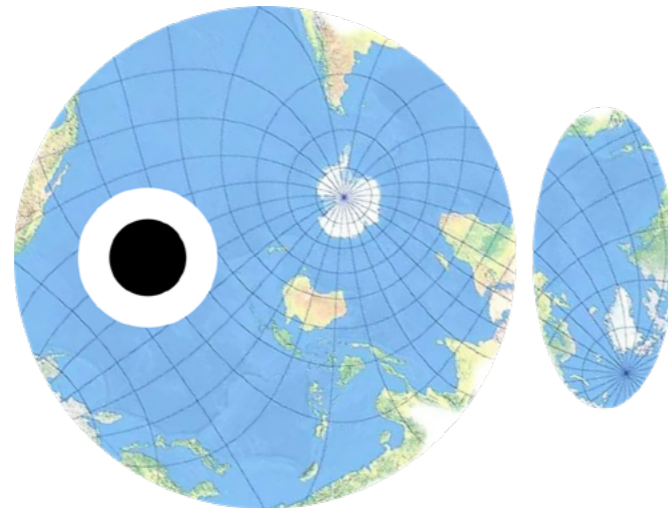


**INTERIM REPORT**

**Q1 2023**



# Crunchfish create blue oceans

Competing in overcrowded industries is no way to sustain high performance. The real opportunity is to create blue oceans of uncontested market space. Blue oceans denote the unknown market space, untainted by competition. In blue oceans, demand is created rather than fought over with ample opportunity for growth that is both profitable and rapid. In most cases, a blue ocean is created from within a red ocean when a company alters the boundaries of an existing industry.

We have all experienced the inconvenience and sometimes embarrassment of not being able to pay. It could be related that you do not have enough money in your bank account, but often it is due to other factors that the payer is not responsible for. For push payments, lack of internet connectivity is a common reason for not being able to pay, but it could also relate to a time-out as your bank is either congested or down. Pull payments, which is used at POS terminals, are also sensitive to bank server outages.

What if there was a solution that would make payment applications resilient? And what if this solution was available in software? Payers and merchants would no longer be dependent on the internet to make or receive payments, and payment providers would be relieved of the constant struggle to cope with the increasing volumes of instant payments. This is great news for any private payment provider, but also for central banks who are aiming to complement cash with Central Bank Digital Currency (CBDC) as payers do not have to worry about connectivity any longer.

Crunchfish Digital Cash is readily available and drives a design-shift from online to offline. Whereas an offline protocol enables an instant payment and settlement online, the reverse is not true. Online payment systems are only capable of handling online payments. Hence, the underlying protocol for payments should be designed from an offline perspective as it supports both offline and online payments. The shift is not dramatic as you might think, as the offline paradigm augments online schemes and can be introduced seamlessly and gradually.

Crunchfish understood early that payment applications of today were not robust and sustainable. It is not wise to make payments dependent on the internet and the core banking systems were never designed to cope with the increasing volumes and instant payment systems of today. A paradigm-shift based on offline payments creates a blue ocean from within the red ocean of payments.

CEO JOACHIM SAMUELSSON



*"What the competition does in hardware, Crunchfish can do in software."*

We also understood very early that gestures will be key for interacting with consumer electronics. Augmented and virtual reality is one of our key segments that requires extremely efficient and flexible software solutions due to the often limited hardware capabilities. With our software platform, we have proven that we can reach the same user experience with a standard camera and our software that many of our competitors need specially designed camera sensors to accomplish. We have developed our technology for many years in this area and now we have a versatile platform that can create blue oceans very quickly. Enabling gesture interaction for e-shopping in web-browsers was a great example of this capability in Q1, when our hand tracking product was adapted to run in any browser and operating system.

We are summarizing another great quarter. With increased focus on sales and marketing, we are getting the word out of having groundbreaking technology. HDFC Bank launch of OfflinePay indicates the success of the pilot offline payment project under the supervision of the Reserve Bank of India. We have already defined two new opportunities with IDFC First Bank, the other bank in the pilot, using the Digital Cash telecom that we released in Q1. The whitepaper and webinar series 'Enabling offline payments in an online world' is recognized for its deep insights. Crunchfish plan to present and exhibit at many payments conferences in Q2 that will establish our unique Digital Cash platform globally.

Crunchfish have signed an MOU for Socio ApS to make an equity investment into Crunchfish for three million shares on market-based terms and conditions. The investment was supposed to happen in February 2023, but has been delayed as Socio have not accessed their financing yet. Based on a renewed mandate provided at the annual meeting 2023 for the board to direct 3,3 million shares to a third party, Crunchfish plan to renew the MOU, but also consider direct investments from other third parties. Crunchfish signed in Q1 an LOI to acquire an Indian payment platform company. Crunchfish have identified technical findings during the due diligence process which have to be assessed before closing. The acquisition process is therefore currently on hold.

Finally, I would like to take the opportunity to thank Joakim Nydemark for more than 10 great years at Crunchfish and wish him all the best for the future. If elected at the annual meeting, Joakim will continue with Crunchfish as a board member. I also like to welcome Fredrik Clementson as CEO for Crunchfish Gesture Interaction and thank Patrik Lindeberg for stepping in as COO for the Crunchfish group in addition to his role as CEO as Crunchfish Digital Cash. I am very much looking forward to a great 2023.



# Significant news during and after Q1

## Crunchfish group

2023-04-21

Crunchfish **Annual Report webinar is now available**, where Crunchfish CEO Joachim Samuelsson was interviewed by analyst Johan Widmark from Emergers. The interview is in Swedish and covers the main events of the year and its progress.

2023-03-31

Crunchfish have **extended the Memorandum of Understanding with Socio** for a potential financing of Crunchfish. Socio still intend to make an initial direct equity investment into Crunchfish for three million shares on market-based terms and conditions.

2023-03-01

Crunchfish have signed a Letter of Intent **to acquire a payment platform company based out of India**. The acquisition will increase the company's presence in India and expand the product- and patent portfolio. The aim is to close the intended acquisition in Q2 2023.

2023-02-16

Crunchfish COO - Joakim Nydemark - **left his operational roles** at Crunchfish and is proposed to join its board of directors.

2023-02-10

Crunchfish announced the **launch of a complimentary report format - Crunchfish iQ** - an interactive view of the year-end report.

2023-01-24

Emergers have **published an equity analysis** on Crunchfish titled "The most interesting fintech rollout since iZettle."

## Digital Cash

2023-05-19

Crunchfish was awarded at the Digital Currency Conference in Mexico City for **Outstanding Advancement in Digital Currency**. The award recognizes a company that has made a huge impression in the space and transformed the way digital currency is experienced. The jury was impressed by Crunchfish Digital Cash as a software-based, tamper-resistant solution.

2023-05-12

Offline payment privacy was the **topic of the webinar** in the series Enabling offline payments in an online world to discuss the 3rd white paper - A practical guide for offline payment privacy considerations, that Lipis Advisors released in partnership with Crunchfish.

2023-05-11

Lipis Advisors in partnership with Crunchfish released today the **third white paper in the series "Enabling offline payments in an online world"** with the title "Privacy considerations".

2023-05-05

The interest in offline solutions from central banks, commercial banks and payment system providers have skyrocketed in recent years. **Crunchfish in partnership with Lipis Advisors were proud to announce the third white paper** and webinar in the series "Enabling offline payments in an online world" with the title "Privacy considerations".

