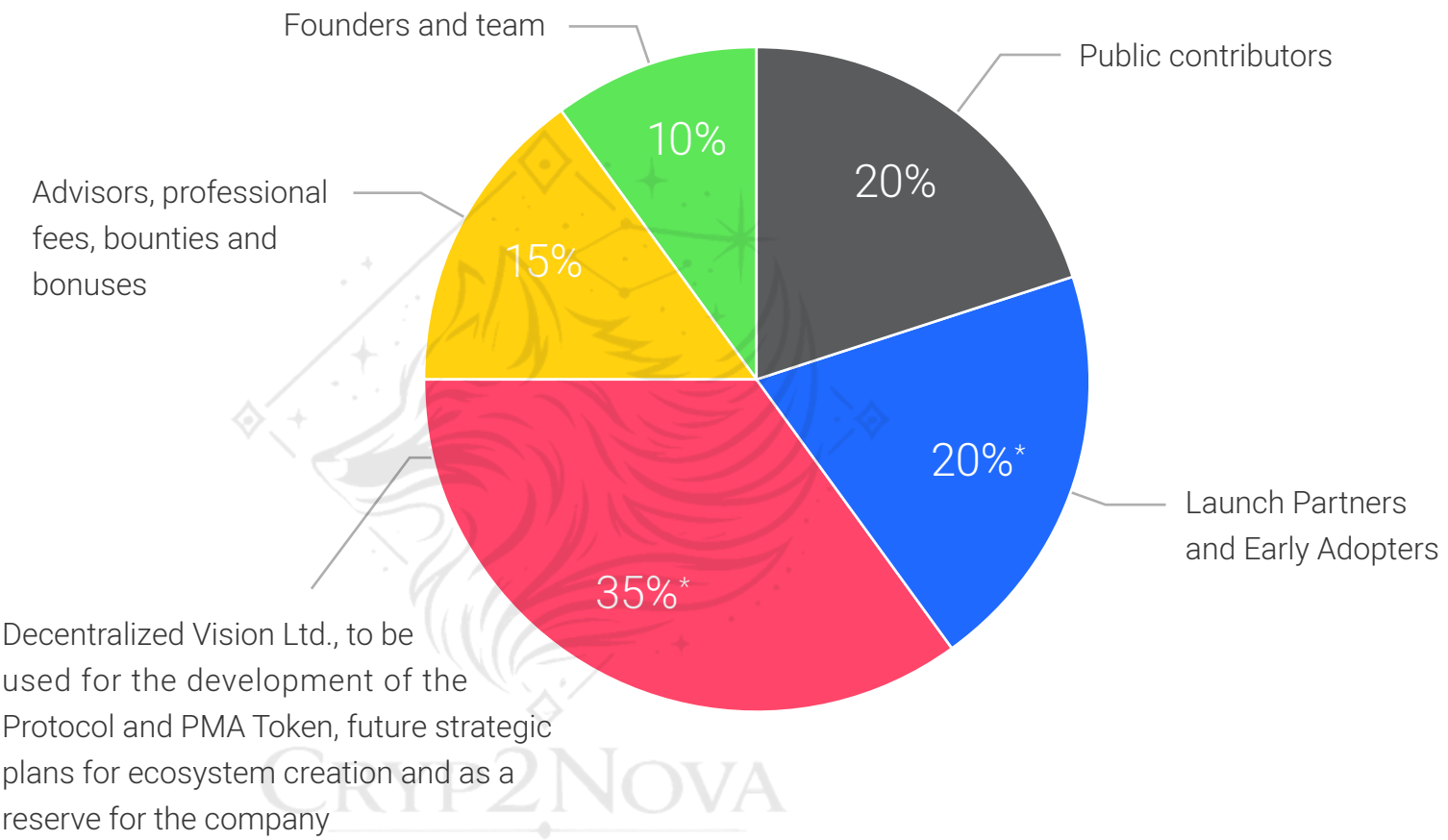


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Token Allocation

The allocation of total **PumaPay** Tokens is the following:



* If a certain allocation category exceeds its above threshold (%) of total **PumaPay** Tokens, the surplus will be taken from the company's share of allocated **PumaPay** Tokens and vice versa.

