

Crunchfish digitizes cash with a simpler offline solution

Crunchfish AB (“Crunchfish”) has developed an alternative solution that digitizes cash where the security is instead based on digital signing of both the transactions and the bank's individually configurable risk parameters. This is a patent-pending solution without third-party products where the offline balance and other risk parameters are handled securely.

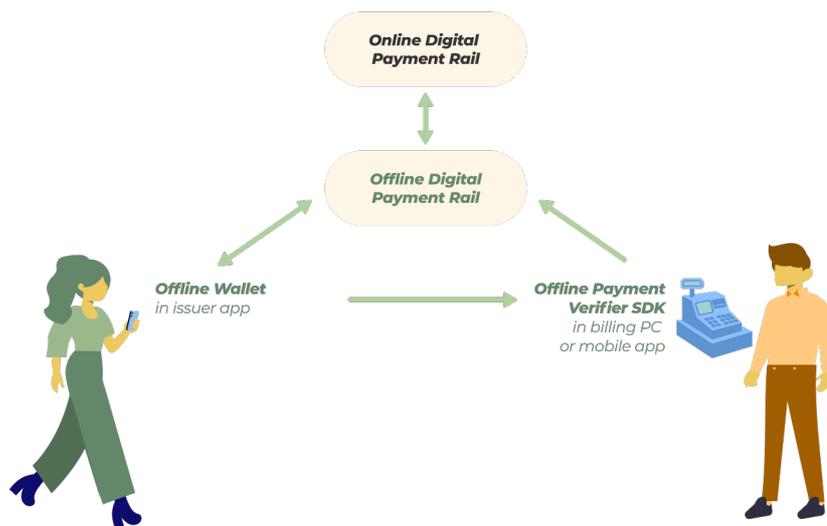
[Less than every tenth purchase in Sweden](#) is made in cash. Sweden's well-functioning IT infrastructure drives the marginalization of physical currency, which makes the Swedish payment market extremely sensitive to disruptions and downtime. The development towards a cashless society may have its advantages, but today Sweden is facing a future where we may completely lack a means of payment that, just like banknotes and coins, works offline. [Crunchfish's patent-pending offline solution](#) offers a means of payment with the same properties as cash, but digitally. The need is extensive, not only in Sweden, but also in countries with poorer IT infrastructure where the problem is that too many digital transactions fail.

Crunchfish has previously developed an offline solution where the heart is an Offline Wallet that runs as a trusted application in the [Trusted Execution Environment provided by V-OS](#). Crunchfish has now also developed a simpler version without third-party products, which instead uses the secure element provided by the mobile operating systems Android and iOS, respectively. This handles the private key used in digital signing of the transaction but does not offer a Trusted Execution Environment for our Offline Wallet. As compensation, both the offline transactions as well as the offline balance, and other individually configurable risk parameters, are digitally signed and can therefore not be manipulated as variables. The risk parameters are set by the bank and digitally signed by the payment service.

	CARD	RTP
ONLINE No Secure Element	HCE / NFC	QR
Secure Element without Trusted Execution Environment	OEM Pay / NFC	N/A
OFFLINE Secure Element without Trusted Execution Environment	Crunchfish Offline Wallet using Secure Element in mobile OS	
Trusted Execution Environment in Secure Element	Crunchfish Offline Wallet as a Trusted Application in V-OS	

Crunchfish's two Offline Wallet solutions can be used by both rails for cards and instant payments (RTP, Real Time Payments).

Offline payment is a welcome addition that makes all digital payment services more robust, [regardless whether it is the card infrastructure or the rail for instant payments](#). When it comes to security, the same proven technology is used as for tokenized card payments where the offline transactions are digitally signed from a secure element in the payment app and earmarked for the recipient. The transaction is transmitted locally with any type of proximity-based interaction, such as QR, NFC or BLE and the recipient verifies the offline payment either in a mobile app, in the card terminal or directly at the checkout. The transactions - which are saved by both parties - are regulated when someone goes online.



Crunchfish's mobile offline solution is exceptionally configurable and complements all types of payment services, regardless of the rail for settlement.

"We continue to simplify the digitization of cash. In our new offline solution, we use a secure element provided by the mobile operating system and ingeniously achieve secure handling of the offline balance. We own this solution entirely and it is easier to roll out in the market", says Crunchfish's CEO Joachim Samuelsson.

Crunchfish's vision is that everyone will [pay offline in the first place](#) in the future. Only if you need access to more money than what is available in the mobile wallet do you connect. The transaction always works immediately in offline mode, as it is independent of anything that can get messed up online. [Crunchfish's offline solution](#) is exceptionally scalable and we believe that it will become standard in all mobile wallets in the future.

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About Crunchfish – crunchfish.com

Crunchfish is a tech company with a patent-pending solution for digital offline payments that can be integrated with both payment rail or in a mobile wallet. The offline solution is globally scalable and makes digital payments more robust as the risks of disruptions and downtime are eliminated. We have also developed Blippit, an app terminal that connects to cash register systems for both online and offline payments, and have a patent-pending solution to reduce food waste. Crunchfish also develops gesture control of smart AR glasses for the consumer market. Crunchfish has been listed on Nasdaq First North Growth Market since 2016 with headquarters in Malmö, Sweden and with representation in India.