



WhisperCash

PRIVACY-FIRST OFFLINE DIGITAL CASH

PAYMENTS TODAY - ONLINE

- The vast majority of payments today happen in connected environments. Transactions are approved and logged online.
- Privacy is usually approached as pseudonymity, but **all** transactions can be traced once the link between a pseudonym and a person has been established.
- Users that lack connectivity options (due to poor mobile coverage or poverty) are excluded and usually fallback to cash.

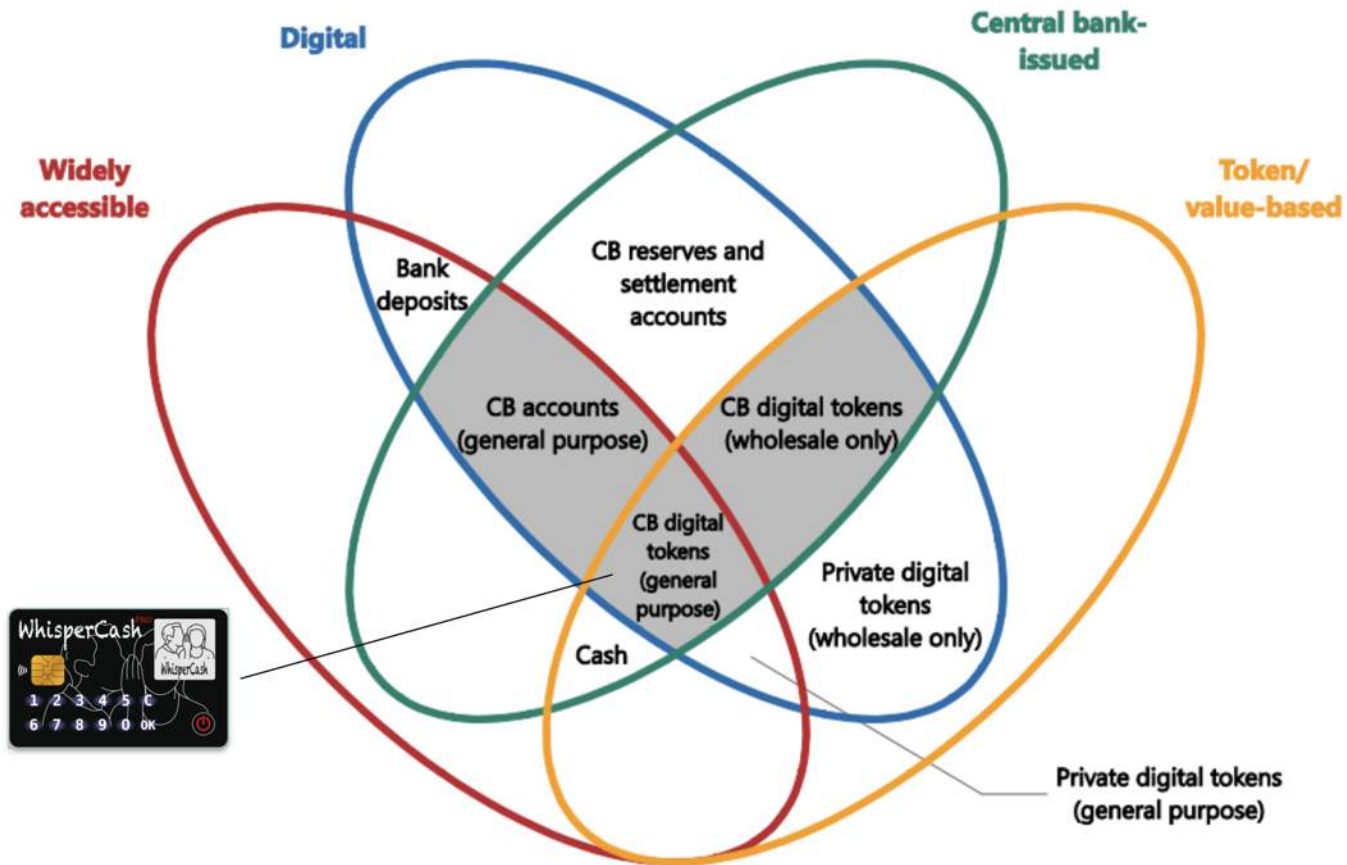
PAYMENTS TODAY – CASH IS KING

- Cash is the only offline widely accepted and universally inclusive solution.
- It has ultimate ease of use and almost perfect privacy.
- Easy to lose / Easy to steal
- Hard to carry in large amounts and impossible to transfer over long distances
- COVID-19 accelerated the push to replace cash with a more sanitary solution
- Digital cash has been "around the corner" for 30 years, we think its time has come.