** In case the amount we have raised exceeds the Hard-Cap due to exchange rates fluctuation, the actual percentage allocated to the public will exceed 20% and will be balanced with the company's allocation

Use of proceeds

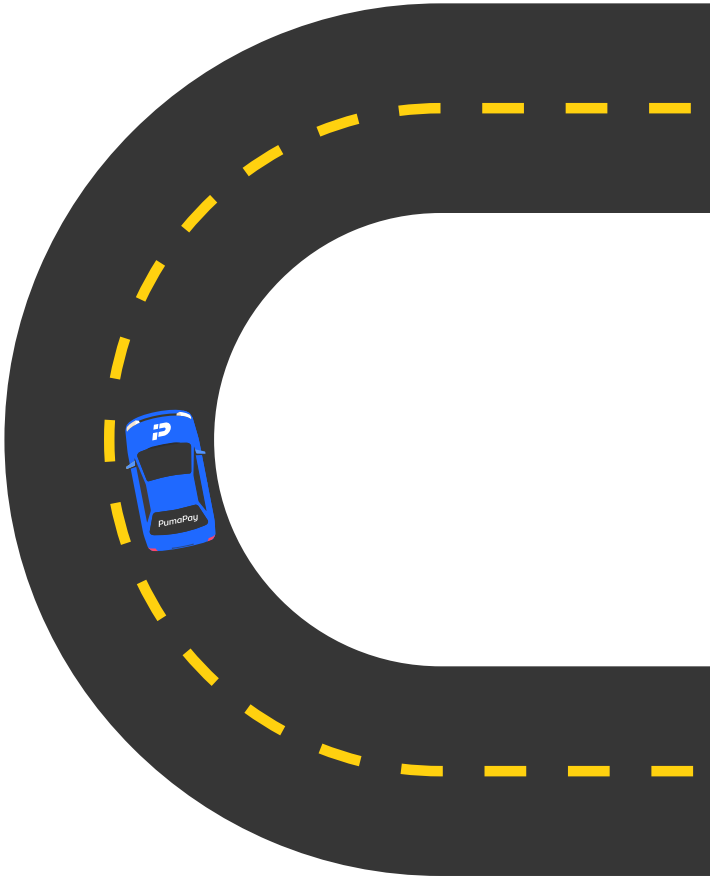
Approximately 30% of the proceeds are used to cover the TGE costs, pay various advisors and service-providers, motivate founders and team members and repay debt. The lion's share of the amount we have raised shall be dedicated for the delivery of the protocol including development, operational costs, business development etc. Approximately 3% of the proceeds should be kept as a liquidity pool for the company.

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Development Roadmap

The below roadmap provides general development timelines for the various components of the Protocol and may be adjusted in the process.



Q2 2018

- PumaPay TGE
- PMA Token V1.0 (ERC20)
- PumaPay Mobile Wallet V1.0 (Android, iOS)
- SDK I - Allowing acceptance of PMA tokens by merchants
- Integration with ImLive – enabling purchasing using PMA tokens

Q3 2018

- Testing next gen. blockchain
- PumaPay Wallet V2.0 (Android, iOS, Chrome) - supporting recurring payments
- SDK II – allowing more advanced integrations and enabling various recurring transactions
- PullContract Wizard – allowing creation and deployment of parameterized PullContracts
- PumaPay Pride

Q4 2018 - Q1 2019

- PumaPay Wallet V3.0 (Android, iOS, Chrome), supporting more PullPayment mechanisms
- SDK III – allowing integration with the PullPayment Protocol as well as allowing development of 3rd party extension services
- Integration with ImLive White Label
- Integration with Early Adopters

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Dovi Frances

Dovi Frances is a financial services entrepreneur and a technology investor. He is the founder and general partner of SGVC, a venture capital firm based in Los Angeles, California.

Since its inception, SGVC has built a name for itself by making early investments into some of Silicon Valley's most prominent FinTech companies. Today it is a major backer and stakeholder in Addepar, Tipalti, HomeLight, SunBit, TripActions and Next Insurance. Frances currently serves on the board of directors of Tipalti, SunBit, HomeLight, and Covercy. He is also an advisor to Addepar, **PumaPay** and is a member of the Advisory Council of Leumi Bank U.S. Frances graduated from Ben Gurion University in 2005 with a bachelor degree in Business Administration and he graduated from UCLA Anderson in 2008 with a Masters in Business Administration in Finance and Marketing.



Prof. George M. Giaglis

Professor Giaglis the Director of the Institute For the Future (IFF) at the University of Nicosia, Cyprus. He has been working on digital currencies and blockchain applications since 2012.

