New payment processing network that uses block chain technology in Pakistan

WHITEPAPER V 1.1

PKR TOKEN PAYMENT NETWORK AND KYC PLATFORM

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ERC 20 Token : PKR (0x1Bd2851c322d1030669759ceba9791601660E6bb)

THE ERC20 Tokens generated with an open source Basic ERC20 TOKEN smart contract on Ethereum blockchain with contract no :

0x1Bd2851c322d1030669759ceba9791601660E6bb

*are for **Proof of Concept only** along with this White Paper. PKR Token Team does not want to sale or distribute these tokens. They are for **Testing and Development** purposes only.*

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1. VISION

Our vision is to provide a low cost, safer and more secure enterprise block chain based payment network for the people and businesses of Pakistan. This system should comply with payment and business regulatory policy as setup in the Law of PAKSITAN.

1.1 INTRODUCTION

First and foremost, we all know that money is a universal metric of cost. The second function of money is to **preserve its value**, the third most important function of money – **informative.** This role of money came about relatively recently – prices that are set in one. Prices are simply information, information about what people are generally ready to pay for a good or a service. This information could be considered money, it is denominated in a currency and it has value, but this type of money is very different from the type that we carry in our wallet. This information is used by vendors, companies and governments in order to plan their activities.

Fiat money (or fiat currency) is currency that a government has declared to be legal tender. Crypto currency is not legal tender and not backed by a government.

Fiat roughly means, “let it be done.” Cryptocurrency implies, “a decentralized and digital medium of exchange governed by cryptography.” Both are currencies, but there are some notable differences:

Fiat currency is “legal tender” backed by a “central government.” It can take the form of physical dollars (for example paper Federal Reserve notes), or it can be represented electronically, such as with bank credit. The government controls the supply and you can pay your taxes with it.

Cryptocurrency is not “legal tender” and it is not backed by a central government or bank (it is decentralized and global). Its form is more like bank credit sans the bank (in that it is represented digitally, but not backed by a bank or government). An algorithm controls the supply and you can’t pay your taxes with it (instead you have to pay taxes on it).

Otherwise, there is no intrinsic difference. Both fiat currency and cryptocurrency can be called money or currency, both are mediums of exchange that are used to store and transfer value, both can be used to purchases goods and services, both have their value governed by supply, demand, work, scarcity, and other economic factors, both have their value affected by the quality of the system

The Fear of having crypto-fiat issuance talk really constitutes (and we're sure central banks are aware of this) is the popularization of an agenda that will take this world away from fractional reserve banking.

We operate a fractional reserve banking system for two key reasons: First, because doing so is cost-efficient (it allows for financial economies of scale) and second, because it provides the central bank with control over financial conditions. In a fractional reserve system there is by design never enough **"full reserve"** capital available to satisfy all the claims of the system simultaneously.

Actually, it is true, a fractional reserve system is not as easy as it seems. The cost efficiencies are to a greater or lesser degree always offset by the risk too many people will try to redeem their liquidity claims against real physical goods and services at the same time.

In reality it is the job of the central bank to monitor inflationary conditions and indicators such as consumer demand and industrial purchasing trends to ensure unexpected inflationary runs can be pre-empted by the early adjustment of liquidity supply. It is also the job of the central bank to supervise private banks so that they do not over-extend themselves by issuing too many liabilities.

For these measures central bank takes pre-emptive action, as we all know, is via an interest rate mechanism. This has the effect of making liquidity more or less expensive, rationing it or releasing it in response to inflationary conditions. Sometimes, however, it's not as easy as just raising the cost of bank funding to achieve an inflation target.

Often the central bank must intervene in the market directly by borrowing or lending its own liabilities against physical assets (or in the Financial scope, buying or selling reserves in exchange for financial assets) at a specific discount or

premium to ensure its policy aims are fully transmitted in the broader financial system of its domain.

Either way, the fractional nature of the system is essential for the central bank to **influence liquidity conditions** in a way that can keep inflation rates stable and trade/commerce functioning smoothly and dependably.

According to the World Bank's Financial Inclusion Database, as of 2015, almost two-thirds of the populations of just five countries - Indonesia, Pakistan, Nigeria, Colombia, and Peru (a combined 730 million people) - remain unbanked. If one includes all middle income and developing nations, that number rises to a whopping 3 billion-plus humans without access to a bank account, let alone access to basic financial tools such as a debit card. Despite the leaps made by financial technologies in the past few decades, it is clear that access to simple, 21st century financial utilities remains shockingly low

Digital payments are the solution that will provide entry to financial inclusion for these billions of people. That said, financial exclusion still remains, in large part, because most merchants in underserved demographics still deal only in cash. These micro and small businesses (MSMs) - the local food vendors, groceries stores , mobile phone kiosks - the lifelines for most people, represent over USD 6.5 trillion in transactions annually. Yet less than 10% of these merchants currently accept digital payments.

Moreover, the current financial infrastructure further disincentivizes digital payments for MSMs. Payment terminals involve long, inefficient application processes, connectivity historically has been poor, and card payment fees are too high to justify operating in anything but cash. Similarly, service providers have thus seen little reason to invest in the infrastructure to bring these billions of people into the modern digital financial system. Blockchain technology and cryptocurrencies offer an opportunity to change that. Against a backdrop of rising mobile device adoption (global smartphone user base to increase by ~1.6 billion in the next 3 years), the barrier for people to potentially transact securely, transparently and conveniently has never been lower. PKR Token Network aims to leverage these new technologies to develop an open source asset transferring

platform. By thus providing the tools for small businesses and their customers in Pakistan to go digital, it is our mission in Pakistan to help the unbanked billions become part of a newer, better, and fairer national financial system.

PKR TOKEN will be developed to be fully compliant in Pakistan as it operates in with strict Know Your Customer (KYC) and Anti-Money Laundering (AML) processes.

1.1. The Current Situation

The size of Pakistan's e-commerce market – one of the most important drivers of Pakistan's digital side – is expected to grow up to $1 billion by the year 2020. However even today, 95% of online transactions are compensated through COD (cash on delivery). COD is also a popular system in many other countries, including the UAE and Eastern European countries like Romania.

However, it has its shortcomings. While it is a good way to sell small ticket items, it becomes a challenge when more expensive products are involved. Any retailer who wants to ship a large ticket item needs to have payment up front or at least a partial payment made.

The regulations regarding Framework for Payment System Operators (PSO) and Payment Service Providers (PSP) have already been devised and approved by the State Bank of Pakistan (SBP) while development of e-commerce policy framework is also under process to cater to all the elements of the user-merchant trust with dispute resolution and remedial mechanisms.

Pakistan is generally a cash-driven economy as a number of debit or credit card holders is small and m-wallet accounts are also very low. All private sector banks have been slow to promote alternative payment methods as they see little return-on-investment and are content to reap their profits in more traditional sectors of retail, consumer and corporate lending.

2.Legal Framework

SBP's oversight of the payment system is governed by the State Bank of Pakistan Act, 1956, and the recently promulgated Payment Systems and Electronic Funds Transfer Act, 2007 which provides the general legal framework for the functioning of the payment system in Pakistan. With the introductions of PRISM, efforts are still underway to formulate operating rules which clearly define the relevant modalities for final settlement in the system.

3.Retail Payment System

The Retail payment system (RPS) in Pakistan comprises of both traditional and modern instruments for transacting payments. Generally, both cash and cheques are used, such that cash continues to be the preferred mode of payment for individuals, while cheques are used for commercial transactions.

Non-cash payments are further categorized into paper-based and electronic instruments of payments. These non-cash payment instruments have undergone substantial changes since the mid 1990s. Some of the major developments are briefly discussed here to reflect the current position of the Retail Payment System in Pakistan.

4.Paper-Based Transactions and Clearing

An assessment of the share of paper-based transactions in the total number of retail transactions reveals that RPS in Pakistan is still dominated by traditional paper-based transactions . Both the volume and value of paper-based transactions is largely driven by cheques for cash withdrawals, and funds transfers through cheque-clearing. The share of all other paper based instruments (Pay Orders, Demand Drafts, Telegraphic Transfers etc.,) is less than 10.0 percent in terms of the total value and amount of paper-based transactions.

As a result, Pakistan's independent retailers are put off adopting modern point-of-sales (POS) systems – which accept debit and credit cards – by transaction fees as high as 3.5 percent. Since the SBP only gives branchless banking approvals to banks, a variety of business models have been mooted. Four mobile network operators partially or fully own microfinance banks while one mobile operator has

agreed an exclusive partnership with a mid-size bank. Two other banks are pursuing telco-agnostic models and an independent third party payment service provider has just been established.

To date, there are several live branchless banking schemes in the country: three of the five mobile operators have launched their products while the remaining two are piloting some others. The bigger banks have taken much longer to engage in branchless banking.