2023-04-28

Crunchfish have been **nominated as finalist for the Digital Currency Awards** in the category Outstanding Advancement in Digital Currency. This award recognizes the most exciting digital currency business of the year, one that has made a huge impression in the space with new and innovative services. Crunchfish has also been selected to pitch at the Fintech Innovation Showcase at the Digital Currency Conference (DCC) in Mexico City which Crunchfish CEO Joachim Samuelsson attends as a speaker and panelist.

2023-04-24

A special Central Bank Digital Currency (CBDC) supplement "An Inflection Point for Global Payments: Industry Perspectives in 2023" **was released** to showcase case studies and perspectives from industry experts. Crunchfish provided the article "Central banks should modernize payments. Who else would?"

2023-03-31

Crunchfish **participated at Digital Euro Conference** in Frankfurt as an exhibitor and as a panelist in the session on CBDC Technological choices where Crunchfish CEO Joachim Samuelsson will explain why Crunchfish Digital Cash is so suitable for CBDCs.

2023-03-30

Crunchfish Digital Cash AB have **received an International Preliminary Report on Patentability (IPRP)** in Chapter II of the Patent Cooperation Treaty (PCT) for a key Digital Cash patent application PCT/SE2022/050090 with a focus on transfer of Digital Cash between a mobile communication device and a smart card, indicating that all claims 1 – 20 are deemed patentable. This patent extends Crunchfish extensive patent portfolio to also support payment cards.

2023-03-30

Crunchfish has **submitted a Swedish patent for a method to establish and use an anonymous and robust Trusted Applications**. The innovation applies to digital applications in general and specifically to payments and Central Bank Digital Currency (CBDC) implementations where privacy is a key feature.

2023-03-29

**Crunchfish have released Digital Cash 2.1** enabling trusted payments anywhere, anytime, and to anyone using telecom connectivity. This much awaited release broadens the scope of Crunchfish Digital Cash significantly making it possible to pay offline to anyone that is onboarded on a domestic payment scheme.

2023-03-24

Crunchfish partners with IDFC FIRST Bank to demonstrate **offline retail payments in RBI's pilot**. This project will give access to digital payments even when there is no network. This unique digital payment solution was designed by Crunchfish for merchants and customers under the RBI's Regulatory Sandbox Program.

2023-03-17

Crunchfish have **applied for a Swedish patent for a method to prevent fraudulent rollbacks**. The patent application enables Trusted Applications to execute securely in software-based trusted environments, which is key for CBDC implementations and other payments applications to achieve scalability, interoperability and cost-efficiency.

2023-03-16

Lipis Advisors in partnership with Crunchfish **released the second white paper** – A practical guide for offline payment security – in the Enabling offline payments in an online world series, outlining the key security aspects relating to offline payments. The white paper includes also Crunchfish's contrarian views on offline payment design and security.

2023-03-13

Crunchfish Group CEO Joachim Samuelsson **presents Crunchfish's pioneering Digital Cash solutions** for making digital payments robust at Stora Aktiedagen in Stockholm. Joachim outlines several contrarian perspectives that are necessary for payment services to survive in the face of temporary failures.

2023-03-10

The interest in offline solutions from central banks, commercial banks and payment system providers have skyrocketed in recent years. Crunchfish in partnership with Lipis Advisors were **proud to announce the second white paper and webinar** in the series "Enabling offline payments in an online world" with the title "A practical guide to offline payments security".

2023-02-22

Crunchfish have undergone penetration testing of the Digital Cash SDK and **passed a security review** executed by Outpost24. The focus of the test was to exploit potential vulnerabilities of the Digital Cash SDK and to provide an understanding about the current level of security of the product.

2023-02-14

Crunchfish have **applied for a patent** protecting a robust solution that enables the digital service to work even offline from a trusted client able to communicate securely client to server or peer-to-peer using an application agnostic Trusted Application Protocol (TAP).

2023-02-08

Crunchfish in partnership with HDFC Bank and another Indian bank are **piloting offline payments** in a project monitored by the Reserve Bank of India (RBI).

2023-02-06

Crunchfish CEO Joachim Samuelsson presented on Aktiedagen in Gothenburg a **new Payments Internet Protocol (PIP)** that is destined to become the foundation of front-end public and commercial digital payments applications.

2023-02-01

Crunchfish **released Digital Cash 2.0** to drive a paradigm shift in payments.

2023-02-01

Crunchfish CEO Joachim Samuelsson commented on the **launch of Digital Cash 2.0** in an interview with analyst firm Emergers. While offline payments protocol may work online, the reverse is not true. Online payments systems are by design only capable of handling online payments. Hence, the underlying protocol for digital payments must be an offline scheme as it supports both offline and online payments.

2023-01-27

Crunchfish CEO Joachim Samuelsson **participated as an expert panellist** in the panel discussion on "The importance of offline payments for CBDCs and financial inclusion" at the DC3 Conference organised by the Digital Currency Global Initiative by International Telecommunications Union and the Future of Digital Currency Initiative at Stanford University.

2023-01-20

Inaugural **offline payments webinar** by Crunchfish, in partnership with Lipis Advisors

2023-01-19

Crunchfish and Lipis Advisors **announced expert panellist line-up** for offline payments webinar.

2023-01-19

Lipis Advisors have **released their first whitepaper**, providing valuable insights to how offline payments relate and can interoperate with online payment system.

2023-01-17

Crunchfish **partnered with Wibmo**, a PayU company and an industry leader in payment security and digital payments, to add offline payments to their Digital Banking platform.

2023-01-13

Crunchfish in partnership with Lipis Advisors announced a **new whitepaper series coupled by webinars** in a series on the theme "Enabling offline payments in an online world".

2023-01-12

Crunchfish **received clean IPRP** for key Digital Cash patent application.

## Gesture Interaction

2023-04-25

Crunchfish **released an upgraded version of XR Skeleton that executes in web-environment**. This enables Crunchfish's hand tracking technology to execute in any browser and computing device which opens exciting business opportunities within e-shopping.

2023-03-22

Crunchfish have **appointed Fredrik Clementson as the CEO of Crunchfish Gesture Interaction AB**. Fredrik will replace Joakim Nydemark as head of the subsidiary. Simultaneously Patrik Lindeberg will take over the role as Chief Operating Officer Crunchfish AB from Joakim Nydemark.

2023-03-09

Crunchfish have **signed an agreement with Change2** in Italy for a Proof-of-Concept project to enable virtual try-ons. The target is to develop a joint offering to enable virtual try-ons. Crunchfish's XR Skeleton product will be integrated in Change2's 3D environment to enable any mobile device with powerful object visualizations for an amazing virtual try-on and shopping experience.

2023-02-08

Crunchfish's XR Skeleton has **successfully been integrated into SpectreXR's OctoXR product** to enable gesture interaction with virtual objects.

# Digital Cash



# Survivability in the face of failure

Crunchfish Digital Cash makes digital payments more robust by providing survivability in the face of failures, whether it relates to connectivity or backend server outages. By inserting trust into the payment bearer application, it augments all types of payments services which rely on keeping the general ledger in the backend updated. Crunchfish have a unique position in the market by providing a patented Trusted Application in a software-based Tamper Resistant Element (TRE) able to maintain a stored value on app and be agnostic to the network the payment application communicates over.

Today's payment systems, whether they are based on instant-, crypto-, or card-payments, are built on online security protocols that keep a general ledger in the backend continuously updated. To identify themselves, the payers might either use a card having a hardware-based execution environment or alternatively an app built on the software-based Rich Execution Environment (REE). These systems are very vulnerable to disruption as they have no survivability in the face of temporary failures on connectivity links or backend nodes. This is where offline payments come into play.



