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Paytomat

Whitepaper v.2.0

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Executive Summary

In this document we cover the main aspects of how Paytomat works and an overview of what we think it takes to make transactional cryptos be used for real world payments.

Paytomat is a set of blockchain software solutions, already used by more than several hundreds Merchants to accept crypto in cafes, restaurants, beauty salons etc. Our product integrates into existing point-of-sale systems or offers a standalone solution without the need to purchase additional hardware. We hedge the risks, increase speed and streamline payments in multiple cryptocurrencies.

For the Customer, it's as easy as scanning a QR code with our own or any other compatible crypto wallet, and pay in one of the 15+ cryptocurrencies currently supported by Paytomat.
For the Merchant, the enrollment is free and is done either via their POS (updating the software) or installing the Merchant App provided by Paytomat.

The in-house developed proprietary system is now being migrated to EOS and includes "Paytomat Core" in the form of an EOS smart contract and services responsible for keeping Merchant accounts and balances, Merchant interfaces (Merchant Web Panel, Merchant App, POS integrations and e-commerce plugins) and consumer apps (non-custodial cryptocurrency wallets).

The technological platform focuses on security, scalability, performance and lowest possible cost. Ideologically, Paytomat focuses on bridging the decentralized financial world with retail, ensuring our non-competitive position with transactional cryptocurrencies and offering an open ecosystem for everyone to benefit from – Relays, Gateways, Regional Leaders, Customers and Merchants themselves.

A nascent decentralized payment system can only succeed with local support – this is what Paytomat Regional Leaders are for. Companies or individuals who oversee the local Gateways and Merchant enrollments, and earn money for doing so.

Our in-house team brings together crypto-evangelists, math scientists and security experts. We have led the software development businesses for over 10 years and our company is now 50+ people strong.

Problem Statement

Centralized payment systems are akin to silos of financial data dependant on the banking system and an industry that is ripe for transformation.

Roughly two billion people are unbanked [1] and have little or no access to personal financial services. The single most important part of the “be your own bank” concept is the ability to pay with crypto at any local shop or online. This is where most crypto offerings fall short and “crypto-enabled” payments cards that rely on central processors are not the answer.

What does it take to move from pure speculation using digital assets to real traction and transactional cryptocurrencies really taking their niche of digital cash? While the infamous “mainstream adoption” could be far away, we at Paytomat believe that there are concrete steps to grow the adoption and create real cases of transactional usage.

From the Merchant standpoint the current learning curve and legal complications might not be worth their time to start accepting crypto – there are technological challenges, administration of payments and a vast pool of new coins to manage. Paytomat takes all of that off their shoulders, bring new customers and even new marketing and data analysis opportunities.

For the Customer using fiat within their banking system there are costly cross-border payments, strict KYC limitations and virtually no privacy controls. Paying at local stores with crypto and being your own bank with cryptocurrency wallet solves that too.

Market Overview

Digital Payments Industry

The balance of force in the payments industry continues to shift towards digitization. Thus, total transaction value in the digital payments segment was valued at $3,265,209m in 2018. If their growth dynamics remains the same, the total transaction value is expected to show an annual growth rate of 13.5% resulting in the total amount of $5,411,354m by 2022 [2].

At the same time, today the situation in digital payments segment is really quite ambiguous. Visa and Mastercard still significantly dominate the payment landscape. In the US, for example, these companies account for almost half of online payments [3].

However, the hegemony of major players is gradually wearing off. Customers in key global markets use an array of local payment methods, such as Alipay, Tenpay and UnionPay in China, Boletos and domestic credit cards in Brazil, SEPA direct debit, SOFORT, and Giropay in Germany [4].

With the increasing strength of new players on the market, new platforms, technologies and even payment methods emerge in digital payments. Respectively, there is an expectation for omnicommerce – the ability to pay using the same method regardless of whether you're buying goods in-store, online or via a mobile device. This shift precipitates a need for retailers to adapt to fast, simple and secure mobile payments [5].

Mobile Payments Industry

According to statistics, the total transaction value in the mobile POS payments segment amounts to $391,435m in 2018, with experts predicting further growth of up to $1,328,244m with 977.2m members by 2022 [6].

On the other hand, 451 Research's VoCUL Leading Indicator survey [7] shows that the percentage of consumers planning to use mobile wallets has remained stagnant since Apple launched ApplePay, growing from 24% in December 2014 to just 26% in September 2017. While contactless POS penetration rates are increasing in the U.S., the value proposition for digital wallets remains undeniably nascent. In order to change it, the next wave of consumers, who are perfectly content with cash, cards, and smartphones, which work well and are accepted ubiquitously needs to be attracted [8].

Although we can argue that this new kind of customer is already living among us. In Britain alone, 22 million people are already managing their current bank account from the screens of their phone. Industry analyst, CACI, has predicted that 35 million people (72% of the UK adult population) will use banking services via a mobile app by 2023 [9].

Cryptocurrency Industry

What exactly is happening with the cryptocurrency industry in this matter? Let's start with the good news: according to Coinmetrics [10], Bitcoin transactions dollar value has outperformed that of payment processors such as PayPal and Discover by a wide margin. Moreover, transaction fees of the oldest crypto are 6,000 times cheaper than traditional fiat transfer – at least according to Bank of America (BoA)'s own rates ($45 per transaction, compared to an average transaction fee of $0.46 for Bitcoin) [11].