TABLE 2: Status of branchless banking deployments in Pakistan

Deployment	Status	Services
(1) EasyPaisa: Telenor Pakistan and Tameer Microfinance Bank own and operate EasyPaisa (Telenor bought a 51% stake in Tameer Microfinance Bank).	Launched in October 2009 with OTC-only mobile wallet introduced in February 2010	Utility bill payments Domestic remittances Airtime purchase Other bill payments Salary disbursements International remittances Loan disbursements /repayments Savings product combined with insurance
(2) Omni: United Bank Limited operates this telco-agnostic service. One of the first banks to participate in government cash transfer payments, including Benazir Income Support Program (BISP)	Launched in 2010, Omni operates over 6,000 agents	Disbursing certain government payments
(3) Mobicash: Mobilink and Waseela Microfinance Bank	Launched in November 2012 with both OTC and mobile wallets. To date Mobicash is offered through 2,700 agents with 150 new agents being added per day.	Bill payments Domestic remittances Postpaid bills Airtime purchases
(4) Timepey: Zong and Askari Bank	Launched September 2013 with 2,000 agents. Askari Bank contracted to disburse salaries to 700,000 soldiers.	Utility bill payments Domestic remittances Account to account transfer Airtime purchases Disbursing army salaries/ pensions
(5) Ufone and Rozegar Microfinance Bank	Tested in Q1 2013	Planning bill payments, domestic remittances and BISP disbursements
(6) Monet, Warid and Bank Alfalah: All three companies have common ownership.	Tested in Q1 2013 Bank Alfalah disburses BISP government cash transfers	
(7) Habib Bank Limited, the largest commercial bank (40% market share) with the largest branch footprint.	Launched in Q1 2013	Disburses BISP government cash transfers
(8) MCB	Launched in Q4 2012	Disburses BISP government cash transfers

To understand this issue we will try to understand Easypaisa as now being offered via a network of 25,000 agents who belong to Telenor's overall network of 150,000 airtime agents throughout Pakistan. Easypaisa agents use an **mPOS device** linked to a Fundamo wallet platform that is hosted and operated by Telenor. Customers have the option of opening a wallet account at more than 1200 agent locations.

TABLE 3: Current tariffs (in rupees)

Transaction	Slab start	Slab end	Charges*
Cash deposit	100	25,000	Free
Bill payment*	1	—	Free
Easyload	10	—	Free
Donations	3	—	Free
Create PIN	—	—	Free
Change PIN	—	—	Free
Balance enquiry	—	—	Free
Send account Info	—	—	Free
Mini statement	—	—	Free

*16% Federal Excise Duty (FED)or service tax applies to fees for bill payments to Internet companies.

Cash withdrawal		
Slab start	**Slab end**	**Charges**
0	1,000	23.20
1,000.01	2,500	46.40
2,500.01	4,000	69.60
4,000.01	6,000	92.80
6,000.01	8,000	116.00
8,000.01	10,000	139.20
10,000.01	13,000	162.40
13,000.01	16,000	185.60
16,000.01	20,000	208.80
20,000.01	25,000	232.00

Funds transfer (mobile account to mobile account)				
Slab start	**Slab end**	**Fee**	**FED (16%)**	**Fee (with FED)**
0	200	6	0.96	6.96
200.01	500	12	1.92	13.92
500.01	1,000	20	3.20	23.20
1,000.01	2,500	40	6.40	46.40
2,500.01	4,000	60	9.60	69.60
4,000.01	6,000	80	12.80	92.80
6,000.01	8,000	100	16.00	116.00
8,000.01	10,000	120	19.20	139.20
10,000.01	13,000	140	22.40	162.40
13,000.01	16,000	160	25.60	185.60
16,000.01	20,000	180	28.80	208.80
20,000.01	25,000	200	32.00	232.00

Funds transfer (mobile account to CNIC*)				
Slab start	**Slab end**	**Fee**	**FED (16%)**	**Fee (with FED)**
0	1,000	40	6.40	46.40
1,000.01	2,500	80	12.80	92.80
2,500.01	4,000	120	19.20	139.20
4,000.01	6,000	160	25.60	185.60
6,000.01	8,000	200	32.00	232.00
8,000.01	10,000	240	38.40	278.40
10,000.01	13,000	280	44.80	324.80
13,000.01	15,000	320	51.20	371.20

Customers can avail conduct over-the-counter transactions without the need to open an account. The Fundamo platform and Tameer's core banking system are technically integrated. Individual accounts are opened on the former while a

pooled account in the core banking system reflects total balances held in all individual wallets.

PKR Token believes that's by adapting the blockchain model operational costs of running such platform or services can be halved and those savings can be passed on directly to the individual and corporate users.

It is also noted that for customer verification and compliance of regulatory framework following KYC policy is followed in these mobile branchless banking systems, when these branch less accounts are opened or transactions occur, there are three levels of controls:

1. Level 0: A picture of the User is taken, along with a copy of her or his CNIC card. These elements are uploaded to the back-end system in real time, and then checked against the NADRA database

2. Level 1: A call-back verification is made by a call center agent to ensure that the client is the person she/or he claims to be. This is generally based on some CNIC information or other details related to current products with Bank.

3. Level 2: A full bank-grade verification is performed

PKR Token development team is fully capable of integrating this KYC compliance into our dApps and payment network services that will be used for redemption or issuance of internal PKR Tokens.

Such branch less money transfer services and companies are not risk free. These risk include operational—and compliance—risks that relates to controls around CNIC card validity and Transaction authentication. Electronic control to check CNIC expiration is difficult. These checks are therefore left to the individual agent's discretion. This means that regular audits are required at opening agents to ensure that proper KYC identification and verification processes are in use.

PKR TOKEN Payment Network plans to cut down network and system resources spent on authenticating and validating each transaction. The Unique hash code generated with each transaction and passed on as additional data on internal

payment networks maintains the net score of Authentication /verification , KYC and AML checks performed on that transaction. Any black listed wallets / merchants and Users will be notified to the relevant parties and any “Suspicious Transaction “can be reported to relevant authorities in real time.

5.BLOCKCHAIN AND CRYPTO PAYMENT NETWORKS

Since the arrival of Bitcoin in 2009, cryptocurrencies have proliferated globally. Currently, over 700 cryptocurrencies are actively traded, with a total market capitalization of more than $31.2 billion (as of October 27, 2017), according to coinmarketcap.com. Most of these are minor currencies with a small circulation. But the top 10 or so cryptocurrencies by market capitalization are a different matter. They aim to create fast, inexpensive and fully secure global payment solutions, challenging and potentially disrupting traditional B2B payment methods.

Ranked first (by considerable margin) is the original cryptocurrency, Bitcoin, followed by Ethereum and newer contenders such as Litecoin, Dash, Monero, Primecoin, Nextcoin and Peercoin. Ripple, also among the top 10, is the native “currency” of a blockchain-based international payments protocol being designed in conjunction with existing global payment solutions providers. Ethereum is the “token” underpinning a development platform whose potential applications go far beyond international payment solutions.

These cryptocurrencies broadly divide into two groups: those that limit the number of coins that can ever be created (called “deflationary currencies”) such as Bitcoin, Monero and Dash and those that don’t (“inflationary currencies”); Ethereum, Litecoin and Ripple.

They all work on a distributed and decentralized basis, with no central intermediary. Payments are made directly from one user to another and verified by the entire network, with copies of transactions held by all computers on the network. To ensure payments are secure, the cryptocurrencies use various cryptographic techniques. Bitcoin, for example, uses the U.S. National Security Agency’s SHA-256 cryptographic hash function, whereas Litecoin uses Scrypt, a

password-based key derivation function for those interested each transaction is encrypted into time-stamped blocks, and each block's SHA-256 hash result becomes a unique identifier that is incorporated into the next block (thus creating the chain) for integrity verification.

6.Verifying Transactions in a Cryptocurrency-Based Global Payments Solution

The absence of trusted intermediaries in a current crypto currency network poses a problem. In existing payments solutions, trusted intermediaries verify transactions, accepting only those that are complete, accurate and legitimate. But in a crypto currency network, in theory any transaction could be accepted. This leaves the system open to spam and "denial of service" attacks.

It could also allow an owner to issue multiple transactions using the same coins – this is known as "double spending." So most crypto currencies have protocols that encourage users to compete to verify transactions in return for a reward. Verification eliminates double spending and helps to protect against spam and malicious transactions.

Broadly, there are two types of verification protocols employed by the crypto currencies vying to be the next big global payments solution. Bitcoin's "proof of work" is a highly innovative solution to the verification problem, and it remains the most popular protocol. It involves solving cryptographic puzzles.

When a puzzle is solved, a new "block" of transactions is confirmed and the user, or "miner," is rewarded with new coins and transactions fees. As more coins are created, the puzzles become progressively more difficult, requiring larger and larger amounts of computing power.

However, proof-of work verification is relatively slow (at least 10 minutes), and its energy-intensive nature encourages the formation of "mining pools" or miner "oligarchs" which can monopolize verification.