Crunchfish CEO argues for a necessary paradigm shift in payments at Aktiedagen in Gothenburg

Offline payments platforms can either support layer-1, layer-2 or both offline extensions to the underlying online payment scheme. Layer-1 schemes use in offline mode the same native security protocols as the underlying online payment schemes, whereas layer-2 schemes use a separate, non-native security protocol for offline payments. Native Layer-1 and non-native layer-2 solutions are explained

in more detail in the whitepapers in the series [Enabling offline payment in an online world](#), where Crunchfish in partnership with Lipis Advisors provide practical guides to offline payment design, security and privacy.

In the first RBI HARBINGER hackathon 2022 Crunchfish demonstrated how Digital Cash can be exchanged securely between hardware-based TRE on a card and a software-based TRE on a smartphone. Crunchfish have received a clean IPRP, International Preliminary Report on Patentability, for this basic [exchange of Digital Cash between an app and a card](#). In the second RBI HARBINGER hackathon in 2023 Crunchfish aim to showcase CBDC-Retail for offline payments using [Digital Cash telecom](#) in partnership with IDFC First bank. This is a layer-1 solution using the native token-based online security protocol of the eRupee. The solution allows the payer to pay offline, without access to the internet, by means of connecting to the host server in the backend using SS7 telecom signaling instead.

Offline payment platforms are vulnerable to double spending that might for instance occur with a rollback attack. Here the fraudster takes a snapshot of the state of the offline application environment, executes a transaction, and then restores the state of the environment from the snapshot. Crunchfish have a [patent-pending against such rollback attacks](#). Mitigating double spending risks starts with the use of within-wallet tamper resistant offline trusted environments that may either be hardware or software-based.

- **Hardware-based TRE** are standalone secure elements that stores value on a chip consisting of hardware and low-level software to provide resistance against software and hardware attacks. They can host both secure applications and their confidential and cryptographic data. TREs have their own CPU(s) and working memories, which reduces attack surfaces and mitigates the risk of successful attacks.

- **Software-based TRE** are secure areas of devices' main processors that stores value in an app and protect it from being replaced or modified by unauthorized entities, including the device owner. They logically isolate the execution from the device's execution in the unsafe Rich Execution Environment (REE). They offer a convenient and cost-effective solution for offline payment because they can run on existing smartphones.



Figure: Crunchfish Digital Cash has a unique position in the market by delivering trust and ability to store value in an app.

# Successful pilot in India

Q1 has been heavily influenced by the Offline Retail Payments project for Reserve Bank of India (RBI). During the quarter, the project advanced from development into pilot phase. The pilot has been successful and has already exceeded all pre-defined targets. In parallel commercial negotiations are ongoing with the two participating banks, HDFC Bank and IDFC First Bank.



Crunchfish, in partnership with **HDFC Bank** and **IDFC First Bank** have been working together to develop an Offline Retail Payments solution for Reserve Bank of India (RBI) under their Regulatory Sandbox program. HDFC Bank is India's leading private bank and was among the first to receive approval from RBI to set up a private sector bank in 1994. IDFC First Bank is also one of the leading private banks in India with a high focus on innovative payment solutions.

**The pilot started** to onboard internal users end of last year and in January advanced with external customers and merchants using real money, under supervision by RBI.

Customers and merchants are spread across +16 cities in India, including the major cities as well as smaller towns and the hinterland. Pre-defined targets on number of customers, merchants and transactions have already been exceeded. The number of transactions is measured both on internal bank transactions and interbank transactions. The latter was an important objective of RBI to investigate the interoperability of the solution. On both transaction parameters the targets have been met and the total number of transactions was already in April more than 4 times higher than targeted. This indicates that the users in the pilot have been very pleased with the Offline Retail Payments solution and have used it more than expected. For Crunchfish this

is a strong sign that Digital Cash is highly needed in the Indian market. The pilot will end mid-May, after being in operation for four months. A one-month evaluation by RBI will follow. If RBI is satisfied with the outcome, the pilot will provide basis for RBI's guidance and regulatory support in providing Offline Retail Payments to the payment ecosystem of India, based on the Crunchfish Digital Cash platform.

To promote the pilot HDFC Bank made an **announcement** in February where they launched "OfflinePay" to the market. The announcement gained **huge interest** among both customers and in media.



In parallel with the pilot, commercial and legal discussions with the two participating banks have advanced into agreement negotiations. The process with IDFC First Bank is in final stage and a license agreement is expected to be signed during Q2. HDFC Bank will follow shortly after. Based on the high interest for the pilot, dialogues are also ongoing with several other banks in India. These discussions are expected to materialize after the pilot has been concluded by RBI.

During the quarter RBI announced the second edition of its global hackathon - **HARBINGER 2023** - with the theme 'Inclusive Digital Financial Services'. RBI invites for innovative ideas on four problem statements, that are aimed to transform the financial ecosystem by improving diverse aspects of financial services and making it more inclusive,

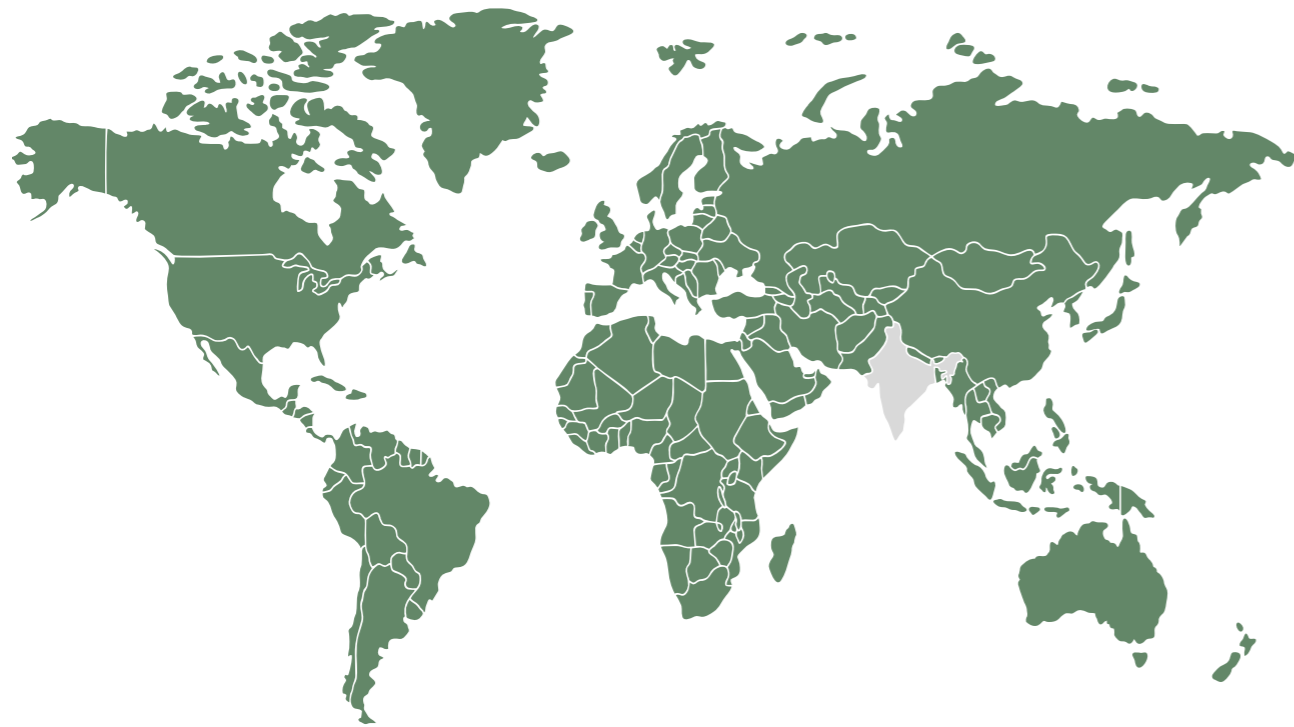
efficient, accessible and secure. Following up on last year's finalist position in the first HARBINGER, Crunchfish will participate with a strong proposal in the CBDC-Retail category. Shortlisting of Finalists will be announced in June.