George is one of the first academics to research and teach on blockchain, having: designed the curriculum of the world's first full academic degree on blockchain (MSc in Digital Currency at the University of Nicosia); led the development of blockchain credentialing technology that has resulted in the first ever publishing of academic certificates on the blockchain; taught on the disruptive innovation potential of blockchain; organized a number of prominent blockchain conferences and events. In his career, he has published more than 150 peer-reviewed papers in leading scientific journals and conferences and serves in the editorial board of seven academic journals, including Ledger.



Muly Litvak

Muly Litvak is a musician, art collector and entrepreneur. He is the co-founder and owner of an investment company that invests in high-tech, start-ups and real estate development worldwide.

Litvak is the founder of high-profile ventures that have a significant impact on the online adult entertainment industry, specializing in the matchmaking and live-streaming sectors. He is a visionary who always tries to stay one step ahead.

"We live in exciting, historic times. The Blockchain era has tremendous potential and promises to change the economic order. In a very short time, it is going to disrupt many sectors and decentralize them, giving the power to the people. Those who make use of the decentralized platforms will have the opportunity to reap benefits that were previously limited to centralized companies and organizations".

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Daniel Sijes

Originally from the Netherlands, Daniel brings over 10 years of experience in the online payment space. Daniel worked for leading companies like Global Collect, eMerchantPay, and Mastercard where he gained insight and expertise in a variety of challenges related to both local and global payment processing.

He used his acquired knowledge to develop his own solutions and start multiple successful online payment ventures. Daniel is the cofounder of Payment Partner, a global consultancy company specializing in e-payments solutions for online businesses.



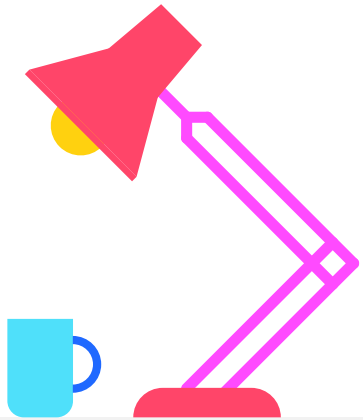
Chris Na

Chris is founder of Chaineer, a blockchain professional accelerator and investment fund located in Seoul, Korea. Chris specializes in global business development. He served as COO and Vice President of Hycon. He also provides on-offline platforms which engage the foremost political, business and industry leaders of society to drive global, regional and industry agendas.



Kenji Sasaki

Kenji Sasaki is a co-founder of Cardano, the CEO of Next Chymia Consulting HK and Corporate Officer of Emurgo, active in blockchain marketing, consultation and promotion in Asian markets.



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Yoav Dror

CEO

Founder and CEO. MBA. Over 20 years of experience at executive level in various online companies. Strategic planner and executor in highly dynamic business environment. Highly analytical and advocate of data-oriented management. An entrepreneurial character with a proven record of accomplishment of setting up new business ventures. Blockchain enthusiast.



Aristos Christofides

CTO

Graduated with honours in MENG Electrical and Electronic Engineering and is an experienced systems and development professional with over 15 years commercial experience within the financial and banking services industry. Aristos has managed and lead teams in the development of bespoke banking solutions, implemented B2B2C, NFC payment platforms and undertaken the responsibility of the successful accreditation for PCI compliance.



Giorgos Kourtellos

Chief Blockchain Architect

Giorgos combines the technical mindset of his engineering background along with professional experience in IT industry to design and deliver complex solutions. As a Blockchain engineer who was working in the Blockchain team at IBM Client Innovation Center Benelux for the past years, he was involved and contributed in multiple pilots and proof of concepts for the energy and finance industry.



Pantelis Foulis

CFO

Pantelis C. Fouli is a Chartered Certified Accountant (ACCA).

Every position he has undertaken these past 23 years has been with the same vigor to stop at nothing until the task at hand is completed.

He has served in various roles in the profession and Industry with a proven record of accomplishment.

He is also an ACCA advocate and mentors aspiring accountants in his spare time.

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Olesia Meshcheriakova

Product Manager

Product manager with experience in payment solutions for mobile and for online. Worked on different innovative solutions across different industries that helped shape and drive products with creative ideas.



Christina Kyriakidou

Content Manager

Christina is a marketing and communications professional with extensive experience in online and offline marketing. With nearly two decade's experience, Christina has worked on global projects in multiple industries, including eCommerce, sales, online education, mobile apps and banking. Christina is a strong communicator, passionate about getting the point across and engaging the audience in the way that's most accessible to them, including video and live presentations.