WhisperCash OFFLINE PAYMENTS

- WhisperCash is an offline person to person payment solution based on secure smartcards
- Infinitely scalable due to its offline nature, it requires no server infrastructure
- Payments are sent and received by exchanging **10 digit numeric codes** between participants
- WhisperCash is not a currency, it is a tool that enables private offline **DIGITAL CASH**

WhisperCash DIGITAL CURRENCIES



WhisperCash TWO FLAVOURS



- **WhisperCash Basic** is an electronic sticker that attaches to any GSM SIM card. It works on any mobile phone manufactured after 1999 and uses the screen and keyboard of the phone for input and output.
- **WhisperCash Pro** is the advanced version, a battery powered contactless smartcard containing an E Ink screen and a capacitive keyboard.
 - The Pro is a self contained system, it does not need to be connected to a network or a terminal, money transfer codes are generated inside the secure element and displayed on the built-in screen.

WhisperCash SOFTWARE ONLY

- WhisperCash Basic can be provided as software to be installed on existing SIM cards by mobile operators.
- SIM cards must be based on JavaCard (>95%) and compatible with the cryptographic algorithms used by WhisperCash as well as offer enough storage space for the cryptographic keys
- Mobile operators can run basic KYC checks on issuance report to government authorities

WhisperCash DUAL EMV+WHISPERCASH CARD

- EMV applets can be loaded onto WhisperCash Pro alongside the WhisperCash application
- This enables a dual EMV + WhisperCash wallet card, usable as a credit or debit card as well as for P2P offline transfers
- Commercial banks can issue dual cards and handle KYC/AML
- ISO 7816 and ISO 14443 compatibility allows reuse of existing banking infrastructure (ATMs, POS terminals) via software-only updates.

WhisperCash LITE EDITION

- A Lite edition version of WhisperCash in the form of a contactless-only smartcard with no screen or keyboard
- Can be used in tap-to-pay scenarios (credit or debit) or for P2P payments with an external terminal
- Useful for tourists or non-residents that want to benefit from deployed WhisperCash infrastructure
- Maximum balance or potential uses of Lite cards can be limited

WhisperCash FACE TO FACE PAYMENTS

- In a face to face scenario, WhisperCash users can instantly transfer value between their cards
- The sender inputs the ID of the receiver and the amount into his card and the card generates a numeric code
- The receiver inputs the ID of the sender and the numeric code and his balance is increased with the transferred amount
- IDs can be stored in the Phonebook and used on subsequent transactions



WhisperCash REMITTANCES

- In a long distance / remittance scenario, two users located anywhere in the world can instantly transfer value.
- The sender inputs the recipient ID and the amount and communicates the resulting numeric code to the recipient (by voice call, text message, snail mail or any other means).
 - We have created a small PoC using the Iridium Satellite Network to transfer WhisperCash funds anywhere in the world over satellite: Recipient enters the sender ID and the code to receive the amount.



WhisperCash TAP TO PAY

- WhisperCash cards allow the familiar scenario of contactless payments at retailers without entering a PIN.
- Tapping the card to a WhisperCash-aware terminal automatically debits the amount from the card balance and credits it to the retailer's WhisperCash card, completely offline



WhisperCash RISK MANAGEMENT

- WhisperCash enforces issuer-defined policies such as:
 - Maximum offline transaction amount
 - Maximum balance for anonymous users
- Advanced policies (KYC, AML, CFT, etc) can be enforced by an on-card “policy enforcer” – a separate app controlled by the issuer bank
 - Enforcer is notified of and validates all incoming and outgoing transactions
 - It can also log and timestamp all transactions for future analysis or reporting

WhisperCash ONLINE OPTIONAL

- In order to better manage risks in the network, WhisperCash allows issuers to set a maximum limit for offline transactions
- Transactions above that limit can still be performed by using an intermediary/agent, usually in an online environment. The intermediary can report the transaction to the issuer or perform analytics
- Both Fully Offline and Fully Online systems are possible

WhisperCash NEGATIVE INTEREST RATES

- Both Pro and Basic cards have access to a real-time clock
- The RTC is outside of the secure area of the chip and could be tampered with, but it is guaranteed to be monotonous (always increasing)
- Negative Interest Rates on holdings can be enforced, card can deduct the corresponding amount from the balance every time it is powered on
- An attacker has no incentive to tamper with the clock given that he can only advance it further into the future (and thus diminish his balance even more).