The project with one of the major e-wallets in India is still ongoing and part of the company's development plans for 2023. The e-wallet app today requires online connectivity at startup and thereby needs to be redesigned to host offline payment capabilities. The redesign is planned to be completed during Q2 2023, whereafter integration of Crunchfish Digital Cash with Proxlink Bluetooth interaction will start.

Crunchfish and the financial platform provider **Wibmo** entered into a partnership for integration of Digital Cash into Wibmo's Digital Banking platform. The Digital Cash SDK has been delivered to Wibmo and integration is ongoing with support from Crunchfish. Partnering with Wibmo is a strategic step to accelerate global adoption of Crunchfish Digital Cash. Wibmo have impressive and proven technology, serving more than 160 Banks and Fintechs in 30+ countries, to which offline payments can now be offered as well. Digital Cash is promoted as a modular, plug and play module within the Wibmo's Digital Banking platform. Wibmo will be an important channel in India as well as Outdia. They have for example already started discussions with existing customers in the Philippines.

# Opportunities in Outdia



## Africa

To increase financial inclusion and add additional use cases to the Nigerian CBDC eNaira, the **Central Bank of Nigeria (CBN) and Crunchfish** entered into a Development and Demonstration Agreement for a Proof-of-Concept of Crunchfish Digital Cash offline payments with eNaira. The project has been delayed due to elections in Nigeria and change in administration. Based on the interest from CBN, commercial banks in Nigeria have also started to investigate offline payments from Crunchfish. One bank is very interested, and a Development and Demonstration Agreement is expected to be entered during Q2.

The collaboration with Socio ApS to enable telecom infrastructure in Africa with offline payments has been delayed as a consequence of the delayed investment in Crunchfish.

## Latin America & the Caribbean

During Q4 2022 Crunchfish entered a partnership with Money Square in Jamaica to address opportunities within both commercial mobile payment services and CBDC in Latin America and the Caribbean. During Q1 Money Square has been onboarded as a sales agent and has actively started to promote Digital Cash. Initial focus is on Jamaica, later the rest of the Caribbean and select countries in Latin America will be addressed. First contacts have been very positive, both with the major e-wallets in Jamaica as well as with the Bank of Jamaica for their CBDC JAM-DEX.



## Southeast Asia

Crunchfish were honored by partner **V-Key** with the Innovative Partner Award at their annual partner event in February. The price honors and recognizes initiatives that have made a significant influence on V-Key's secure environment V-OS. The co-operation with V-Key around sales and marketing continues, V-Key is promoting Digital Cash alongside its own products. Focus is on the VIP-countries - Vietnam, Indonesia and the Philippines, but activities are also made in other countries where V-Key operates. One example is a fintech event in Hong Kong June 9th, hosted by V-Key and local partner Powerhouse in cooperation with the Fintech Association Hong Kong, where CEO Joachim Samuelsson has been invited to present and participate in a panel discussion. Unfortunately, the joint V-Key and Crunchfish project with an e-wallet in Vietnam have been put on hold. At this stage it is uncertain when it will be restarted.

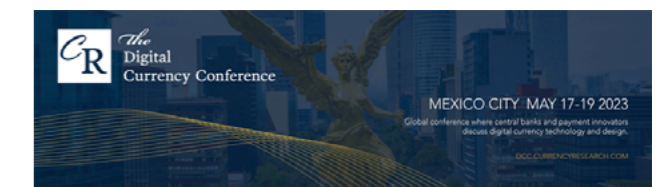


## Events

Crunchfish's ambitions to expand the market scope to Outdia was initiated during 2022, during 2023 this will be intensified. Crunchfish will be **present at several events** within payments around the world.

## Mexico City May 15th-17th - Digital Currency Conference.

CEO Joachim Samuelsson will be speaking about "Central Banks should modernize payments. Who else would?" and participate as a panelist in a session about offline payments. In addition, Crunchfish have been **nominated as finalist** for the Digital Currency Awards in the category Outstanding Advancement in Digital Currency and been selected to pitch at the Fintech Innovation Showcase at the start of the event.



## Mumbai June 8th - Payments Innovation Summit.

Crunchfish will exhibit Digital Cash, have a speaking slot about "Enabling offline payments in an online world" and participate as panelist in the session "Driving India Towards Becoming a Cashless Economy".

## Hong Kong June 9th - Executive Roundtable Event hosted by V-Key, Powerhouse and the Fintech Association Hong Kong on the theme "Strengthening the Future of Finance: Understanding Cybersecurity and Fraud in the Digital Age".

Joachim Samuelsson will present "A practical guide to offline payment security" and participate in a panel discussion.

## Cape Town June 26-28th - Central Bank Payments Conference.

Crunchfish will exhibit Digital Cash and participate as panelist.

## Cape Town June 28-30th - The Global Payments Summit.

Crunchfish will exhibit Digital Cash, have a speaking slot about "Payment applications only work when everything works" and participate as panelist.

## Mumbai September 5-7th - Global Fintech Fest.

Crunchfish will exhibit Digital Cash and as an official "Offline Payments Partner" host a workshop on "The impact of offline payments in a digital world: Robustness, Privacy and Inclusion".



# Central banks should modernize payments

Public goods like the internet, electricity or telecom are carefully designed to continue working despite temporary outages. It is hard to understand why digital payments is not as robust as it should be given its critical role in modern societies. Technology exists that makes digital payment services as robust, secure, and inclusive as cash payments. Crunchfish argue that financial regulators should demand that payment services must fulfill these design criteria to be allowed to operate in the country. Also, central banks should take it upon themselves to modernize payments. CBDC presents the perfect opportunity.

Payments need to be modernized for the interest of society. Central banks are best motivated to act as they operate from this perspective. Commercial payment services have an obligation to their shareholders to make money and will always address the most lucrative parts of the market first. If they are allowed to get away with implementing a payment service which works most of the time, in contrast to all the time, they will do so. For the same reason commercial payment services are not as motivated as the central bank to ensure digital and financial inclusion as these segments are less financially rewarding. Central banks should lead by example by showing how CBDC-retail implementations can be robust and cater for all needs in the market. Users will reward them by using CBDC and force other payment services to follow.

Payment applications are typically designed with a client server architecture. Although built upon the robust internet protocol, payment applications themselves are not robust as they rely on many backend servers being operational as well as users get access to the host server at the moment-of-payment. **Crunchfish have a solution** by offering a trusted and secure client with Digital Cash Trusted Application that uses an application- and communication network agnostic Trusted Application Protocol (TAP) that enables similar survivability in the face of failures on links or nodes for the payment application, just as the internet delivers for digital communications.