Effectively, this creates central intermediaries that may be corrupt or become a target for malicious attacks. Because of this, some crypto currencies are adopting

"proof-of-stake," where the ability to verify transaction blocks is determined by the size of the miner's investment.

Proof-of-stake is less vulnerable to monopolization and malicious attacks, but on its own it encourages fragmentation of the system, so it is usually combined with some other mechanism to discourage excessive mining.

Nextcoin, for example, randomly selects the verifier for a new block using a lottery-type mechanism. Clearly, the more coins a user holds, the more likely they are to be selected as the verifier. Ethereum is planning to move to its own version of proof-of stake, while Peercoin and Dash use a combination of both methods.

In the longer-term, which protocol is used is likely to affect both the security and the speed of B2B payments.

7.How Other Crypto currency-Based Global Payment Solutions Work

Crypto currency payments work in much the same way as cash. The owner keeps their coins in a secure wallet to which only he has the "key" – a digital signature that only he knows. The wallet can receive payments without being opened, but to make a payment the owner must open the wallet with the key.

To make things extra safe, some wallets have multiple keys: for example, a wallet might have three digital signatures, one held by the owner, a second held by a trusted third party and a third in offline ("cold") storage. Making a B2B payment from one of these "multisig" wallets requires two or more keys, not just one. This is not unlike business checks that must be countersigned to be valid for payment.

A crypto currency-based global payment solution would thus work very differently from credit cards and other online transfers. Instead of the payment being authorized by the owner and then taken from the account by the recipient, the owner transfers the coins directly to the recipient – ***a "push" model***, rather than an "***authorize and pull" model***. To make the payment, of course, the owner must have enough coins or tokens in the wallet.

Cryptocurrency payments typically clear much faster than today's B2B payments, and other user to user payment methods used in Pakistan, as there are no

intermediaries. And as the wallet must contain enough coins for the payment to be made at all, in theory the payment cannot fail.

If all local payments were pre-funded and peer-to-peer, there might be no need for very short-term commercial bank credit. However, this carries implications for business cash flow, since businesses cannot commit to payments in advance of funds being received. Automated payments may be particularly problematic; since businesses may have to put funds into escrow to ensure that the payments can't fail, potentially tying up funds for long periods of time.

Crypto currency-based global payment solutions offer the possibility of vastly improving the speed and security of international payments, while reducing transaction costs. However, as crypto currencies become more attractive as global payment solutions, businesses may need to fundamentally re-think the way they manage their cash flow.

8.Our Solution – PKR TOKEN Payment Network

In our solution, fiat-pegged internal crypto currency called "PKR TOKEN" and its supporting Payment network for Pakistan. For proof of concept all PKR TOKEN dummy tokens have been already created on the Ethereum blockchain protocol and so they exist as a ERC20 tokens. Each PKR Token unit if &/ when issued into circulation on PKR Token Payment Network will be backed in a one-to-one ratio (i.e. one PKR Token is equal to one Pakistani Rs) by the corresponding fiat currency unit held in deposit by Pakistan based bank of PKR Token issuer.

PKR Token may be redeemable/exchangeable for the underlying fiat currency pursuant to PKR Token legal and regulatory terms of service or, if the holder prefers, the equivalent spot value in any other crypto- currency **(if allowed by Regulator**). Once a PKR Token has been issued, it can be transferred, stored, spent, etc just like bitcoins, ethereum or any other crypto currency. This will give fiat currency on reserve the properties of a crypto currency and its price is permanently attached to the price of the fiat currency Pakistani Rupee.

The idea for asset-pegged crypto currencies was initially popularized in the blockchain community by the Mastercoin white paper. Today, can see this idea

implemented with the likes of Tether, Ripple, Omni, and others. One should note that all crypto exchanges and wallets (like Coinbase, Bitfinex, BitStamp etc) which allow users to hold value as a fiat currency already provide a similar service in that users can avoid the volatility (or other traits) of a particular cryptocurrency by selling them for fiat currency, gold, or another asset. Further, almost all types of existing financial institutions, payment providers, etc, which allow you to hold fiat value (or other assets) subsequently provide a similar service. In this white paper we focus on PKR Token applications where in the fiat value is stored and transmitted with software that is open-source, cryptographically secure, and uses distributed ledger technology, i.e. a true fiat-pegged crypto currency.

While the goal of any successful crypto currency payment system is to completely eliminate the requirement of trust, each of the aforementioned implementations either rely on a trusted third party or have other technical, market-based, or process-based drawbacks and limitations.

PKR Token Platform will have numerous advantages over other crypto currencies payment networks as PKR Tokens can be used just like other crypto- coins, i.e. in a p2p, pseudo-anonymous(If allowed by Regulator), decentralized (If Allowed by Regulator), cryptographically secure environment. They can be integrated with merchants, exchanges, and wallets just as easily as any other crypto currencies can be integrated. The whole PKR Token payment network is monitored and regulated by a separate internal system which authenticates, verifies and risk scores every transaction occurring in real time.

PKR Tokens inherit the properties of the ERC20 protocol which includes, a decentralized exchange system, browser and mobile based, open source, wallet encryption, Distributed Ledger based transparency, accountability, multiparty security and reporting functions. A KYC application that controls the redemption and issuance of tokens to makes sure that **No Token** is issued outside the regulatory framework of payment network.

This KYC application for quick verification and authentication purposes uses an internal token network which employs swarming architecture for its nodes.

If allowed by regulators a gateway can be setup to provide inter- changeability between both internal tokens and external crypto-currencies.

PKR Token employs a simple but effective approach for conducting **Proof of Reserves** which significantly reduces our counterparty risk as the custodian of the reserve assets.

PKR Token issuance or redemption will not face any pricing or liquidity constraints. Users can buy or sell as many PKR Tokens as they want, quickly, and with very low fees. PKR Tokens will not face any market risks such as Black Swan events, liquidity crunches, etc as reserves are maintained in a one-to-one ratio rather than relying on market forces.

PKR Tokens one-to-one backing implementation is easier for non-technical users to understand as opposed to collateralization techniques or derivative strategies.

9. HISTORY OF PKR TOKEN

Last year, Mastercard announced it will be opening up access to its blockchain technology. According to company, “MasterCard’s blockchain solution provides a new way for consumers, businesses and banks to transact and is key to the company’s strategy to provide payment solutions that meet every need of financial institutions and their end-customers.”

MasterCard plans to implement the technology initially in the realm of business-to-business (B2B) transactions. The company believes its blockchain technology will help to address challenges involving speed, transparency and costs associated with cross-border payments.

Through blockchain technology companies can create an irrevocable digital ledger of transactions. The technology can be integrated into business processes today, not even in the near future. And smart contracts can be created for literally any task, from smart homes and property insurance, utility bills , B2C and B2B Payments, for payment cards and logistics. Additionally, blockchain technology removes the need for a central authority to manage transactions, making these transactions highly secure and impenetrable for hackers.

This technology has yet to be widely adopted, but it has already proven critical for businesses and even more so for the B2B realm since it often involves larger transactions. But that's only one of the reasons why blockchain technology will be critical for B2B.

Blockchain technology provides a high level of privacy by ensuring that transaction details are shared only amongst the participants involved in those transactions. With blockchain transactions there's no need for a third party.

But the level of privacy associated with blockchain payments has raised concerns among many in the finance community. However, in addition to the high level of privacy built into blockchain technology, there is also a high level of transparency. Blockchain systems include a fully auditable and valid ledger of transactions. This ledger is indelible and unforgeable.

Entries into the ledger can only be made if they are validated by the system. And in order to change it, every single other blockchain in the system would also need to be changed. For this reason it's impossible to delete a blockchain transaction in an attempt to hide it and fraudulent transactions cannot be added.

This transparency eliminates the need for checks and balances that often take up important resources and manpower in traditional payment and remittance systems. With blockchain, payment transparency is automatic. As a result, some predict financial reporting costs could shrink by 70%.

Data is also optimized and simplified, making it easier for companies to comply with regulations and meet demands for data. And some have even argued that due to the transparent nature of the technology, it should not be regulated.

Just like other crypto tokens PKR TOKEN payment system is a decentralized, on-demand, scalable token and payment network that will operate on PKR Payment Network Blockchain with a separate KYC mechanism for dApps. PKR TOKEN PAYMENT SYSTEM fills a need and is complementary to the other components to make the decentralized Internet and payment eco system of Pakistan complete. PKR TOKEN payment platform is the right fit because for B2B and retail payment market of Pakistan as it provides enterprise-grade payment transfer,

authentication and verification service & A regulatory compliant KYC Services at a price which is half of currently operating other payment and remittance systems available to people of Pakistan.

Seeing that blockchain can provide numerous benefits to the finance industry, we started working in idea of PKR TOKEN Payment System back in July 2017. We started working to develop a payment technology stack that abstracts the complexities of managing blockchain payment and compliance applications that adhere to local regulatory framework. Working with our other enterprise customers presented us with one critical challenge for widespread adoption of blockchain payment applicatons: the management of large amounts of payment data and associated KYC regulatory processes.