WhisperCash POLICY ENFORCERS

- WhisperCash rules are fully customizable by using a **Policy Enforcer** application
- Loaded alongside the WhisperCash app and under the control of the bank, the Enforcer can Accept, Reject, Refund and/or Log transactions
- The Enforcer has no access to the funds and cannot initiate payments but can override transaction limits and perform velocity checks or random verifications
- It can also assemble a transaction history or require issuer confirmation for high value transactions or when certain limits have been reached
- Issuers can update the Enforcer module or its data independent of the WhisperCash application, to reflect the user's status (KYC performed, VIP status = limits removed, etc).

WhisperCash COMPETITORS/INSPIRATION

- MONDEX – 1990-1998, a smartcard electronic cash system implemented as a stored-value card. Similar in approach to WhisperCash, the only system to allow person to person offline payments. Older technology (1990-level) but same general purpose.
(<https://en.wikipedia.org/wiki/Mondex>)
- DigiTally (<https://kbaqer.com/DigiTally/index.html>) a payment scheme for use on mobile phones, to extend mobile payments to areas with poor connectivity and reduce transaction fees. DigiTally enables transactions by copying short strings of numbers between their phones. Similar to WhisperCash Basic.
- Chinese Digital Yuan (DCEP) - <https://en.pingwest.com/a/8347> - the first offline Central Bank Digital Currency, allows offline payments backed by battery-powered smartcards with screens and keyboards, similar to WhisperCash Pro

WhisperCash MARKETS

- CBDC (Central Bank Digital Currency) - https://en.wikipedia.org/wiki/Central_bank_digital_currency - WhisperCash can facilitate the introduction of digital versions of existing currencies, issued by central banks
 - Privacy-first design, card to card offline payments, anonymous but taxable
 - <https://www.ledgerinsights.com/bank-of-japan-offline-central-bank-digital-currency-payments/> - July 2020 - Bank of Japan explores offline digital yen
 - <https://www.bankofcanada.ca/2020/06/staff-analytical-note-2020-9/> - June 2020 – Bank of Canada research on privacy in CBDC context, including offline
- Digital local currencies - https://en.wikipedia.org/wiki/Local_currency – currency that can only be spent in a given geographical area, aimed at encouraging spending within a local community / at locally owned businesses
 - "Anyone can be a bank" approach in WhisperCash, frictionless issuance and payments

WhisperCash AS DIGITAL CASH

- According to the study “CBDC adoption and usage: some insights from field and laboratory experiments” (<https://www.bankofcanada.ca/wp-content/uploads/2020/06/san2020-12.pdf>) by the Bank of Canada, the desirable features of a Digital Cash solution are:
 - **Universal accessibility** – Users do not need a bank account, Internet connectivity or a smartphone to use WhisperCash. The Pro is completely self contained and WhisperCash Basic is compatible with any mobile phone made after 1999.
 - **Transparent and low per-transaction fees** – Fees and their value are transparent to all participants and each issuer can decide on a low or no fee policy depending on transaction type
 - **A high level of privacy** – transactions are executed offline and participants are only identified by their numeric ID. The issuer may require that high value transactions are executed online, but parties may choose to remain anonymous.
 - **The capacity for offline transfers** – WhisperCash is offline by default and is not affected by Internet or power outages. Person to Person payments can be executed fully offline and on battery power.

WhisperCash MASS SCHEDULED PAYMENTS

- Welfare, Universal Basic Income or stimulus payments ("helicopter money") require mass sending to a group of users
- Payments authorization/release is either time-based (monthly payments) or event-based (government aid in case of a disaster).
- WhisperCash supports these scenarios by preloading mass payments into the card and requiring an authorization code (**the same for all beneficiaries**, published in the media by the sender) to accept the payment.

WhisperCash TEAM

- WhisperCash is the brainchild of RAZVAN DRAGOMIRESCU.
 - Author of OtherCoin, the first offline Bitcoin payment solution using smartcards (<http://www.othercoin.com/OtherCoin.pdf>). Winner of Best Innovation (Discovery category) at 2015 SESAMES Awards.
 - Designer of card-based offline food voucher / payment solution for the United Nations' World Food Programme. 5+ years, over 18 million cards deployed.
 - 17+ years of experience in the mobile industry
 - Entrepreneur since 2002

WhisperCash GO-TO-MARKET READINESS

- WhisperCash is under evaluation by 6 Central Banks
- Concept exploration by International Organizations involved in Monetary Policy (International Monetary Fund et al.)
- In advanced talks with one technology provider for a 2021 Proof-of-Concept
- Incorporation as Krypto Tech Innovations Q1, 2021
- Seed Investment Established - Angel Investor/Advisor On-Board

WhisperCash GET IN TOUCH



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THANK YOU!