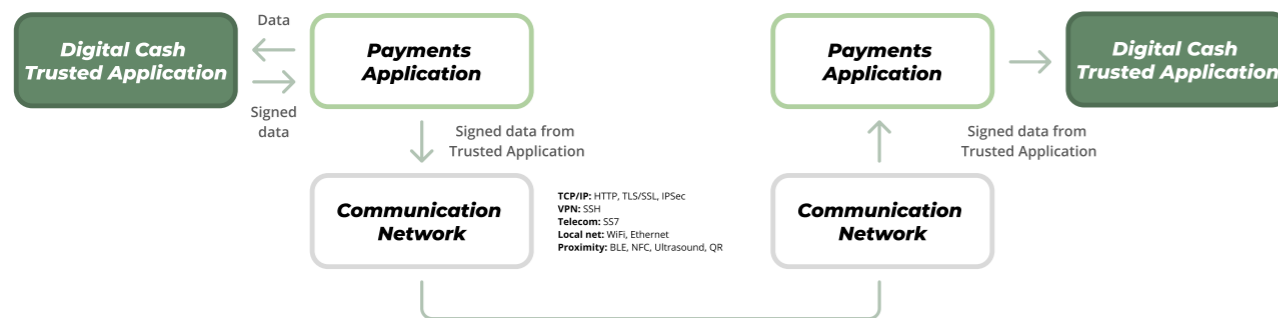


Figure: The Trusted Application Protocol makes payments applications robust by adding trust and security to the host client.

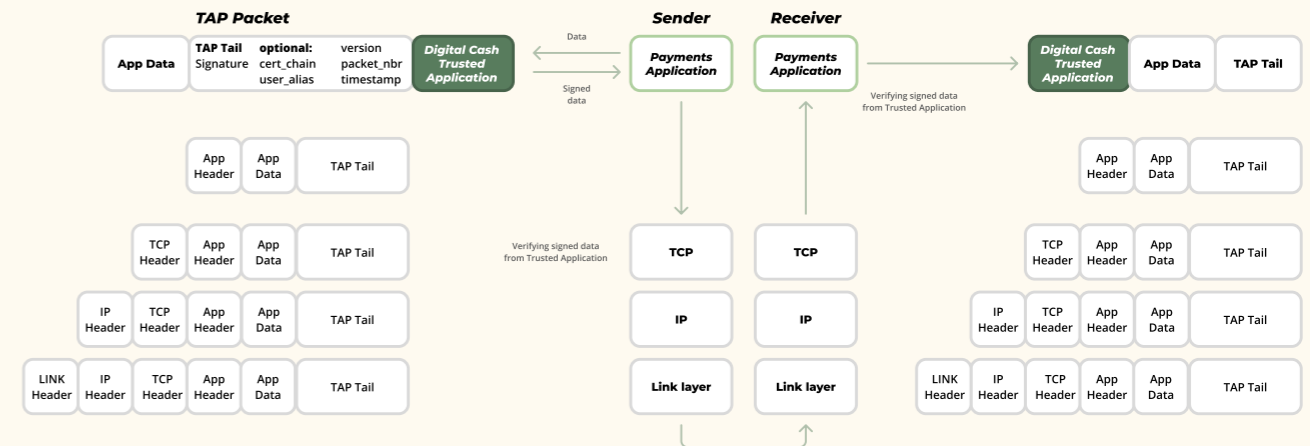


Figure: The Trusted Application Protocol used with the internet protocol stack

A paradigm-shift is necessary to deliver the robustness in payments required by society. Crunchfish believe that TAP will be used by all payment applications including CBDCs as it offers the required robustness whilst facilitating instant payment if the payment rails are open. Payment applications of today only work, when everything works, offering no survivability in the face of temporary failures on nodes or links.

Crunchfish Digital Cash is based on the same design principles and is destined to deliver for payments and other digital applications what the internet offered for communications. Furthermore, TAP improves on the internet itself by providing a trusted client that may communicate to the server via other communication network protocols than TCP/IP, for instance SS7 over telecom. This is arguably the most important improvement in digital communications since the internet came in the 90s.

TAP appends the application data with a TAP tail that contains at least a cryptographic signature of the payer using a private key securely stored on the host device. The extended application data payload may then be sent and verified at any node, without any change to the system, regardless of whether it is sent remotely to a host server or locally to a payment application.



## An Inflection Point for Global Payments: Industry Perspectives in 2023

A CBPN Special Supplement



Read the full Crunchfish article "Central Banks should modernize payments. Who else would?" in *Central Bank Payment News, A CBPN Special Supplement*.

# Digital Cash products

Crunchfish have an extensive suite of Digital Cash applications that are based on having a trusted app client using the Trusted Application Protocol (TAP). The picture below outlines them in relation to the where the recipient of the TAP message goes. In addition, there are three Bluetooth products, Blippit, Proxilink and aBubbl, in proximity interactions with Digital Cash.

**Digital Cash offline** is in a pilot stage in India with **HDFC Bank and IDFC Bank in the Regulatory Sandbox of RBI**. A handful of payment platforms, e.g. **Siriustech, M2P, Wibmo**, have integrated or are in the process of integrating Digital Cash offline into their payment platforms.

**Digital Cash telecom** has been released this quarter and **Digital Cash online** is an MVP, whereas **Digital Cash non-mobile** and **Digital Cash consecutive** are PoC that have been showcased at **RBI HARBINGER Hackathon** and at the **G20 BIS Techsprint** during 2022.

**Digital Cash quantum-safe** is conceptual and patent pending. During Q1 2023 Crunchfish have applied for patents relating to **TAP, rollback protection** and **anonymous wallets**.

The three Crunchfish Digital Cash Bluetooth applications are released products. **Blippit** is integrated with realtime payment service Swish in Sweden. **Proxilink** will be used by one of the major e-wallets in India for Digital Cash offline transactions. Contextual payments with **aBubbl** has only conceptually been applied to payments.

Below are three views of the products in the Crunchfish Digital Cash platform:

- Digital Cash products in payment applications
- Digital Cash products relating to TAP
- Digital Cash product categories