This discovery led to the idea for formation of the PKR TOKEN payment platform, associated blockchain payment network, a decentralized payment service and KYC protocols embedded dApps that control and limit the transfer and redemption of these tokens on associated network.

It can be imagined as high powered scalable enterprise payment network, where each transaction is verifiable, auditable, regulated and Fail Proof. PKR Tokens exist as a Transactional Unit on this network. However like common crypto-currencies its value does not change with supply and demand and is always pegged on the Fiat currency of Pakistan.

10.THE CURRENT STATE OF PAYMENT SERVICES IN PAKISTAN

The **Retail payment system (RPS)** in Pakistan comprises of both traditional and modern instruments for transacting payments. Generally, both cash and cheques are used, such that cash continues to be the preferred mode of payment for individuals, while cheques are used for commercial transactions.

Cash payment is the most widely used means of payments to settle obligations in Pakistan. However, this mode of payment is costly due to problems related to manual counting, verification, and storage of physical currency notes. Non-cash payments are further categorized into paper-based and electronic instruments of

payments. These non-cash payment instruments have undergone substantial changes since the mid 1990s.

Following are the major Payment Systems in Pakistan:

1. The Pakistan Real-time Interbank Settlement Mechanism (PRISM) - which is the RTGS system of Pakistan

2. Central Security Depositaries - in SBP for Government Securities

3. Central Depository Company (CDC) - for corporate securities which is regulated by SECP

4. National Clearing Company of Pakistan Limited (NCCPL) - manages the clearing and settlement of all book entry securities

5. Paper instruments Clearing House

6. ATM switches

7. Retail Payments (e-banking, ATM Network, Mobile Banking, POS Payments etc)

Pakistan Real-Time Interbank Settlement System (PRISM) A Real-time Gross Settlement (RTGS) system is one the most preferred mechanisms for the settlement of large value payments by central banks, as it is designed to achieve sound risk management in payment settlement, especially in the settlement of interbank transactions. In this system, payments are settled in real time across settlement accounts held at the central bank.

Various developments in Past clearly indicate that the Payment and Settlement System in Pakistan is still in the process of evolving in response to advancement in information technology and developments at the international and domestic front. While its capacity and efficiency has seen visible improvements in recent years, these changes have also impacted the associated nature of risks.

In terms of benefits, e-banking and e-payments facilitates customers by providing a wider range of options, more information and awareness, and faster and more competitive services. At the same time, it entails the risk of information

overload, as customers at times do not fully comprehend the terms of reference of the facilities they subscribe for.

Payment Systems at a Glance

As on June 30, 2015

Sr. No.	Description	Number
Financial Institutions		
1	Commercial Banks	35
2	Microfinance Banks	10
3	Development Financial Institutions	8
Categorization of Banks		
4	Public Sector Banks	5
5	Local Private Banks	21
6	Foreign Banks	5
7	Specialized Banks	4
8	PRISM's Direct Participants	45
Payment Systems Infrastructure		
9	Online Branches	11,315
10	Manual Branches	622
11	Automated Teller Machines (ATMs)	9597
12	Interoperable Switches	2
13	Banks Managing POS	6
14	Point of Sale (POS) Machines	41,183
Payment System Services by Banks		
15	Banks Providing Internet Banking	21
16	Banks Providing Mobile Banking	16
17	Banks Providing Call Center & IVR Banking	16
18	Banks issuing Credit Cards	12
19	Banks issuing Debit Cards	27
20	Banks issuing Prepaid Cards	9
21	Banks having ATMs	28
Per 100,000 Statistics*		
22	Online Branches per 100,000 Population	6
23	ATMs per 100,000 Population	5
24	POS per 100,000 Population	22

* Population value equal to 186.19 million. Reference: State Bank of Pakistan

Payment Systems Infrastructure

S.No	Infrastructure	FY2010-11	FY2011-12	FY2012-13	FY2013-14	FY2014-15[P]
1	ATMs	5,200	5,745	6,757	8,240	9,597
2	POS Machines	37,232	34,879	33,748	34,428	41,183
3	Credit Cards	1,384,814	1,231,000	1,223,271	1,333,827	1,369,958
4	Debit Cards	12, 631,959	15,984,000	20,202,558	23,061,171	25,024,235
5	ATM Only Cards	1,484,005	1,673,132	932,971	957,807	900,270
6	Total Bank Branches	9,362	10,020	10,395	11,199	11,937
7	Online Branches Network	7,117	9,291	9,827	10,640	11,315
8	Internet Registered Users	839,948	1,005,428	1,246,373	1,478,301	1,811,707
9	Mobile Registered Users	916,780	1,383,588	1,807,306	1,671,693	2,267,688
10	Call Center Registered Users	7,920,193	9,635,522	11,565,713	13,910,779	16,624,377

Payment Systems Transactions – Year Wise

(No. in Thousand & Amount in Billion Rupees)

S.No	Type of Transactions	FY2010-11		FY2011-12		FY2012-13		FY2013-14		FY2014-15[P]	
		No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount
1	PRISM Transactions	329	81,882	375	112,533	488	161,748	600	149,303	772	219,362
2	ATM Transactions	137,659	1,196	166,158	1,589	199,779	1,979	258,483	2,648	300,231	3,202
3	POS Transactions	14,287	70	17,447	80	17,311	87	24,293	124	32,035	171
4	RTOB Transactions	74,407	20,652	83,070	23,969	89,058	27,091	98,491	30,173	113,800	31,560
5	Internet Banking	4,436	209	6,925	365	9,589	499	15,552	676	15,999	798
6	Mobile Banking	3,286	8	3,121	12	4,150	27	6,167	67	6,139	107
7	Call Center Banking	778	7	663	7	639	8	666	10	766	10
8	Paper Based Transactions	343,755	91,054	357,490	98,741	358,504	106,831	362,039	115,157	361,589	127,164

Different Payment Types Break Down

It's estimated that in 5 years there will be over 20 Billion connected devices around the world that require the generation, management, storage, and retrieval of enormous amounts of payment data and authentication tokens for their customers.

Business users and leaders demand next-generation payment applications and new insights to drive more intelligent engagement and better security and authentication decisions. To get there, enterprise architects need to design an agile technical payment architecture that can scale automatically with capabilities, such as databases, that are always available to support new authentication and verification initiatives. It takes enormous time, effort, and coordination to provision new databases today because of a lack of resources to meet the administration challenges of rolling out complex clustered systems.

11.Poor Quality of Existing Alternatives

Latent demand for e-payments must be looked at in the context of the accessibility and quality of the alternatives. If there are many good alternatives to mobile payments (as is typically the case in Pakistan), it will be easy for users to switch to the new service. In the Philippines, for example, the G-Cash and Smart Money mobile payment services experienced low take-up in part due to the availability of a competitive alternative to crypto payments – an extensive and efficient semi- formal retail network of pawnshops which offered domestic remittance services at 3 percent.

Finally, the ability of Mobile Money Transfer stores to convert cash to e-value for customers depends on how easily they can rebalance their liquidity portfolios. This will be more difficult to achieve if bank branch penetration is too low, as this will force the agent channel to develop alternative cash transport mechanisms.

Thus, a (Mobile Money) agent network will need to rely on a minimal banking retail infrastructure. There appears to be a branch penetration “sweet spot” for Crypto backed payment system, where penetration is not so high that it hampers demand for conventional money services, but so low that agents are unable to manage their liquidity.)

Pakistan is reasonably well supplied with urban liquidity points due to the branch networks of banks and MFIs. Even so, our experience say shortage of cash or electronic value for agents is at time problem both in country’s rural areas and city.

Mobile Cross-border payments and ecommerce still have many challenges ahead. The natural concerns of security, a multiplicity of devices and operating systems, slow adoption, and the technological limitations all contribute to the obstacles facing mobile payments, today.

With all these applications producing more and more data, past and present database management services are under-equipped to meet the needs of

businesses. There are problems centered on performance, reliability and scalability. These can lead to problems of data breaches resulting in massive amounts of data theft. The systems of the past and present payment systems will eventually evolve to the future, The PKR TOKEN decentralized, payment service and KYC Platform.

12. PKR TOKEN - FEATURES

PKR TOKEN and its KYC Service is a decentralized payment system with attached KYC Services for dApp developers, Users, exchangers and other Financial Institutions. To ensure our Users get the highest throughout in performance, reliability and scalability, PKR TOKEN implements swarming technologies. A swarm is a large group of nodes (computers) that work together to store and manage data. Nodes in these swarms can go down and new nodes can come up with minimal impact on the network. Overall PKR TOKEN payment system is a meta-swarm comprised of multiple swarms.