Around 7% of users from the largest cryptocurrency markets own crypto, and another 4% plans to buy some in the nearest future (according to the survey [12]). By 2018, around 25,714,000 people will own one or more crypto-wallets. That number is almost 8 times bigger than it was in 2015 [13].

However, there are significant challenges which serve as barriers for in the way of the whole crypto-industry development. One of the main issues is a liquidity problem laying concealed by the media hype. The obvious fact is that without driving a sufficient influx of the real life transactions into the field, the future of crypto is in real trouble.

Look for yourself: only 7.8% of $3.7 billion raised by various initial coin offerings in 2017 were actually related to payments [14]. While teams from all over the world are working to resolve this issue, the total amount of transactions these projects generate is still critically lagging behind. This is especially true in regions like Africa, Latin America, South-East Asia, Central and Eastern Europe.

What is the solution to this problem? We believe it lies in generating a sufficient amount of real life transactions and traction with the real economy. How? Well, this document was created to answer this very question.

Solution Vision

Core Principles

Our core principles reflect values we want to introduce to the world of cryptocurrency payments and technology in general:

- **Security**. We will use all the power of blockchain technology to secure each transaction in our system.
- **Openness**. We want our system to be transparent to all our clients and open for new participants that are able to add more value to our ecosystem. This means trust [15], fairness and high scalability.
- **Privacy**. While keeping the system open we care about user privacy. All private data not essential for transaction properties will be kept safe. Customers will be able to delete their private data upon request according to the latest data privacy laws.
- **Convenience**. Our intention is to provide a solution with minimal barriers for Merchant adoption, so they do not need to reinvent their businesses just for a new payment option. We aim to create a seamless processes of Customer-to-Merchant payments that are easily understandable, secure and fast.
- **Greater good**. Cryptocurrency, as with all other economies, is about a shared community [16] and we want to give back to it. It's essential to provide all participants of our network with nice benefits to motivate them to spread the word, which, in turn will lead to mass adoption and greater traction.

Customer Flow

If using crypto was easy, then everybody would use it. At the moment, that's simply not the case because there are too many steps involved to make a single transaction. However, the market matures fast and the future of payments is basically knocking on an average person's door.

The goal of Paytomat is to make payments easy and simple to use by a person who has no technical or blockchain expertise. That implies that a client only knows that Bitcoin is the same thing as cash, except digital.

Imagine Chang-Woo, a 26 years old sales manager in Seoul (South Korea), surfs through the web and finds an awesome IT conference [17]. He enjoys spending time checking different projects but the one that really captivates his attention is Paytomat. The guys explain that whole cryptocurrency thing in a human form and give him $10 worth of EOS as a giveaway to start exploring and playing with it. He downloads a wallet on the spot and receives his first digital transaction. From now on he's a Customer.

As a curious person, he decides to find a bar and get himself a drink with this new form of payment. He opens up his Paytomat wallet and can clearly see a few places on the map. He goes to the one that he wasn't familiar with, orders some brewskis and asks the waitress to pay with EOS.

The waitress steers him on over to mQR that is standing on the table. Chang-Woo simply scans it, enters the amount in Korean won, chooses EOS and clicks "pay". After confirming payment with his fingerprint, the waitress can see a push notification on her phone. He looks at the wallet to check his balance and realizes that he also received some tokens as a bonus for paying in crypto. What a nice app.

He thanks the waitress, takes a selfie of his happy face and shares it on KakaoTalk [18]. He receives lots of comments, and now has to explain how this whole cryptocurrency thing works to his friends. He becomes popular.

Merchant Flow

Camila, a 32 years old owner of a restaurant from Margarita Island (Venezuela) has hundreds of tourists coming to her place every day. She is doing okay, but the inflation rate seems to ruin her business [19]. The cash is worth less hour by hour and the fees that credit card companies charge are extremely high.

One day she decides to conduct extensive research on alternative forms of payments that can save and improve her situation. That's when she stumbles upon Bitcoin. It is fairly new and volatile but the risk is worth it.

Apparently she could open up a wallet and receive transactions directly but it's way too hard to keep track of all of the non-cash related payments in her point of sale system, which is why she finds a Paytomat plugin that supports multiple coins and is compatible with her machine. She contacts the support team and gets the whole system set up within a day. She puts cryptocurrency stickers on her front door and shares this amazing news across all of her social media to attract customers.

With the help of a local team she also decides to host an event and explain to locals the benefits of using and accepting crypto. The event becomes a massive success and now Camila has even more customers.

Every day she now serves about 10-30 tourists from different countries who pay in their favorite crypto. By this point, waiters can print out custom receipts with QR codes for each crypto and give them to clients in a respectful and presentable form.

