Soramitsu
Central Bank Digital Currency Solution in Cambodia
We are the original contributor of Hyperledger Iroha and an active member of the Linux Foundation’s Hyperledger Project; V1.0 released in May 2019

We implemented a payment system based on Hyperledger Iroha for the central bank and regulator of the Kingdom of Cambodia, targeted at 18 million retail users

We are the technology provider to D3, a decentralized digital depository with the national CSDs of Slovenia and Russia

We worked on an implementation of digital, self-sovereign identity with BCA Group in Indonesia

We were chosen by the Web3 Foundation to create the C++ implementation of the Polkadot Runtime Environment
What is Bakong?

Bakong is the world’s first retail payment system run by a central bank, using blockchain technology. Currently 50 thousand users and 20 millions dollars worth of assets in the system.

Anyone with a Cambodian phone number can download the mobile app and access the mobile currency. Money can be sent to another person and the transaction is recorded on the central bank’s ledger.
Bakong Pilot Launch on July 17, 2019
System Officially Launched on October 28, 2020
20 banks in the system and counting
Bakong consists of applications:

- **mobile** - for commercial bank clients to transfer money to registered users (using a QR code, phone number, or account ID) and to an existing bank account (deposit); *identity solution for onboarding*
- **desktop** - for commercial banks to manage bank accounts
- **web client interface** - for commercial banks to monitor clients’ transactions, manage client limits, and generate reports
- **physical cards** - for secure transaction signing
Mobile Apps

- Send money to a registered user
- Display QR code that others can scan
- Scan a QR code to send money to
- Deposit money to an existing bank account
Identity verification by face recognition

Selfie movie

Shoot ID card

OCR

Calculate face similarity
Regulatory Compliance

To comply with AML regulations, by default spending limits are $250/day. To increase their limits, a user must go to a commercial bank to do verification.
1. Create Bakong account and transfer from bank account to Bakong account

2. Make a payment by scanning a QR code...

3. or by sending money to a recipient's phone number

4. The payment can be easily sent
Desktop Apps For Banks
Bank blockchain account top up

Banks can top up their blockchain account by transferring money from their reserve account at NBC to their digital reserve account on the Hyperledger Iroha blockchain. This is done via the core banking system and sending an ISO 20022 message.
User blockchain account top up

Users can top up their blockchain account by going to a bank branch, giving cash to the operator, and then the operator transfers digital money to the user’s blockchain account.
Interbank money transfer

Banks can transfer money between each other using ISO 20022 to move money onto the blockchain, then transfer on the blockchain, and eventually transfer back to the traditional core banking system if desired.
User money withdrawal from blockchain account

Users can withdraw money from their blockchain account to their current or any other bank account with a core banking ISO 20022 message, by clicking the Deposit button in the mobile app.

User’s Bakong Account $ Bank’s Bakong Account $ Bank’s Reserve Account
Unified Architecture, 2 Tiers

- Bakong uses a 2-tier architecture, where the central bank provides an interbank ledger of all transactions and each commercial bank provides access to transact on the platform to their users.

- Ground truth about the balances of money in the economy is at the central bank’s ledger (Hyperledger Iroha blockchain).
Bakong: Mobile Payments (Retail Settlement System)

Blockchain platform is run by NBC as the central bank and regulator; only NBC has access to all transactions.

Commercial banks:
- run mobile API servers that provide access to the Bakong system; commercial banks can only monitor the transactions of their own users;
- desktop API and app to manage bank and branch accounts;
- integration with the Core Banking System via ISO20022 messaging
Why Bakong?

• **Large unbanked population**: Only 22% of Cambodians (>15 years old) have bank accounts

• **Large remittance market**: Domestic money transfers are common, yet still costly

• **Missing out on Internet commerce**: Very few credit cards and means to pay digitally
Why Blockchain?

- Can simplify payments architecture by having both core banking systems and RTGS on the same platform
- Increase efficiency of payment systems by creating a protocol for digital money
- Create a trust-minimized system
- Give users mathematically provable property ownership
Potential for Social Impact

• “Because it is peer-to-peer in nature, every transaction is free of charge. This is empowering for women to be able not only to earn but also manage her own finances from afar, making sure that her hard work is put into good use.” Serey Chea the Director General at the National Bank of Cambodia

• “We want to allow migrant workers – many of whom are women – to send money back home free of charge, and have more control over their finances. Instead of sending a bulk amount each month to someone in their home country, who could misuse the funds, we want to enable them to transfer money directly to a school or hospital, or to pay a utility bill.” Serey Chea the Director General at the National Bank of Cambodia

• Easy and fast shopping with Bakong without risks
• Control over transfers to make sure assets got their destination
Potential Economic Impact in Cambodia

• **Savings of over $360M annually** due to increased efficiency of transactions and costs of handling cash

• Increase the number of Cambodian citizens with a bank account

• Increase transparency of financial transactions to allow for better monetary policy, credit expansion, and economic development planning

• Increase trust in the banking system

• Increase peer-to-peer commerce and velocity of M1

• Reduced transaction costs at scale
Effects on Monetary Policy

• New opportunities to do targeted monetary policy

• No negative effects, as retail users can have a limit on how much they can have in their wallets, so no competition with bank deposits
  – Our system is merely a replacement for carrying around small amounts of cash in your wallet
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