12.1. Performance

PKR TOKEN's payment system unique and proprietary KYC services based on swarming techniques are developed and designed for the highest performance keeping Pakistan's local fin-tech and Payment Systems domain in context. PKR TOKEN Payment System can reduce latency by retrieving data from the nearest nodes on the leaf swarm, and/or increase speed many fold by retrieving data in parallel from the fastest nodes on the leaf swarm. This is like torrents and seeds. When data is requested, it is done in parallel where chunks (shards) are requested from all the different swarms that contain those shards, and these are all retrieved in parallel, resulting in desirable performance metrics.

12.2.Reliability

Using the concept of fog or swarm computing, PKR TOKEN internal network follows a model where every unit of data is 100% replicated in a single leaf swarm amongst a swarm of swarms. So while the data is only in one swarm, that swarm's nodes are aplenty and are geographically dispersed, immune to localized outages

caused by either natural or human-related events like flooding, load-shedding etc. “ PKR Token network can never be down “.

12.3.Scalability

Scalability is possible both horizontally and vertically. PKR TOKEN platform manages the various strategies and considerations around the use case of having to increase scale. Horizontal scaling is a cornerstone of the PKR TOKEN swarm architecture, where every swarm is another “unit” of horizontal scaling at the meta swarm level. Within every leaf swarm, every node acts as yet another agent of horizontal scaling, at the leaf swarm level.

13. HOW DOES PKR TOKEN WORK FOR INDIVIDUALS?

Step 1- User deposits fiat currency (PKR Rs) into Token Issuer's bank account held in Pakistani Bank.

Step 2- Issuer generates PKR Tokens and credits the user's ethereum account. PKR TOKEN enter circulation.

Fiat currency (PKR) deposited by user = PKR Tokens issued to user

(i.e. 100 k PKRs (Pakistani Rupees) deposited = 100 k PKR Tokens issued).

Step 3- Users transact with PKR Tokens on PKR Payment Network . The user can transfer, exchange, and store PKR Tokens via a p2p open-source, KYC Verified, blockchain-based platform.

Step 4- The user deposits PKR Tokens with Token Issuers for redemption / cashout into fiat currency of Pakistan. User can only request a cashout on wallet that has been digitally verified by users National ID card Number.

Step 5- Token Issuer deposit PKR Tokens into its wallet and sends fiat currency to the user’s linked bank account.

Users can obtain PKR Token from other exchangers or agents (In Pakistan Only) or another individual (In Pakistan Only). Once a PKR Token enters circulation it can be traded freely between any businesses or individuals.

14.How it Works for MERCHANTs on Payment Platform

1. Consumer buys a product or consumes a service from a merchant using one of our products. For example a customer orders food in a restaurant using PKR Payment Platform Restaurant Edition web/mobile Application.

2. Consumer makes payment for the product or service using Fiat Currency (ex. PKR) or PKR TOKEN.

3. If the payment is made using a credit/debit card in Fiat Currency, the merchant can decide to use PKR TOKEN in order to receive an Instant Merchant Deposit* instead of having to wait the traditional two working days for the settlement to occur.

4. If the payment is made using PKR TOKEN, the settlement process is initiated and the payment to the merchant wallet in the form of the respective PKR TOKEN is transferred instantly.

5. Loyalty points are accumulated for consumers on every purchase of a product and service. (If activated)

6. Loyalty points for merchants are accumulated on every sale of a product and service.

7. Loyalty points can be redeemed when the consumer or merchant collect enough points.

8. Loyalty points are redeemed in the form Fiat currency PKR or PKR TOKEN.

9. The ratio of points with currencies is calculated using built-in configurations and Oracles based on the market dynamics.

10. An API will be developed to connect payment platform to all possible external payment systems in Pakistan.

15. PKR TOKEN PAYMENT NETWORK APPLICATIONS

In this section we'll summarize and discuss the main applications of PKR Tokens across the blockchain ecosystem and for our consumers in Pakistan. We divide our potential market into five main user groups: Financial Institutions, Exchangers, Individuals, , Businesses / merchants and the public sector.

.The main benefits, applicable to all groups

● Properties of Blockchain, Less volatile and a familiar unit for day to day account

15.1 For Exchangers -Banks and other financial institutions understand that accepting fiat deposits and withdrawals using legacy financial systems can be complicated, risky, slow, and expensive. Some of these issues include:

● Identifying the right payment provider , irreversible transactions, fraud protection, lowest fees, etc

● integrating the platform with systems and other banks that have no APIs

● Liaising with these institutions to coordinate compliance, security, and to build trust, Prohibitive costs for small value transfers, 3-7 days for international wire transfers to clear , Poor and unfavorable currency conversion fees.

Exchange users know how risky it can be to hold fiat currencies on an exchange. With the growing number of insolvency events it can be quite dangerous. As mentioned previously, we believe that using PKR Token exposes exchange users to less counterparty risk than continually holding fiat on exchanges.

15.2 For Financial Institutions - By offering PKR Tokens, a financial institution can relieve themselves of the complications and gain additional benefits, such as:

● Accept crypto-fiats as deposit/withdrawal/storage method rather than using a legacy payment system, Allows users to move fiat in and out of bank more freely, quickly, cheaply

● Easily add other fiat currencies, Secure customer assets purely through accepted crypto-processes, Multi-signature security, cold and hot wallets, HD

wallets, etc. Conduct audits easier and more securely in a purely crypto environment. Anything else that one can do with Blockchain as an exchange or issuer can be done with PKR Tokens.

● Regulate the Crypto Currency market. An example can be how Japanese banks used a unified Token to transact all crypto currencies. This mechanism allowed them to regulate and Tax the potential of crypto-currencies trading business while providing end users of all the benefits of block chain technology.

● Issuance of crypto-folio based debit cards.

15.3 For Individuals - There are many types of individual users in Pakistan today. From traders looking to earn profits daily, to long term investors looking to store their funds securely, to tech-savvy shoppers looking to avoid credit card fees or maintain their privacy, to those interested to remit payments globally more effectively, to those looking for access to financial services for the first time, to developers looking to create new technologies; to all those who have found many uses for Blockchain. For each of these individuals, we believe PKR Token is useful in similar ways,

● Transact in PKR/fiat value, pseudo-anonymously (If allowed by regulator), without any middlemen/intermediaries Cold store PKR/fiat value by securing one's own private keys.

● Avoid the risk of storing fiat on exchanges - move crypto-fiat in and out of exchanges easily. Avoid having to open a fiat bank account to store fiat value

● Easily enhance applications that work with blockchain to also support PKR Token. Anything one can do with Bilockchain as an individual one can also do with PKR Token

15.4 For Merchants - Merchants want to focus on their business, not on payments. The lack of national, inexpensive, ubiquitous online payment solutions continues to plague merchants around the country both large and small. Merchants deserve more. Here are some of the ways PKR Token can help them:

● Price goods in PKR/fiat value rather than other conventional crypto-currencies (no moving conversion rates/purchase windows). Avoid conversion from other crytpo to USD to PKR and associated fees and processes

● Prevent chargebacks, reduce fees, and gain greater privacy as crypto payments are irreversible.

● Offer loyalty, Gift card and other points based schemes and vouchers where incentives and gains can be exchanged for PKR Tokens, which can be redeemed for fiat by customers.

● KYC and AML features of PKR Token Platform takes a burden off merchants who are always struggling to find extra work force to keep up with compliance requirements.

● Quick setup and easy integration of Platform with any existing POS, web app, mob App or merchant account.

● Anything other service that is available on blockchain , as a merchant one can also do with PKR Token Platform.

15.5 For Government - It is our firm belief that we should be welcoming regulation into the crypto-community of Pakistan, rather than rejecting it. This will help to spur on adoption among mainstream high tech companies, financial instituations, investors and the general public. The crypto community at large needs to be involved in this and any future regulatory process. PKR Token team understands if we simply let regulators regulate then we may be left with regulations that stifle progress and do little to safeguard crypto-investors and block-chain developers. It can also hinder the growth of any block chain based business model in Pakistan.

We believe with proper regulations enforced PKR Token payment platform can be used by Govt as a measure to regulate the crypto-coin Market and its trading in Pakistan. PKR Token can be used to setup and safe and auditable regulatory framework for crypto-currency Trade and deposits in Pakistan. The open ledger

frame work of blockchain provides an auditable and taxable mechanism that beats many current systems in transparency and integrity.

16. Current Audit Flaws for Crytpo Exchanges: Current Exchanges and Wallets Regulatory Compliance Limitations

It is noted that in the Merkle tree approach users must manually report that their balances (user's node) have been correctly incorporated in the liability declaration of the exchange (the Merkle hash of the exchange's database of user balances).

This proposed solution works if enough users verify that their account was included in the tree, and in a case where their account is not included this instance would be reported. One potential risk is that an exchange database owner could produce a hash that is not the true representation of as opposed to hiring a professional auditor the database at all; it hashes an incomplete database which would reduce its apparent liabilities to customers, making them appear solvent to a verifying party.