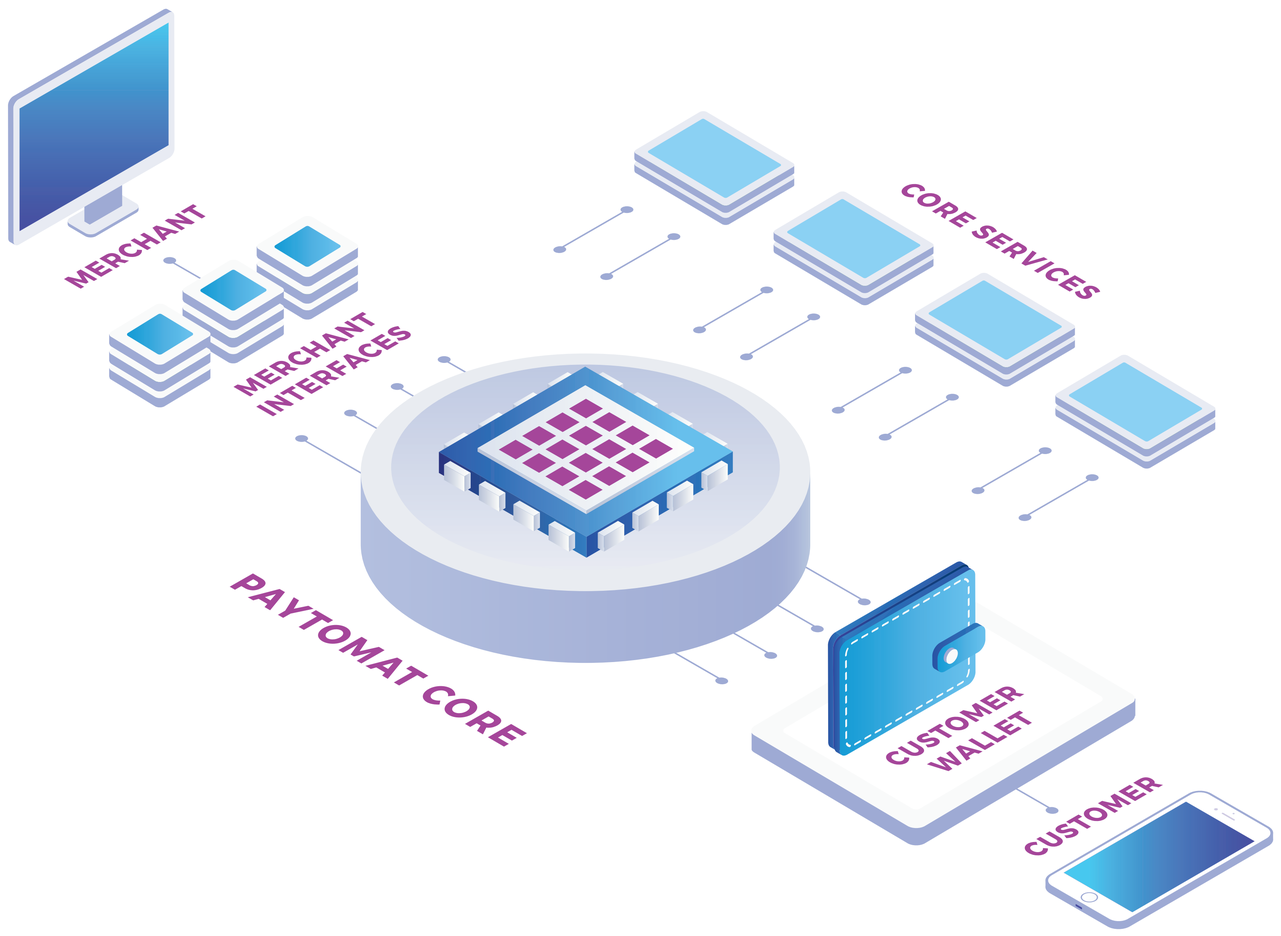
Camila and all of the waiters can track the transactions on their phones and POS system and receive SMS or push notifications if required. Due to this extra payment option Camila saves money and attracts clients from all over the globe.

Architecture Overview

Intro

Paytomat system consists of the following components:

- **Paytomat Core**: the heart of the system, responsible for keeping Merchant accounts and balances, keeping track of exchange rates and most importantly – managing transaction lifetime flow.
- **Core Services**: additional entities providing Paytomat Core with an interface to various blockchains and external services. Among others they include Relays (receive Customer payments), Oracles (confirm payments) and Gateways (handle Merchant settlements).
- **Merchant Interfaces**: various ways for Merchants to interact with Paytomat Core. These include Merchant Web Panel and Mobile apps, POS integrations and other interfaces.
- **Paytomat Wallet**: while Customers can use any app to pay the Merchants, there is a wallet app specifically designed to make crypto payments via the Paytomat system quicker and easier.