Gleb Chernov

VP Business Development

An accomplished and high achieving Fintech professional with specialist skills in sales, account management and operations management. Combines a broad technical skill set with strong business acumen to deliver outstanding results. Skilfully identifies and pursues key opportunities that impact positively on commercial/financial goal while upholding customer satisfaction.



Stella Evagorou

Developer

Stella Evagorou completed her studies in Leicester, UK where she obtained a bachelor degree in Computing and a Master's degree in web application and services. During and after her studies, Stella was involved in various development projects and has recently moved to the field of blockchain and smart contracts.

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Constantinos Eracleus

Developer

Constantinos Eracleous started at a young age to show interest in coding and computer science his interest quickly developed to a passion in his teen years. He has since studied Computer Science at the European University of Cyprus. During his studies Constantinos got involved with various projects including a small open source Inventory System and a reservations website. After finishing his studies he began his involvement with cryptocurrency.



Athina Chatziadamou

Legal Associate

Athina Chatziadamou is an experienced lawyer specializing in the fields of corporate law, commercial and general litigation and financial services law.

She obtained her bachelor degree in Law from the University of Leicester and also holds a Master's degree from the University of Surrey in International Commercial Law.

She is currently a member of the Cyprus Bar Association since 2013.



Mat Stone

Cyber Security

Mat Stone is an IT professional who works with technology to solve problems. Mat believes there is always a way of making things better, stronger and more secure. From an early age, Mat has been using computers and the internet to learn about the world and help others. In 2002, Mat moved into the world of servers, data and security. Focusing more on how people actually work allowed Mat to build more human-friendly and secure systems.



Aspasia Stephanou

Content Writer

Aspasia has a passion for words and writing content that performs. Having worked with different marketing teams, she has crafted content to help companies build brands that customers love. Fueled by the desire to develop compelling, search-friendly content that can attract prospective customers, she has written and published a variety of marketing content including landing pages, blog posts and articles. Her goal is to deliver content that best expresses PumaPay's brand and product story, and help turn readers into users.



Efi Klaus

Web Designer

Efi is a Creative and Web Designer with more than 15 years' experience in Design. She successfully manages and coordinates graphic design projects from concept to completion, working closely with clients to create the vision and conceive designs. Her expertise is providing effective online artwork solutions for internal and external corporate clients.

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Risk Factors

The following is a summary of the main risk factors in relation to **PumaPay** business in general and PMA Token Sale event in particular. A link for the comprehensive list of risk factor can be found at https://pumapay.io/docs/legal-considerations-risks-disclaimer.pdf

Token Sale Risks

- There is no prior market for Tokens and the Token Sale may not result in an active or liquid market for the Tokens.
- Future sales of the Tokens could materially and adversely affect the market price of Tokens.
- Negative publicity may materially and adversely affect the price of the Tokens.
- There is no assurance of any success of the Company's business platform or any future Token functionality.
- The market price of the Tokens may fluctuate following the Token Sale.
- The private keys to the escrow wallet may be compromised and the cryptocurrencies may not be able to be disbursed.
- The Token may be significantly influenced by cryptocurrencies market trends and Token value may be severely depreciated due to non-PMA related events in the cryptocurrencies markets.
- The use of the Tokens may come under the scrutiny of governmental institutions.
- The ownership of Tokens may fall under new and unpredicted taxation laws that will erode Tokens benefits.
- There may be unanticipated risks arising from the Tokens.
- Applicable laws and regulations may limit the utility, functionality, the accessibility and transferability of the Tokens.
- Crowd sales have been known to come under malicious attacks from hackers and/or other parties resulting in the theft of tokens. Such events may inflict massive losses on buyers and the company.

Company Related Risks

- The Company may be materially and adversely affected if it fails to effectively manage its operations as its business develops and evolves which would have a direct impact on its ability to maintain or operate the Company's business platform and/or develop structure and/or license any future Token functionality.
- The Company may experience system failures, unplanned interruptions in its network or services, hardware or software defects, security breaches or other causes that could adversely affect the Company's infrastructure network, and/or the Company's business platform.
- The Company may in the future be dependent in part on the location and data center facilities of third parties.
- General global market and economic conditions may have an adverse impact on the Company's operating performance, results of operations and/or cash flows.
- The Company or the Tokens may be affected by newly implemented regulations.
- The Company may not be able to pay any anticipated rewards in the future.

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