There is a possibility that a malicious exchange could publish different states/balances to different groups of users, or retroactively change the state. Thus it is fundamental to publish this data through a secure broadcast channel, e.g. the Ethereum blockchain. Privacy is a barrier to entry for the adoption of an automated/open auditing system. While some progress has been made towards better privacy there is no perfect solution yet.

Further, to build up an accurate user verified liability space, these users will have to report account balances with the exchange and blockchain addresses. Some users likely would not report this information regardless of the incentive, therefore providing cryptographically secure privacy whilst obtaining the reporting goal is paramount.

The Merkle tree hash is a single snapshot of the database at a single point in time. Not having a somewhat continuous time series of the database opens significant attack vectors. Additionally, a time series of user reported information would also be required for piecing together the history of any reported incidents of fraud.

Trusted Third Parties - All of the current exchange audits have relied on some "reputable" trusted third party to make some type of verification. Coinbase audit used Andreas Antonopoulos or Kraken was audited by Stefan Thomas. If we absolutely must rely on a trusted third party then some audit standards and procedures should ensure this weakness is fortified.

16.1 Limitations for a Fiat-pegging Systems

● These systems are based on closed-source software, running on private, centralized databases, fundamentally no different than Paypal or any other existing mass-market retail/institutional asset trading/transfer/storage system.

● Decentralized systems that rely on altcoin blockchains which haven't been stress tested, developed, or reviewed as closely as other blockchains, like Ethereum.

● Pegging processes that rely on hedging derivative meta-assets, efficient market theory, or collateralization of the underlying asset, wherein liquidity, transferability, security, and other issues can exist.

● Lack of transparency and audits for the custodian (Central Bank) / Insurance companies, either crypto, fiat, or relating to their own internal ledgers (same as closed source and centralised databases).

● Using old banking systems and trusted third parties (bank account owners) as a transfer and settlement mechanism for reserve assets.

16.2 PKR TOKEN Market Risks - Liquidity Crunch

In the collateralization method, one of the major market risk of Liquidity Crunch exists because the price of the asset being used as collateral can move in an adverse direction to the price of the asset it's backing/pegging. This would cause the total value of the collateral to become less than the total value of the asset and make the system insolvent. This risk is mitigated by the custodian closing the position before this happens; that is, when the collateral price equals the pegged

asset price then the collateral is liquidated (sold on the open market) and the position is closed. This method has its own merits and is used in many assets markets across the traditional banking sectors around the world and financial stock and trade markets.

However, as we saw from the global financial crisis, situations can arise in which the acceleration of such events causes a “liquidity crunch” and thus the collateral is unable to be liquidated fast enough to meet trading obligations, subsequently creating losses. With the cryptocurrency markets being so small and volatile, this type of event is much more likely. Additionally, the overall approach suffers from other liquidity and pricing constraints since there must be a sufficient supply of users posting collateral for the creation of the pegged-assets to exist in the first place.

In the practical approach, the price of the asset is pegged through entering one of several derivatives strategies, such as swap , covered and naked options or various futures and forwards strategies. Each strategy has their own strengths and weaknesses. To summarize, each of these pegging processes themselves have similar “market risk” characteristics as the aforementioned collateralization method. It should be noted that the any of these methods are not mutually exclusive and often paired and used together in a specific trading, hedging, or risk management function at legacy system financial institutions.

We believe some combination of the above approaches may become a secure, reliable, and generally risk-free process for backing/pegging assets; however, at this point in time, this is not a direction we feel is feasible to take to ensure liquidity and price stability. Further, we believe that a Proof of reserve-based approach will always be in existence and complement these other approaches as the entire industry grows. As advances in technology continue, we will evaluate and incorporate any benefits available while maintaining the guarantee of 100% redeem ability.

17. Legal and Compliance

PKR TOKEN Payment networks is pursuant for incorporation in Pakistani Security Exchange Commission. If allowed it will be wholly owned by PKR TOKEN Pvt Limited.PKR Token Payment Networks will be registered as a Financial Services Business. PKR TOKEN Payment Networks will be establishing a working business relationship with Pakistani financial institutions for purposes of better servicing our users in Pakistan.

PKR TOKEN is concluding a principal–development agency agreement with Tier3 Cyber Security. Tier3 Cyber Security is cyber security services provider, and it will provide services and help in development of algorithms for anti-money laundering compliance work and customer due diligence procedures as development agent of PKR TOKEN. Tier3 will also manage other technical and development aspects of this payment platform and its associated block chain powered payment network.

Through these and other measures, PKR TOKEN payment platfiorm will be undertaking customer due diligence, record-keeping, and reporting procedures consistent with Pakistani Banking laws , Anti-Money Laundering Act, 2010 and Counter-Terrorist Financing (Financial Institutions) Ordinance.

PKR TOKEN payment platform currently holds or operate **no bank accounts** with in any financial institution in Pakistan or around the world, A Reserve deposit bank account will be opened in Pakistan with a Pakistani recognized and regulated financial institution where both parties are aware and confident that PKR Token business model is acceptable.

This bank will have the right to scrutinize our processes and also audit that our business operates in accordance with Pakistan banking regulations, as all of the banks had been requested to check this with their own legal, compliance and head office before opening accounts. It is our goal from the beginning to have a compliant operation and to provide the maximum level of comfort to our banking partners in Pakistan.

18. TECHNOLOGY OVERVIEW

This section provides an overview of PKR TOKEN ’s technology architecture. For a more in-depth reading with more details refer to the Technology Paper.

18.1. Payment System Database – CRUD API (KYC IMPLEMENTATION)

CRUD stands for “create, read, update, and delete” for the four basic functions pertaining to databases and permanent storage. CRUD covers the functionality of relational databases, where each of create, read, update, and delete can be mapped to corresponding SQL and HTTP methods.

A password of the user’s own choosing is also required, and it is up to the user to protect this password and keep it available for later. All the data stored in key value pairs are encrypted, with the password being used as the initialization vector in AES 256 symmetric key encryption. This password is only ever used locally and never travels on the network in any way, shape, or form.

18.2.Sharding

Shard stands for “System for Highly Available Replicated Data”. Large databases often are hard to work with due to the size and memory constraints they come with. By partitioning the database along logical lines, the database becomes much easier to work with.

A logical shard is the smallest unit in PKR TOKEN and contains individual units of data that all share the same partition key. A partition key is a unique identifier that allows the shard to be verified for the retrieval and transfer of information. In PKR TOKEN , partition keys allow the dApp to store and retrieve data from the correctly identfied leaf swarm efficiently. In PKR TOKEN , groups of logical shards are stored on leaf swarms, and it is the amalgamation of these leaf swarms that makes up the entirety of the PKR TOKEN KYC database.

18.3. Jump Consistent Hashing

Jump consistent hashing (JCH) was first described in a white paper by John Lamping and Eric Veach at Google. JCH does not have a state machine, and therefore requires no storage. It is an algorithm without lookups in memory and is therefore much faster. PKR TOKEN Payment network uses JCH to map from the key (in key value pairs in a NoSQL table) to the id of the swarm that the key is replicated in. Once that id is found, PKR TOKEN uses Kademlia hashing to find the means to reach that swarm even if that specific swarm is not running.

18.4. Kademlia Hashing

Kademlia is an advanced form of a typical peer-to-peer distributed hash table which has been structured in a way to make particular use of the special symmetric and geometric properties of the bitwise XOR functions. PKR TOKEN will use Kademlia hashing to efficiently enable nodes to know about every other swarm on the network. Using Kademlia's own form of "finger tables", each node in the network only needs to know basic information about how to reach O(Auth(n)) other leaf swarms, where n is the total number of leaf swarms on the network. This means that irrespective of how large the network ever becomes, every node can reach every other leaf swarm within O(log(n)) tries, by only storing O(log(n)) data. As a result, PKR TOKEN is able to handle exponential growth and provide the fastest and most reliable payment network for Pakistan.

18.5. Partial Replication

Partial replication means that not every node in the network has a copy of the data -- only the nodes within the leaf swarm delegated to that data replicate it. This is one of the key differences between PKR TOKEN and a traditional "blockchain". Blockchains are inherently slow and do not scale well, as every set of transactions or blocks is 100% replicated everywhere, pulling severe vertical scaling limitations on the network. PKR TOKEN internal Network will be designed to only stores the data amongst a strategic subset of the nodes, statistically providing an guarantee that the data is always available and still achieving the benefits of boundless horizontal scaling. Partial replication exists because only

ONE swarm amongst all the swarms in the network replicates a given piece of data. An interesting incumbent technology that can be compared to this is the content delivery network (CDN).

18.6. Load Balancing

A benefit of having a logical shard stored on multiple physical nodes is speed - by having the same data accessible through different hardware resources at various geographical locations in Pakistan, the system may load-balance queries to retrieve data from nearby nodes that are least taxed at any given moment in time. This permits PKR TOKEN Network to dynamically perform queries and retrieve data in the most efficient way possible, maximizing use of the shared resources spanning across multiple nodes.