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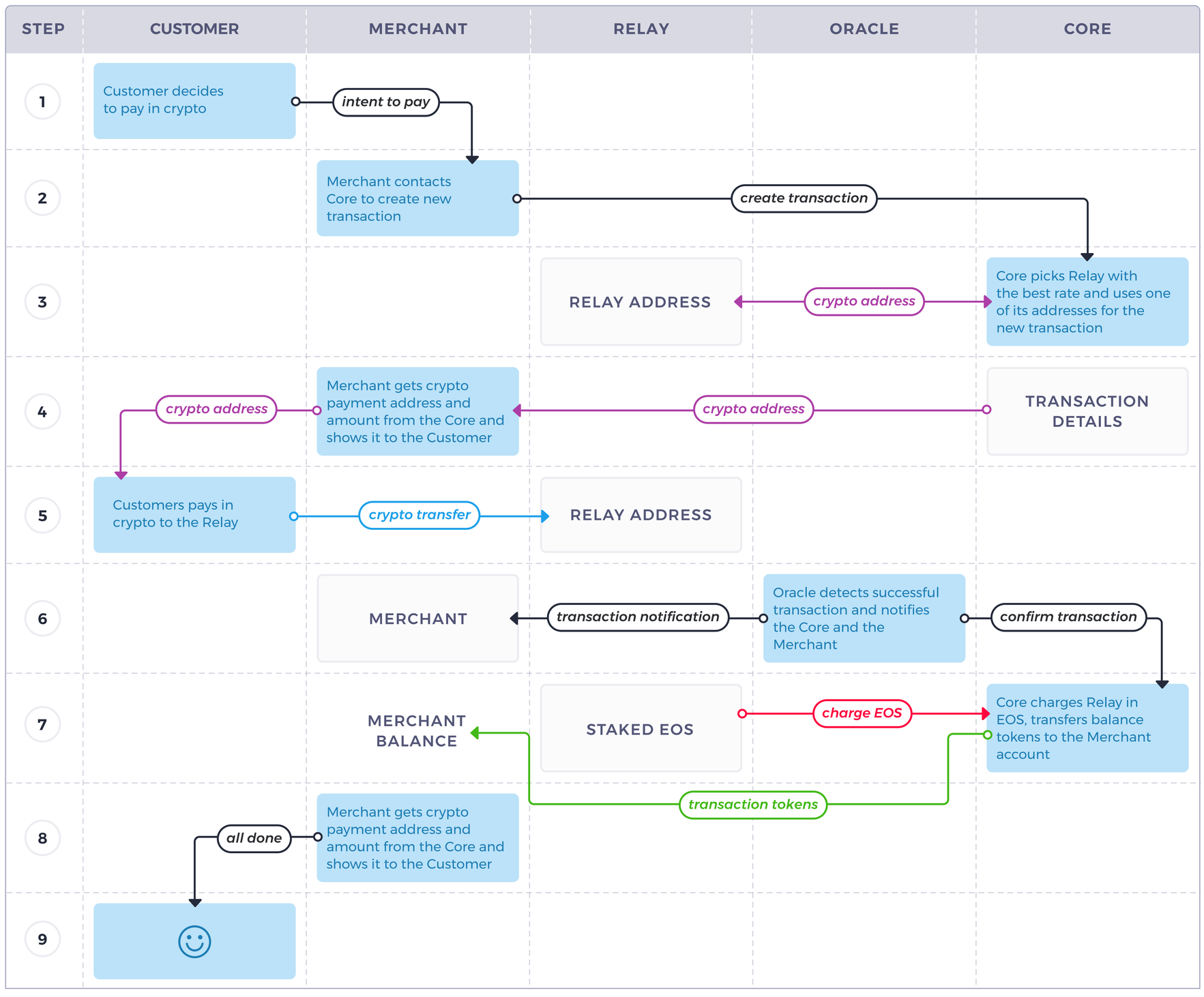
Payment Flow



1. The Flow starts with the Customer informing the Merchant of the intention to pay via Paytomat using one of the supported cryptocurrencies.
2. The Merchant contacts Paytomat Core (via the Merchant Interface used) to create a new transaction for particular amount in fiat to be paid in a particular crypto.
3. Core picks one of the Relays with the best exchange rate. It uses this rate to calculate the amount in cryptocurrency for the Customer to pay, takes available Relay crypto address and creates a transaction with all these details.

4. The Merchant takes the transaction details and provides the crypto address and amount in QR code to pay to the Customer.
5. The Customer transfers crypto to the Relay.
6. Then the transaction gets picked up by the Oracle, which calls the Core to confirm the payment. Also it notifies the Merchant (via SMS or push notification) with a payment confirmation.
7. Core marks the transaction as confirmed and charges Relay from the EOS balance it staked earlier. Also, it transfers a corresponding amount of fiat-pegged tokens to the Merchant account.
8. Notification about successful payment reaches the Merchant, who can now finalize interaction with the Customer.
9. Customer is happy. All done!

Now let's discuss all these components in more detail.

Paytomat Core

As mentioned before, Paytomat Core is the central part of the system. It needs to be secure and transparent to all participants. The best way to guarantee this is to implement it as a smart contract on EOS blockchain [20]. Let's explore the pros of such a solution:

- **Transparency**: Paytomat Core smart contract code will be open for review by third parties. Also all data stored by the smart contract can be accessed and reviewed [21].
- **Pseudonymity**: all participants in the transaction are operating under aliases, so no personal information will be revealed to the public. Of course, we are required to do some degree of KYC (depending on Merchant jurisdiction), however this information will stay off the Core.
- **Security**: is supported by the blockchain itself – all actions are signed, confirmed transactions are almost impossible to alter etc. This is further supported by the fact that Paytomat Core will run on the main EOS chain, so the security will be guaranteed by the whole EOS ecosystem.

- **Scalability**: because Paytomat Core will run on the main EOS chain, it will theoretically have access to all the computational and storage resources of EOS blockchain.
- **No final costs**: because of the way EOS manages resources [22], participants in the system do not pay for transactions, but stake funds to use storage, computational and network resources as needed. If a Merchant decides to stop using Paytomat, then all resources staked to process transactions can be refunded.
- **Performance**: another EOS advantage is its speed. It already manages thousands [23] and potentially millions of transactions per second.

- There are some cons for using smart contracts like Paytomat Core (such as varying resources cost or inability to contact external services from the smart contract), but the pros vastly outnumber them.