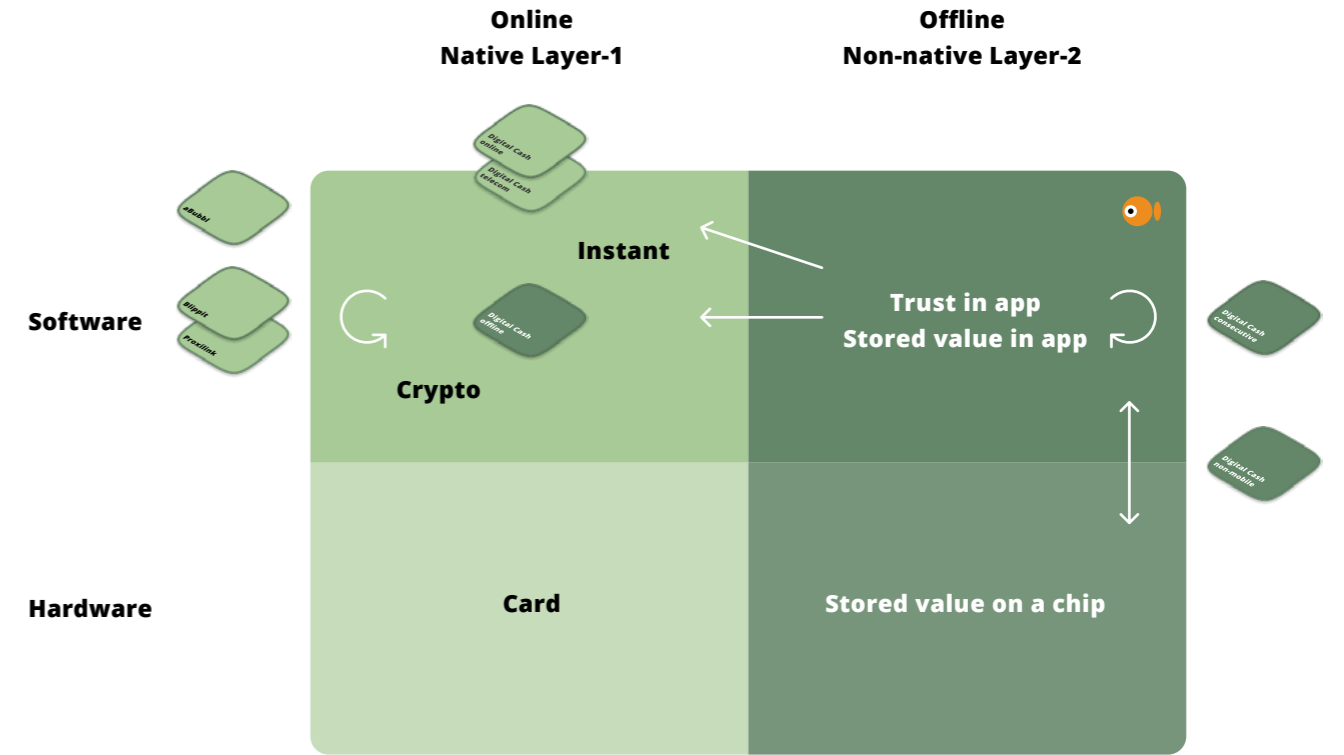


Figure: Crunchfish Digital Cash products relating to the Trusted Application Protocol (TAP).

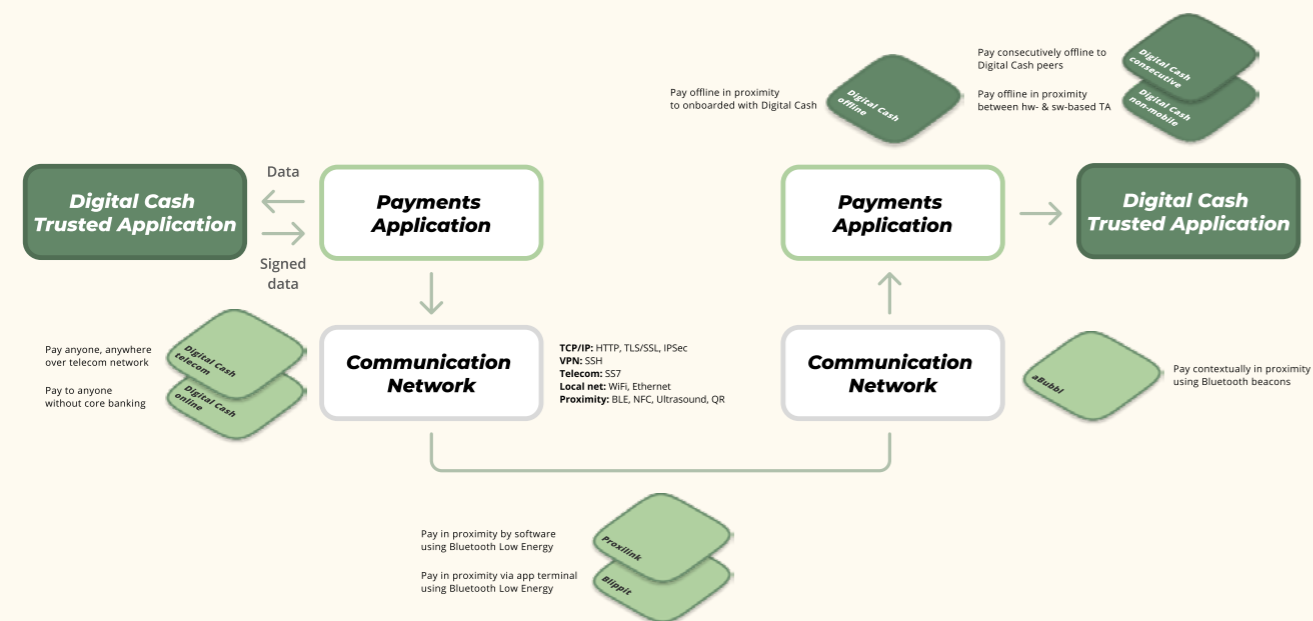


Figure: Crunchfish Digital Cash products in payment applications

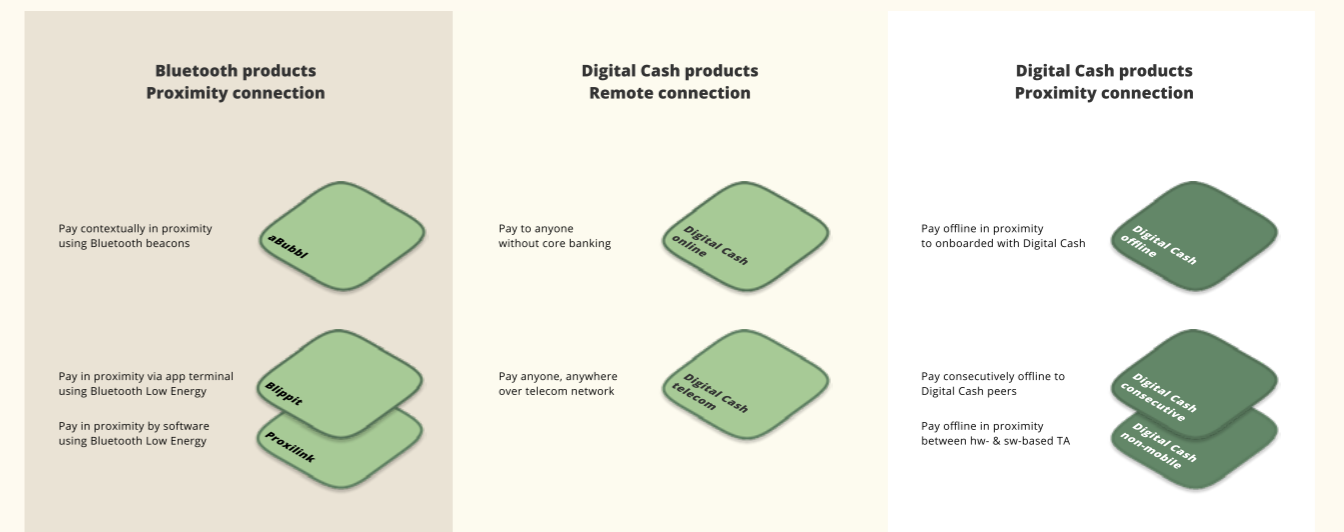
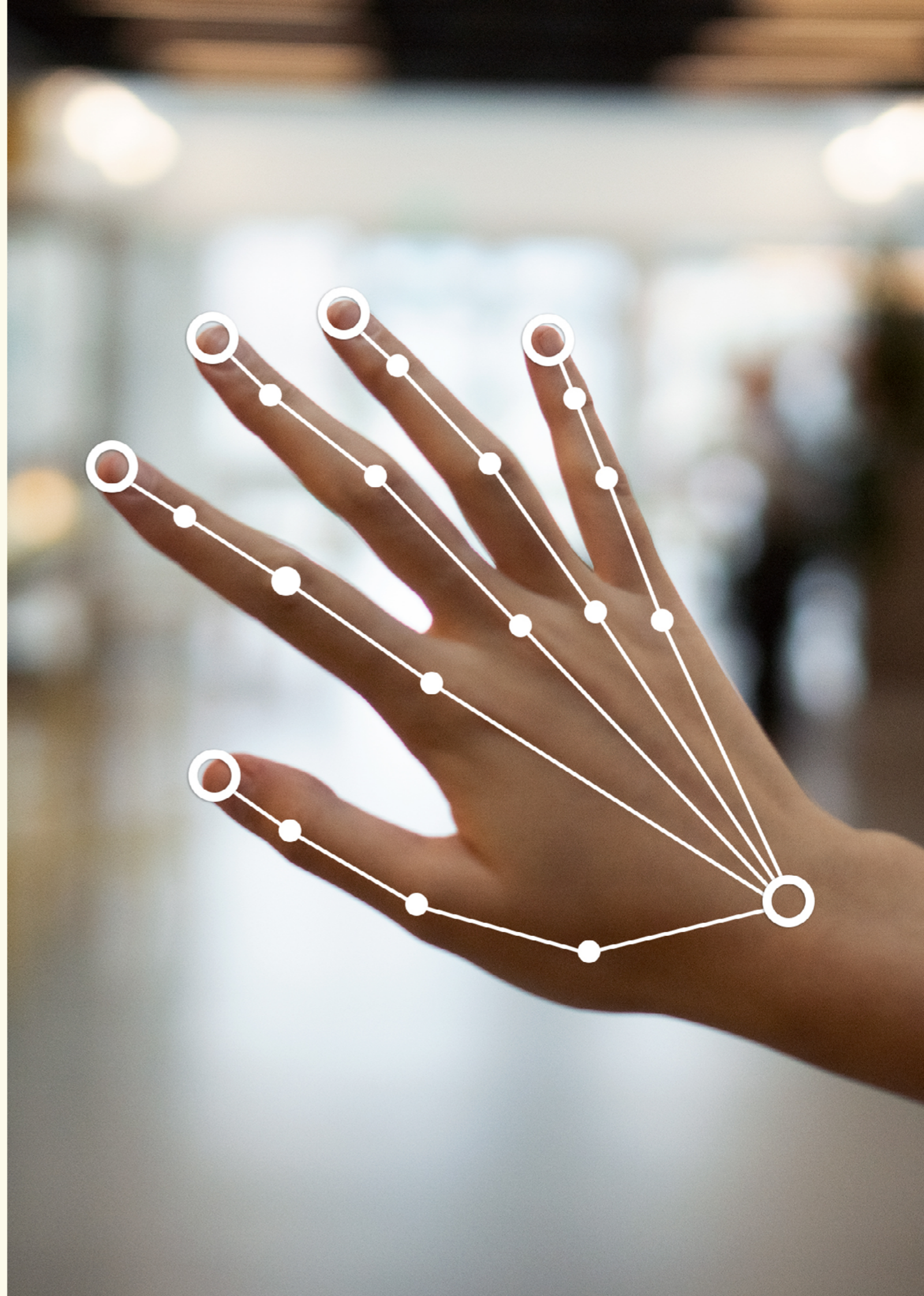