118.7.Redundancy

As replicated payment and wallet data is stored across different nodes with unique infrastructure, there is a severely reduced causation between single-node failure and loss of the shard. This method of mirroring serves to secure the availability of data in an efficient manner by ensuring any single point of failure is inconsequential.

18.8.Consensus

PKR TOKEN deals with consensus differently from blockchains, doing away with any concept of a network-wide universal state. There is no need for a single state for the whole network, so PKR TOKEN applies the consensus model on a swarming level, ensuring that leaf swarms of nodes storing data shards are each reaching localized consensus, using our customized forms of consensus and proof algorithms working on internal network. These algorithms will operate and incorporate the regulatory framework , KYC policies and AML limitations as enforced by Regulator.

A swarm with consensus appears to clients interacting with that swarm (or other swarms interacting with the swarm) as a single, atomic, indivisible unit that stores

value and a set of data reliably. Any node in that leaf swarm can accurately service requests pertaining to that data.

18.9. User Level – Trust Based

Every user on PKR TOKEN is entitled to run one or more nodes on the network as farming nodes. Each such user will use their Ethereum address as the “key” that identifies them. This identifier is unique to that Issuer and is ted 1:1 with their Ethereum address. The producer also has a “Trust Index”, which is a score that dictates how well-behaved the user is. The Trust index can go up and down depending on the user’s activates and decisions, intentional or not, autonomous or not, and spans all the nodes the producer operates. If one such user misbehaves, the Trust index typically drops and this applies to all the networks nodes.

18.10. Sybil Attacks

Some blockchain networks, like Bitcoin, allow anyone to add their node to the network. That brings the concern that a malicious organization could potentially add so many nodes that they disproportionately control the network and leading to hijacking the network. This is referred to as a Sybil attack. Ethereum obviate Sybil attacks by making them prohibitively expensive via proof of work.

PKR TOKEN employs several methods to prevent Sybil attacks so that when a bad actor is caught, they can be blacklisted, and economically penalized leading to complete removal from the network. These ant-Sybil attack methods are:

• Node Operators will be are required to put up a PKR TOKEN stake to participate in the network. This stake serves as a requirement for participation and as a strong economic deterrent from bad behavior.

• The Kademlia distributed hash table is used as it relies on message redundancy and the XOR distance function. Neighbors are selected and messages are redundantly sent to multiple neighbors of the intended node for ant-Sybil verification purposes. Nodes that mislead the swarm location effort will be systematically tracked down and caught.

• A request to a swarm for CRUD functionality is done with redundancy, where multple nodes in the same swarm all perform the request. Given the node-swarm membership rules for PKR TOKEN , it is statistically unlikely that multiple such nodes chosen to perform a given transaction are colluding bad actors that deliver bad yet consistent data.

• Swarm membership is determined by the network and cannot be chosen by nodes. This means that a would-be Sybil attacker who attempts to join the network with n nodes or masquerading with the identity of n nodes will not be able to gain a critical mass of memberships into any single swarm.

• Nodes can be posed a challenge request to participate in a proof of storage test. This test is performed in co operation with the consumer on either a random network-initated basis or by the consumer directly and forces the targeted node to prove they have the correct data.

18.11 Byzantine General's Fault

One way to protect against Byzantine Faults is to have a default understanding of what to do if there is no information. In PKR TOKEN , if misleading or corrupted or inconsistent information is detected, the default is to do nothing. Thanks to the afore mentioned redundancy in CRUD requests made to a swarm, inconsistency is caught, whether intentional or not. In any case, PKR TOKEN nodes are instructed to ignore the transaction and do nothing. Only authenticated transactions with proper credentials and checksums are accepted and transacted upon. By this way, PKR TOKEN is Byzantine Fault Tolerant by design.

19. RISK DISCLOSURES

The realization of any one or more of the risks described in this White Paper, or other risks whether unforeseen or unforeseeable, could significantly reduce or eliminate the utility of PKR Token. This White Paper discloses all risks and other significant aspects of the Token Utility, including risks which may be personal to proposed Participants and thus unknown to PKR TOKEN Platform.

Proposed users who do not fully understand or are not comfortable with any of the risks described in this White Paper should consult their legal, commercial, financial, tax, or other professional advisers; otherwise, they should not participate without relevant advice.

To the maximum extent permitted by all applicable laws and regulations, PKR TOKEN Platform and its affiliates and its and their founders, directors, officers, employees, advisers, agents, and representatives (the "PKR TOKEN Related Parties") shall not be liable for any direct or indirect loss of revenue, income, profits, business, business opportunity, anticipated saving, data, reputation, or goodwill; or any indirect, special, incidental, reliance, consequential, punitive, or other losses or damages of any kind, in tort, contract, strict liability, or otherwise, arising out of or in connection with any loss or damage of a Participant (or a proposed Par2ticipant) relating to the risks associated with the Token or in connection with erroneous or insufficient consultation with or advice received from any adviser, even if PKR TOKEN Platform and the PKR TOKEN Related Parties have been advised of the possibility of such losses or damages.

References to 'PKR TOKEN in the risk factors discussed in this section include, where the context permits or requires, any PKR TOKEN Related Party involved in the operation of PKR TOKEN or the conduct of the Token Utility. References to "discretion" mean "sole and absolute discretion", unless otherwise qualified.

19.1Company Risks

19.1.1 Company Failure - . As a consequence of the realization of one or more of the other risks in this White Paper or of risks not described in this White Paper, PKR TOKEN business could fail and PKR TOKEN Platform could be wound up or dissolved. If PKR TOKEN Platform business fails and PKR TOKEN or the software platform on which it operates (the "Application") is not transferred to and operated by another company, PKR TOKEN would terminate and any PKR would have no utility or value. PKR TOKEN PAYMENT Platform does not commit that it can or will transfer the Application or PKR TOKEN to another company if its business fails. If PKR TOKEN does transfer the Application or PKR TOKEN to another company, PKR TOKEN PAYMENT Platform does not commit that the other

company will operate PKR TOKEN to a user's satisfaction or at all, or will continue to accept PKR for use in PKR TOKEN .

19.1.2 Management Failures.- PKR TOKEN PAYMENT Platform management may fail to manage its personnel, finances, facilities, information, technology, and other resources to effectively develop, operate, maintain, support, improve, market, and sell the Application and PKR TOKEN , or to manage the growth of PKR TOKEN or its business, or to adapt the Application or its business to changes in technology or the markets in which it operates, or to identify and effectively respond to the risks described in this White Paper or otherwise, the realization of any or all of which could adversely

19.1.3 No Governance Rights. - PKR confer no governance or similar rights with respect to PKR TOKEN.

19.1.4 Platform, the Application, or PKR TOKEN .- PKR TOKEN PAYMENT Platform will, at its discretion, make all decisions concerning its business, the Application, and PKR TOKEN , including decisions to fork or discontinue PKR TOKEN , to change any pricing, parameter, or feature of PKR TOKEN , to subcontract or outsource the development, maintenance, support, and operation of the Application; to sell the Application; and to sell, merge, or liquidate PKR TOKEN Platform or all or a material part of PKR TOKEN Platform assets, any of which decisions may not be consistent with a Participant's expectations or interests.

19.2 Business Model Risks.- PKR TOKEN PAYMENT Platform designed PKR TOKEN (including the Application and PKR) according to a specific business model. In particular, the adoption and success of PKR TOKEN depends on several factors, including:

• PKR TOKEN PAYMENT Platform ability to hire top engineers to develop the Application and PKR TOKEN ;

• the number of users providing resources to support the functions of PKR TOKEN

• The availability of PKR TOKENS to users after the Payment System Launch and

• the number of users perceiving PKR Token Payment Platform to be viable and valuable and thus willing to use PKR TOKEN and its associated payment system as either providers of resources / services or consumers of PKR TOKEN Payment Platform services .

If the business model of PKR TOKEN is flawed, or if the assumptions underlying that business model are incorrect, PKR TOKEN may underperform or fail. PKR TOKEN PAYMENT Platform may at its discretion elect to change the business model of PKR TOKEN in response to competition or market requirements, to address perceived flaws, to optimize the model, or to comply with regulatory framework. Any such changes to the business model of PKR TOKEN may fail to achieve their purpose and could adversely affect PKR TOKEN .

19.2.1Insufficient Funding.- PKR TOKEN PAYMENT Platform will depend on the proceeds of the transaction service charges, Token Cash outs and purchases to fund its operations until such time, if ever, that PKR TOKEN PAYMENT Platform earns sufficient revenue from PKR TOKEN or other services and activities.

19.2.2 Unanticipated Risks.- PKR TOKEN Payment network will be launched and will evolve in technology, business, economic, and legal environments that are uncertain and subject to rapid, unpredictable, and potentially contradictory evolution. The future risks associated with those environments, their respective evolutions, and the interactions among them are unknown and unknowable but they could threaten the viability or existence of PKR TOKEN Payment network and its associated internal token PKR TOKEN .