Core Services

Core Services help Paytomat Core to communicate with the outside world. Designed to be small and mostly self-contained, they allow for greater scalability of our system.

There are 3 main services working with Paytomat Core:

- **Relays**: accept Customer payment in crypto on behalf of Paytomat Core.
- **Oracles**: keep track of Relay payment addresses and notify the Core when payment is received.
- **Gateways**: responsible for processing Merchant settlements from Paytomer Core in fiat or crypto.

There are other minor services working with the Core (for example, exchange rate monitoring services, system admin trackers and notifiers and more), but those 3 are the most important ones. Below we discuss them in greater detail.

Relays

While working with the Core, Relays are completely independent from the system and can be outsourced to anyone willing to accept a given cryptocurrency. They could be exchanges or cryptocurrency core teams – all they need is to stake funds, choose an exchange rate and provide a list of addresses to accept crypto from the Customers. The rest (monitoring payments and charging Relays from the funds staked) is done by the Core and Oracles.

Relay interface with the Core will be open and fully documented and will provide an open source reference Relay implementation for anyone to use.

Oracles

With the 3rd party Relays accepting payments, there should be an entity to keep track of them and the entire transaction confirmation process. This is a job for Oracles [24]. Here is what they do:

- Validate addresses provided by Relays.
- Monitor Customer payments and notify Core to confirm transactions when payments are received.
- Notify Merchants about received payments.

Unlike Relays, Oracles will be operated by our team, at least in the first iteration of the Paytomat System.

Gateways

After Relays receive crypto from Customers (and Oracles confirm this process) the Core adds the appropriate funds to the Merchant's address. These funds are represented by tokens pegged to a particular currency (like USD-tokens, BTC-tokens etc.) issued by Paytomat Core. To turn these tokens into an actual currency we'll need Gateways.

There will be two types of Gateways – Crypto Gateways and Fiat Gateways [25]. Crypto Gateways will be global and will not have any additional fees. However, since fiat settlement conditions vary from country to country, Fiat Gateways will be localized and might charge additional fees. When approving settlements, Merchants will be able to select a particular Fiat Gateway which works for them the best.

Merchant Interfaces

Here are some of the ways a Merchant can work with Paytomat Core.

- **Customer Web Interface**: requires the least possible effort from the Merchant. Each registered Merchant gets a direct URL which can be shared with the Customer. The Customer in turn opens this URL, enters an amount and selects which cryptocurrency to pay in, and gets presented with the crypto address for the transfer.
  Merchant Web Panel: basically the same process, but requires the Merchant to issue an invoice to the Customers and only show them the resulting crypto payment address [26].
- **Merchant Mobile App**: much like Merchant Web Panel, but uses a native iOS/Android [27][28] application which would be preferable and easier to use.
- **POS Integration**: If the Merchant already uses some kind of a POS system [29]. We work directly with different POS providers and incentivize them to add Paytomat payment support to their systems with technical assistance from our specialists.
- **Any other custom integration**: since Paytomat Core's direct interface will be thoroughly documented, it is possible for the 3rd party providers to write their own integrations with our input.

All these interfaces are to set up to make the Merchant's work with Paytomat easier. However we did not forget about the Customers, see what we offer them in the next chapter.

Customer Wallet

By design our customers are able to pay with any cryptocurrency wallet [30] [31]. Each transaction has its own payment address that is just a regular addresses in a paricular blockchain, and payment confirmaton that comes at the very moment the transaction is added to the blockchain (or receives several confirmations, depends on the amount).

We have developed our own wallet to ensure the speed and convenience of payments. Here's what the users already have when using Paytomat mobile wallet:

- Native iOS and Android applications.
- Deterministic wallet with single seed phrase to backup all the private keys in all the cryptocurrencies.
- Monitoring balances on many addresses in the same wallet, showing fiat equivalent with current exchange rates.
- Payments in 9 cryptocurrencies (Q3 2018).
- Support of EOS [32] and Ethereum tokens.
- Faster transaction confirmation when using our wallet for payment.

Here are some features coming up in v.2.0 (currently in development):

- Merchant catalog to help find nearest Merchant where Customer can pay via Paytomat.
- Extra incentives for using the system, like special offers from Merchants, premium currency airdrops etc.
- For registered users extra-features not directly connected with Paytomat: keeping synced address book, payment to other users in the system without knowing their address (by username), single-click EOS account creation etc.
- Built-in exchange between different cryptocurrencies.

Paytomat Tokens

PTM Token

PTM is a participant incentive token represented by EOS asset. The PTM pool is emitted once at the Paytomat Core smart contract launch. Part of PTM pool is designated to smart contract account to be distributed between Paytomat participants with every transaction. Another part of PTM pool will be issued in exchange for PTI tokens.