Figure: Crunchfish Digital Cash product categories

# ***Gesture Interaction***



# Gesture interaction overview

Crunchfish develop technologies based on deep learning that enables detection and tracking of hands and body. The technology can be used in several areas but is optimized for AR/VR (augmented & virtual reality), e-shopping and the automotive industry. During the quarter an exciting agreement was signed with an Italian partner to develop a proof-of-concept for virtual try-ons. In parallel the work has continued to support other customers and to further extend the product portfolio with a new product release - XR Skeleton for Web – that supports execution of the hand tracking algorithm in web-browsers.

## Purpose

During the last 15 years, the world has been moving from keypads and physical buttons towards touch screens and interactive surfaces. For mobile phones and tablets it is today mandatory to have touch screens and the same goes for larger public screens at train stations etc. In automotive the number of screens increase and are adapting touch interaction as well as touchless interaction. In AR/VR there are no physical displays at all, so the question is how to interact with devices without a physical screen?

The purpose of Crunchfish Gesture Interaction is to enable users to interact intuitively with any screen. No matter if the screen is physical or virtual and if in Reality, Augmented Reality or Virtual Reality – interaction always need to work and be deeply intuitive.

For the automotive industry and vehicles there is another, even higher purpose – Save lives. By enabling intuitive screen interaction with gestures, the driver can keep focus on the driving. Further, and even more important, Crunchfish's hand & body tracking technology can keep track on driver and passengers' behavior (Driver Monitoring System and Occupant Monitoring System) and alert the driver if something is not safe. This may include drowsiness, attention on mobile phone instead of driving etc.

## Crunchfish Skeleton platform

Gesture control is about interacting with electronic devices without having to touch a screen or press physical buttons. Using a camera sensor and hardware with a processor, Crunchfish's gesture control technology makes it possible to interact from a distance by detecting and tracking the movements of the hands and body and then connect these movements to various functions of a device.

The product XR Skeleton has a software architecture that enables a skeletal image of each hand represented by 21 points. Unique combinations of different neural networks have been used to train algorithms and create detection and tracking functionality. The development speed of new products not only creates a wide range of new solution areas, but also shows technical ability and flexibility of the company's advanced gesture control software.



“With the latest research findings within deep learning and a great team effort, we have developed an extremely reliable and fast detector module that further increases the performance of XR Skeleton Stereo”, **says Jens-Henrik Lindskov, R&D Director at Crunchfish Gesture Interaction.**

Crunchfish Skeleton platform – based on the XR Skeleton product - forms the basis for the continued development of existing and new products and have during the quarter been supplemented with additional functions and adaptations to specific contexts and areas of use. The platform itself consists of several different components such as inhouse developed tools, camera rigs, inhouse designed neural networks and processes for generating synthetic data.

XR Skeleton Stereo is the flagship hand tracking product of the platform and enables high precision tracking and accuracy in all 3 dimensions due to the dual-camera input. The solution also provides tracking of 42 points simultaneously (21 points on each hand) with high precision measurement of the distance between the camera sensors and each point of the hands.

With XR Skeleton as a base, detection of the whole body is also possible by applying 34 points from head to toe, which creates a full body tracking solution - FB Skeleton (under development). By combining hand tracking and body tracking, Crunchfish UF Skeleton (User Facing) was created. UF Skeleton can be used for interaction in vehicles, for interaction with smart TVs etc. since it makes it possible to keep track of people in front of the screen and camera, detect hands super-fast and provide information about body positions and hand movements.

# Market update and trends

The market for hand- and body tracking technologies is growing with new usecases. Crunchfish's key market segments are since earlier AR/VR and Automotive, but during the last 6 months have Online shopping evolved to become a third segment with great potential. Crucial for the company's key target market segments is use-cases with clear demands for gesture technology. To further increase the market penetration and list of customers and partners, Crunchfish have during the period participated at Consumer Electronic Show (CES) in US - the most influential tech event in the world.

## Market for AR/VR and automotive

Smart glasses continue to evolve from devices with a small screen in front of one eye and a single camera sensor to more advanced devices that project the screen in front of both eyes and have multiple camera sensors. For the consumer market, AR glasses with a stereo camera configuration will probably become standard as it adds a lot to the AR experience. From a gesture control perspective, this provides conditions for both greater precision as well as interaction with both hands simultaneously. The recently **upgraded Crunchfish XR Skeleton Stereo** will therefore be an important component in the company's portfolio.