19.3 Product Risks

19.3.1 Delay. PKR TOKEN Platform and its associated network may not develop and deploy the proposed KYC and payment application according to its intended schedule. Delays in deploying the application may adversely affect the acceptance of PKR TOKEN in the market and ultimately the viability of PKR TOKEN Payment Network.

19.3.2 Inability to Use PKR Payment System . Holders of PKR TOKENS will not be able to use them fully or avail all the services of PKR Token payment network ,

until PKR TOKEN Platform makes them available ("Launch"). Launch may be delayed, or may not occur at all. Even after Launch, the availability of certain services can be limited.

19.3.3. Failure to Develop and Support the Service. As a consequence of the realization of one or more of the other risks in this White Paper or of risks not described in this White Paper, or because of business or technical decisions taken by PKR TOKEN TEAM in good faith, PKR TOKEN Platform may fail to launch PKR TOKEN payment network with a full set of intended features and functions or at all, may discontinue certain features and functions of our payment system , may not improve or add to the features and functions of PKR TOKEN payment system over time, may not adequately support PKR TOKEN payment network , and may not fix bugs in PKR TOKEN in a timely way or at all. PKR TOKEN (including PKR) may therefore not have the utility described in this White Paper or expected by a user.

19.3.4 Service Issues. PKR TOKEN may be degraded, interrupted, or fail because of hardware, sotware, or network defects, security breaches, hacking, viruses or other malicious code, natural disasters, congestion in underlying networks, and other causes. PKR TOKEN Platform may be unable to restore PKR TOKEN to normal operation in a timely way or at all.

19.3.5 Service Updates. PKR TOKEN Platform may not update PKR TOKEN in a timely way or at all to fix bugs, address incompatibilities arising because of changes in underlying technologies and services, respond to user feedback, or react to competitive threats. Any such delays or failures could adversely affect PKR TOKEN.

19.3.6 Failure to Meet Expectations.- The initial and future versions of PKR TOKEN may not meet a Participant's expectations regarding features, functions, performance, availability, quality, security, scale, price, or other atributes that are important to a Participant.

19.3.7 Reliance on Third Parties and Third Party Systems. - PKR TOKEN Platform relies on third parties and third party systems it does not control to operate the

Application and PKR TOKEN and to provide services on which PKR TOKEN depends. Those third parties and third party systems may be unable or unwilling to act as PKR TOKEN Platform needs and expects, may themselves act maliciously, or may be adversely affected by other parties acting intentionally, unintentionally, or maliciously or by other events outside their control. The failure of those third parties or third party systems to perform according to PKR TOKEN PAYMENT Platform needs and expectations could adversely affect PKR TOKEN .

19.3.8 Privacy Risks. PKR TOKEN will rely in part on Ethereum and other public, decentralized platforms. Anyone with Internet access can inspect all transactions and other information stored in those platforms that is not encrypted. A Users's transactions involving PKR Token, and other information about a User or that belongs to a PUser that may be processed by or stored in those platforms in connection with a user's use of PKR TOKEN , may be inspected by the public.

Certain information may, even if encrypted, be associated with a Participant by combining it with other public or non-public information.

19.4 Technology Risks

19.4.1 Core Technology Risks. PKR TOKEN is built with core technologies that are in some cases immature and unproven, including the Ethereum blockchain platform and various open source software applications and libraries. If those core technologies do not perform according to PKR TOKEN Platform's needs or expectations, have bugs or security vulnerabilities that are not or cannot be fixed, become unstable, degraded, or unavailable, are changed or forked in a way that is incompatible with PKR TOKEN , or are not further developed or supported, PKR TOKEN Platform may be required to change the specifications of PKR TOKEN and to reduce or eliminate features and functions that are important to Users, or to discontinue PKR TOKEN .

19.4.2 Integration Risks. PKR TOKEN will be integrated using some essential third party services. If the integrations with those services fail, or those services are unreliable or do not perform as expected, those features within PKR TOKEN , or PKR TOKEN generally, may be adversely affected or delayed.

19.4.3 Smart Contract Risks. Certain key features of PKR TOKENwill be implemented in smart contracts on the Applicaton and on the Ethereum blockchain platform. The nature of smart contracts makes them difficult to change to fix bugs, improve performance, or add features and functions. PKR TOKEN

Platform may therefore not correct defects in PKR TOKEN or improve PKR TOKEN to meet market needs or respond to competition fast enough or at all, which could adversely affect the utility or viability of PKR TOKEN .

19.4.4 Hacking. All software systems, including the Application and the Ethereum blockchain platform, have security vulnerabilities. Malicious actors may (a) disrupt, corrupt, or interfere with the Application, PKR TOKEN , or the Ethereum blockchain platform, (b) defraud PKR TOKEN PAYMENT Platform or other stakeholders in PKR TOKEN , including Users or PKR holders, and (c) steal PKR or other valuable data stored in the Application, PKR TOKEN , or the Ethereum blockchain platform, some of which may belong to or involve Users or PKR holders.

19.4.5 Security Risks. The security and integrity of essential components of PKR TOKEN depend on cryptography. Known and currently unknown weaknesses in the cryptographic algorithms used in PKR TOKEN and its underlying core technologies, and advances in techniques or computing power to circumvent those algorithms, may compromise the security and integrity of PKR TOKEN , cause the loss, theft, or corruption of PKR and other valuable data stored in PKR TOKEN , including users or PKR Token holders, and require the suspension or discontinuation of PKR TOKEN . The existence or future development of stronger cryptographic algorithms to replace compromised algorithms, and the feasibility of implementing those stronger algorithms in PKR TOKEN and its underlying core technologies, is uncertain.

19.4.6 Prohibitively High Transaction Costs. All transactions on the Ethereum blockchain platform, including the transfer of PKR Token, have a cost in Ether (“Gas”). As at the date of this White Paper, Gas prices for basic transactions on the Ethereum blockchain platform are nominal. However, Gas prices may increase

and make the trading of PKR Token on the Ethereum blockchain platform commercially unfeasible.

19.5.7 Ethereum May be Superseded. In PKR TOKEN payment Platform view, the Ethereum blockchain platform is the optimum blockchain platform from which we have issued PKR Tokens for testing and development purposes. However, the Ethereum blockchain platform may be superseded by competing blockchain platforms that improve on the Ethereum technology. It is not known whether the Ethereum blockchain platform will remain the predominant platform for token issuances. If Ethereum is superseded, PKR Token development and testing could be adversely affected.

19.6 Regulatory Risks

19.6.1 Regulatory Status. The regulatory status of the Application, PKR TOKEN , PKRT, and the Payment System is unclear or unsettled in Pakistan. Regulators have announced their intention to consider the adoption of regulations to cover cryptographic tokens and the markets for them. It is not known if, when, or to what degree different jurisdictions will interpret existing laws and regulations or adopt new laws and regulations that could adversely affect the Application, PKR TOKEN , PKRT, and the Token Platform, or whether those laws or regulations would be applied retroactively. Adverse laws or regulations and/or the financial and other costs of regulation could cause PKR TOKEN Platform to modify or discontinue certain features or functions of PKR TOKEN , or cause PKR TOKEN Platform to discontinue the Application or PKR TOKEN in Pakistan entirely, or make dealing in PKR Token regulated or illegal under certain circumstances.

19.6.2 ICO/Token Sale (or similar cryptographic token offerings). Violation of those prohibitions or restrictions may result in criminal and/or administrative penalties being imposed on the breaching users.

19.6.3 Compliance Risks. Complying with laws and regulations that apply to PKR TOKEN Platform, the Application and/or PKR TOKEN may be costly and may divert a significant portion of PKR TOKEN Platform's attenton and resources. If PKR TOKEN Platform must have a license or other government registration or

approval to operate the Application or PKR TOKEN in a Pakistan, there is no guarantee that PKR TOKEN Platform will qualify for or be granted the necessary license, registration, or approval. The lack of the necessary license, registration or approval would restrict or prevent PKR TOKEN PAYMENT Platform from operating PKR TOKEN n that jurisdiction. If PKR TOKEN PAYMENT Platform fails to comply with applicable laws or regulations, PKR TOKEN PAYMENT Platform could be subject to significant legal liability and financial and reputational losses which may adversely affect the Application, PKR TOKEN , and/or token.

19.6.4 Tax. The tax status of the Application, PKR TOKEN , PKR, and the Token Utility is unclear or unsettled in Pakistan. Adverse interpretation of existing tax laws and regulations or adoption of new adverse tax laws and regulations could result in unanticipated and potentially retroactive tax liability for PKR TOKEN Platform and other stakeholders in PKR TOKEN , including users and PKR holders. Those adverse tax consequences could cause PKR TOKEN PAYMENT Platform to modify or discontinue certain features or functions of PKR TOKEN or increase service charges for PKR TOKEN , or cause PKR TOKEN Platform to make the Application or PKR TOKEN unavailable in certain areas, or make dealing in PKR subject to tax in certain jurisdictions.

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