From every transaction we take a 2% exchange rate margin in paid cryptocurrency and distribute it this way:

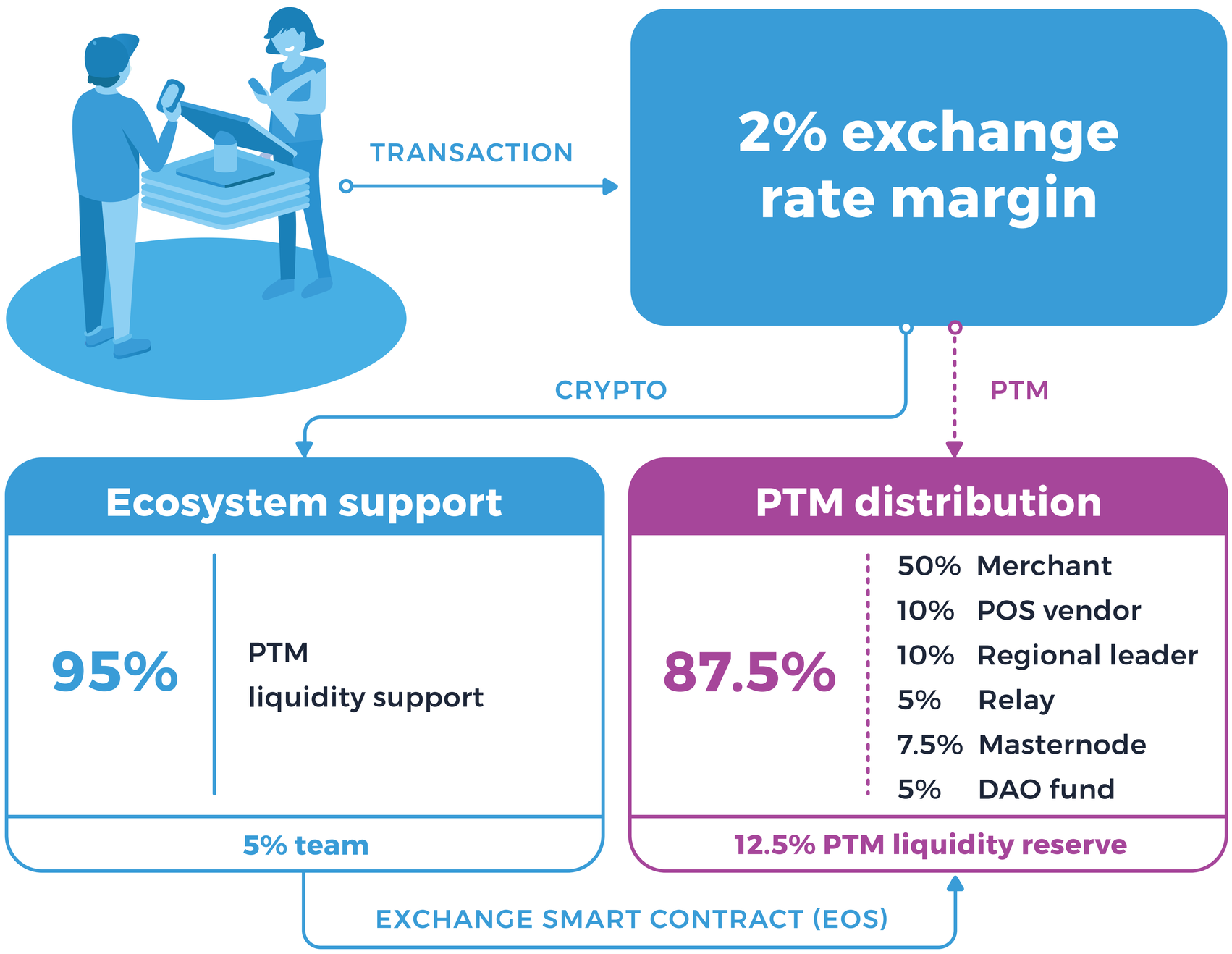
- 5% – Paytomat Core;
- 95% – used to liquidize PTM tokens.

We distribute 87.5% worth of PTM tokens to all Paytomat ecosystem members.

At the same moment, we calculate PTM tokens for this amount from current value of PTM token and distribute them like this:

- 50% – Merchant that accepted cryptocurrency payment;
- 10% – POS vendor that processes Merchant's payments (or Paytomat team if there's no specific POS assigned);
- 10% – Regional Leader that manages Merchants and POS vendors;
- 7.5% – Paytomat masternodes [33];
- 5% – Relay that provided cryptocurrency address to accept customer's selected cryptocurrency;
- 5% – DAO [34] fund;
- the rest (12.5%) stays in Liquidity Reserve to support token value.

The Masternode is an EOS account that staked 1,000,000 PTM tokens in Paytomat Core and has voting rights in the network governance.



PTX Token

Customer incentives are a bit more complex than PTM tokens, as they are tied to particular bonus programs for a region [35]. We plan to create a family of EOS assets that will represent value for a Customer in a particular region. This will either be direct value PTX token that can be used as a sort of payment inside the Paytomat system, or group of tokens that will directly represent particular goods that can be exchanged for real product inside a network of Merchants that chose to participate in such a program.

Partnering with an existing bonus system is also a viable option. In this case we will establish a gateway to convert PTX tokens to that program's assets or vice versa.

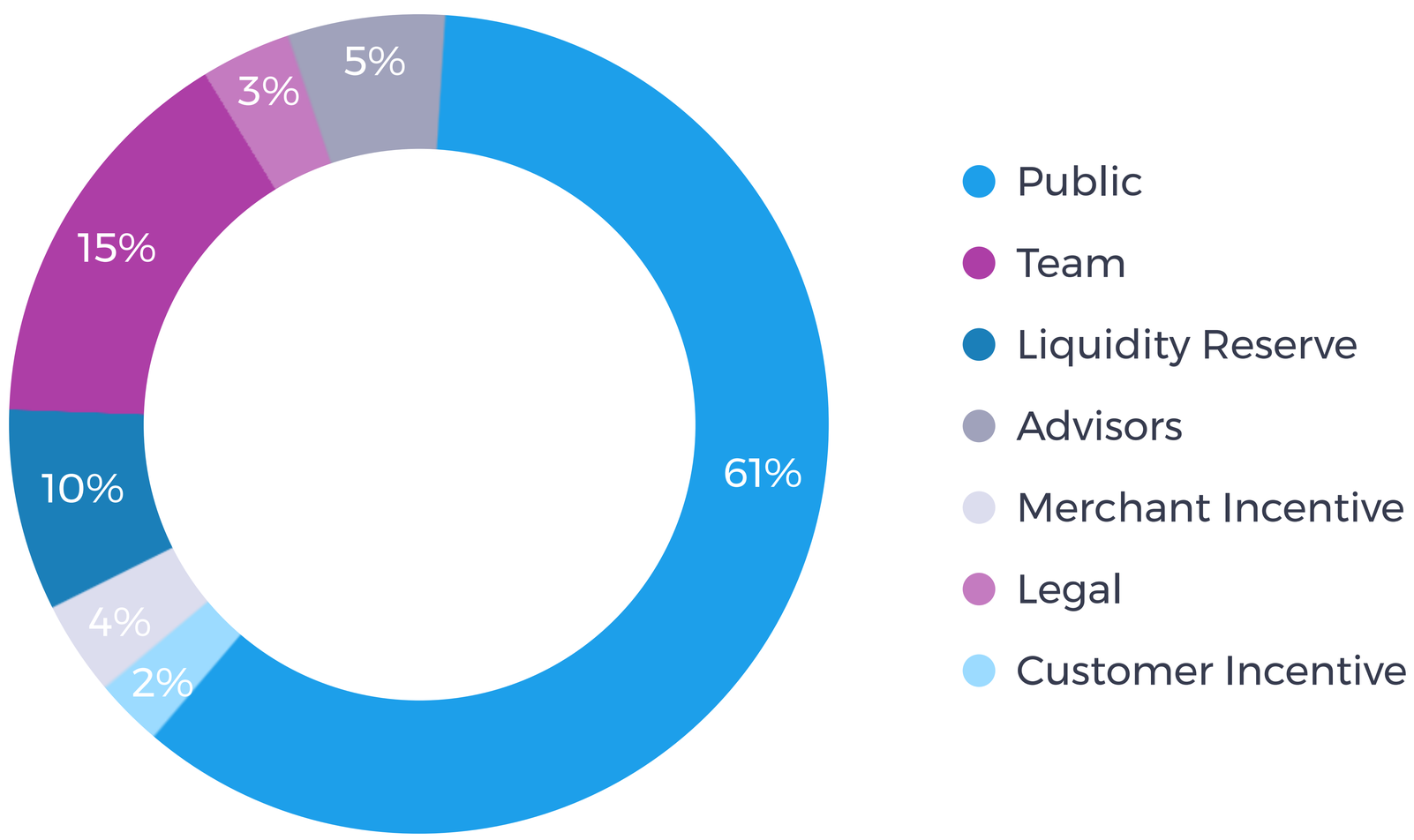
Paytomat Tokenomics

Tokens Allocation

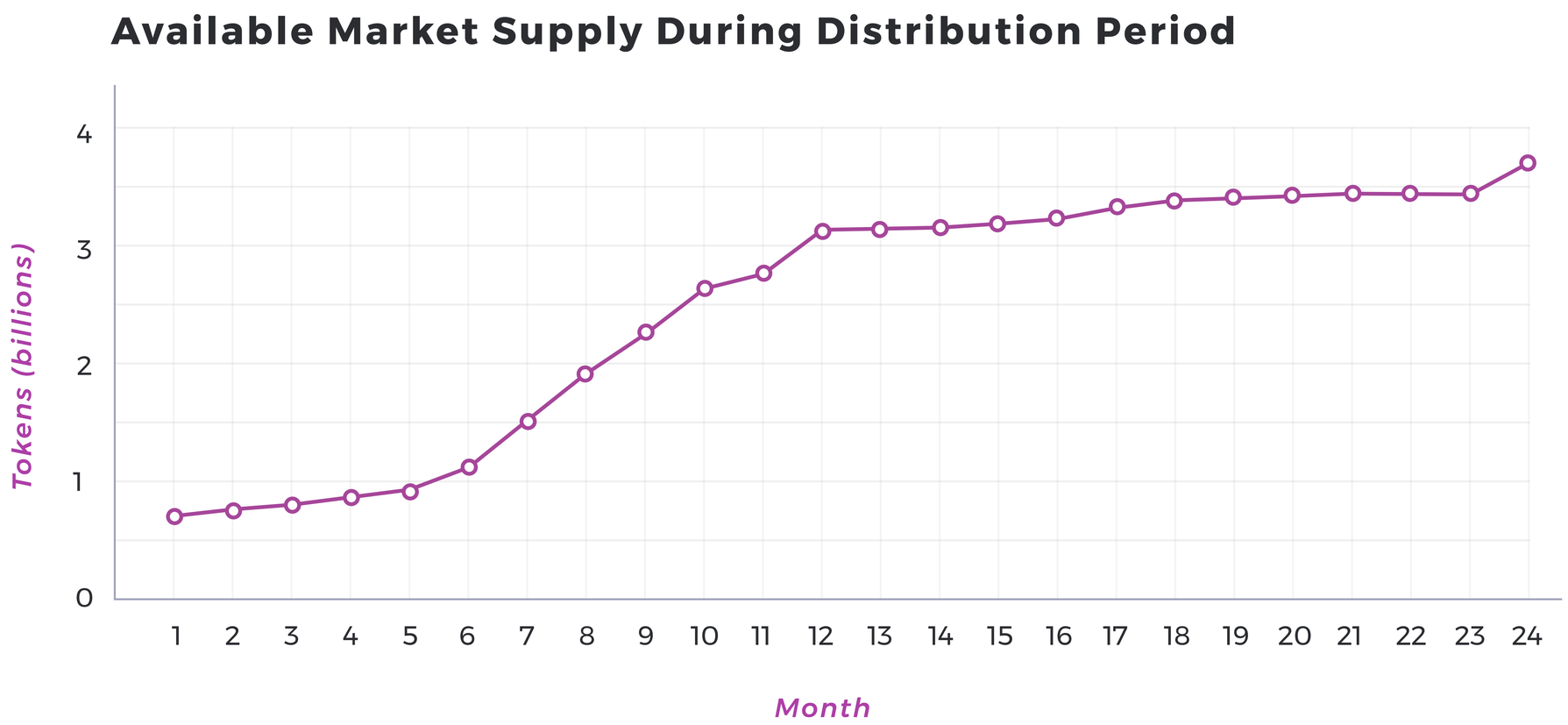
At Paytomat, we designed a token based on definitive market rules and fundamental economic principles. We ensure that PTM and PTX tokens are used actively by our ecosystem members.

PTM tokens are created during the launch of Paytomat Core smart contract that generates and distributes tokens. After the tokens are generated, there is no chance to create PTM tokens, as there are no mining activities associated with the Paytomat network. The total supply of PTM to be distributed is 3,600,000,000 PTM.

As a result, PTM tokens allocation can be described as the following:



Based on lockup periods for different stakeholders and incentive models for both Merchants and customers, we can know precisely the total number of tokens available on the market each month, thereby helping to prevent price manipulation of PTM token.



Liquidity Reserve

Liquidity Reserve is a pool of tokens that are used as incentives for transactional usage within the Paytomat network.

Paytomat intentionally distributes less PTM tokens to ecosystem members to create less selling pressure on PTM tokens, which means that demand is projected to be always greater than the current supply.

As the initial PTM Liquidity Reserve will be exhausted, Paytomat Core will start to buy PTM tokens from the open market for EOS accumulated from transaction exchange rate margin.

An ongoing purchase of PTM tokens from the exchange will help to establish an environment where PTM token value correlates with the purchasing power and habits of cryptocurrency customers and the number of Merchants who convert cryptocurrency into local fiat currency. In other words, PTM token shows an approximate dynamic of growth or decline of the market involvement.

Paytomat Labs

Paytomat Labs is our sandbox for ideas, concepts and code. Pet projects and off the wall initiatives that could become future core features are documented and tested here. Paytomat Labs is what allows us to filter through the ideas – sometimes building a prototype, sometimes just producing a youtube video and getting the discussion started.

The latest project graduated from the Labs is our mQR – the unified Merchant QR that enables the Customer to pay with any wallet and any crypto supported by Paytomat without requiring any additional point of sale device on the side of the Merchant or special software on the Customer's side.

For an overview of the current Paytomat Labs project, please head over to our Medium page.
Testers and contributors are welcome and you can contact labs@paytomat.com for details.

Project Timeline

2017 Q2:

- Paytomat development began.

2017 Q3:

- Paytomat MVP launched.
- Integration with Profit Solutions POS.
- Bitcoin, Litecoin, Dash and Waves accepted for payment.

2017 Q4:

- Integration with Poster POS.
- Paytomat Mobile Merchant Alpha.

2018 Q1:

- Added Customer invoicing from web application.

2018 Q2:

- Paytomat Mobile Wallet 1.0: deterministic multicurrency wallet, BTC, ETH, LTC, DASH, XEM, WAVES support from the launch.
- 13 different currencies accepted for payment.

2018 Q3:

- Paytomat Mobile Merchant 1.0: mQR code for Merchants, transactions and notifications.

2018 Q4:

- Paytomat Mobile Wallet 1.x: more currencies, ERC20 and EOS tokens support.

2019 Q1:

- Paytomat Core MVP launch on EOS blockchain.
- Paytomat Mobile Wallet 2.0: Merchant catalog, built-in exchange etc.

2019 Q2:

- Paytomat Core production launch on EOS.
- Paytomat Mobile Merchant 2.0: with products inventory, invoicing, reporting etc.
- Paytomat Web Merchant 2.0: web version of Paytomat Merchant App with all its functionality plus product and user management.

2019 Q3:

- Paytomat own EOS chain launch: with PTX-based loyalty programs, voting for crypto-currencies etc.
- Paytomat Partner Web 1.0: web application for all participants in Paytomat ecosystem (POS, regional leaders, masternodes) to track their rewards, see transaction volume and vote for decisions within Paytomat system.

2019 Q4:

- Paytomat Mobile Wallet 2.x: more currencies, transaction notifications, new products from Paytomat Labs.

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