In enterprise and industry, there is great potential for AR/VR with warehouses / logistics, training and machine maintenance with remote expert support as some examples. What model of AR/VR devices that is used in different environments varies depending on the area of use, but common is that they all need gesture control for effective interaction and Crunchfish have several different software products that may be suitable depending on the type of hardware.

The automotive industry is a growing market segment where hand & body tracking is starting to gain momentum. The increase is partly driven by the increase in the number of screens in vehicles, but above all by the forthcoming legal requirements regarding safety.

To help prevent accidents, car manufacturers are developing safety systems that keep track of the driver's condition and send alerts when a person shows signs of deviant behavior. These advanced systems include camera-based driver monitoring systems (DMSs) to detect inattention or fatigue of the driver and send an alert if the system detects that the driver appears distracted. There are also systems for monitoring passengers and other things in the vehicle that come in the next step. These are called OMS (Occupant Monitoring Systems) and will be able to provide additional information about the safety of a vehicle.

To meet the automotive use-cases, Crunchfish's UF Skeleton was developed and offers a competitive product to the automotive industry. With both hand tracking and soon body tracking, functions such as detection of drivers and passengers are made possible.

With UF Skeleton optimized for RGB and IR camera sensors, Crunchfish have an excellent opportunity to take a position in the rapidly changing automotive industry by meeting the legal requirements that will be set for DMS. To use gestures to interact with entertainment systems in the front seat is another promising usecase in vehicles. As screens are becoming more common also in the back seat, the demand for gesture control will increase in this area to solve problems such as children in car seats not reaching the screen.

## New market segment - e-shopping

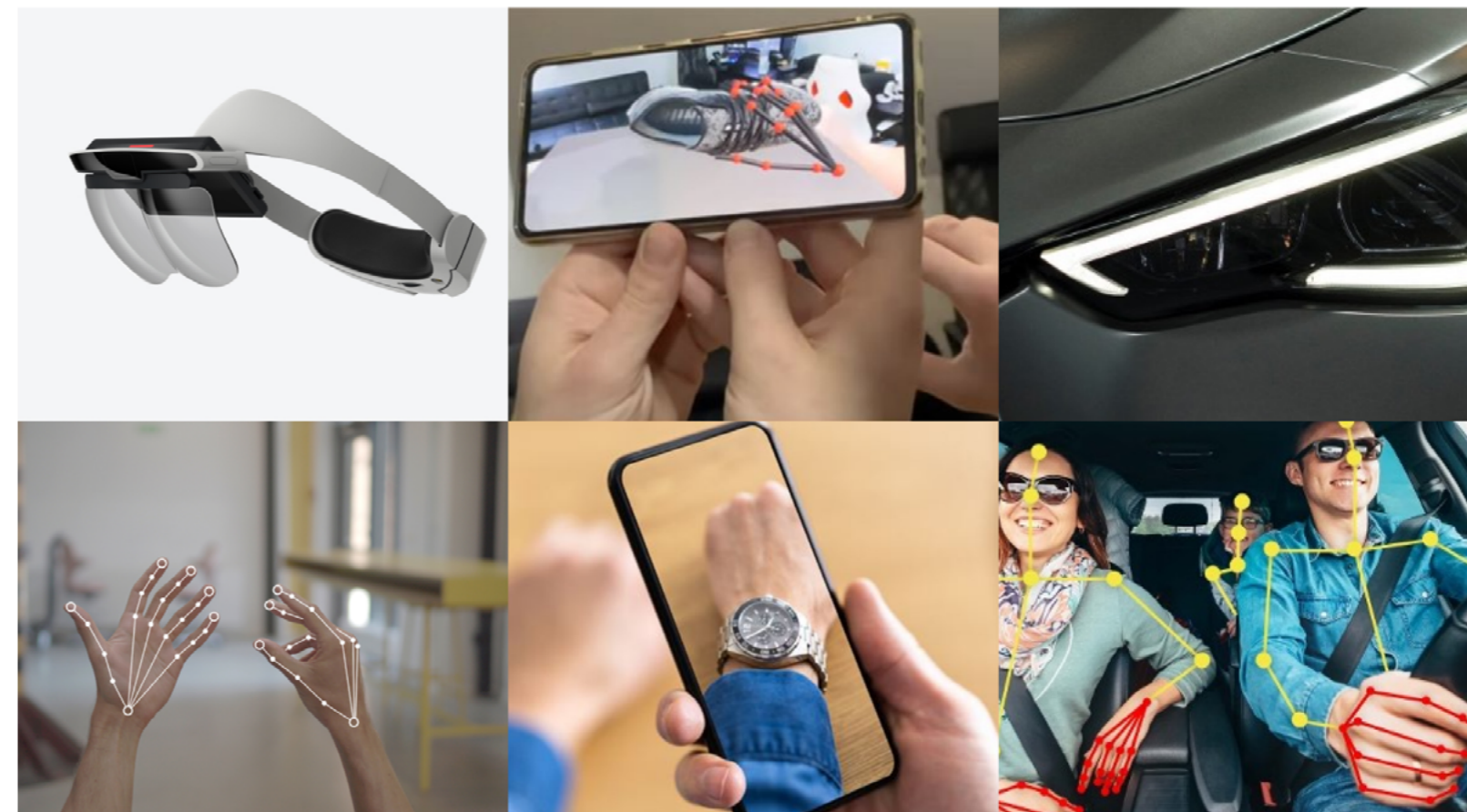
Online shopping or e-shopping is to search for and purchasing goods and services over the Internet using a web browser. The main allure of online shopping is that consumers can find and purchase items they need (which are then shipped to their front door) without ever leaving the house.

The software of Virtual try-on works on the technology that helps users to try on products using mobile/ laptop based cameras. Products can include, clothes, cosmetics, jewelry, watches etc. By using AR (augmented reality), the shopping experience can be greatly improved and give the customers an immersed feeling that is much more similar to visiting a real store. The customer can see the items in 3D, pick them up and rotate them to have a closer look of details. Crunchfish can enable virtual try-ons of eg. watches, rings and bracelets.

The rising trend of online-shopping, increasing penetration rate of internet in the developing regions and launch of advanced software in this field are some of the prime driving forces of the market. E-shopping is already a huge market that is growing rapidly and to offer technology that dramatically improves the shopping experience and increase sales is a great place to be.

## Marketing events

Crunchfish have during the quarter participated in Consumer Electronics Show (CES) in the US, which is the most influential tech event in the world. With 115,000 visitors from 177 countries, it is the proving ground for breakthrough technologies and global innovators. CES showcases companies including manufacturers, developers and suppliers of consumer technology hardware, content, technology delivery systems and more. Crunchfish had a great show with many positive meetings and good market and tech insights. Trends this year at CES were sustainability, electrification and XR where especially VR is taking impressive steps forward. When looking at the development of AR and VR devices, most attention is given to VR and in many cases devices with an AR experience by using camera sensors for see-through capabilities. Most larger manufacturers of consumer electronics including giants like Apple and Samsung, mean that AR is the future, but since the hardware is not yet good enough for AR glasses, VR drive the adoption of the XR experience and development of VR apps that in a next step easily can be adapted to AR.



# Customers and partners

Crunchfish have during the quarter signed agreement with Change2 in Italy for a Proof-of-Concept project to enable virtual try-ons for the fashion industry. In parallel, discussions with a number of different potential customers and partners have continued. Crunchfish have also continued to support current customers such as Lenovo and Ximmerse in their development of new products that will hit the market during 2023. The main market segments for the gesture business are AR/VR and automotive, but e-shopping has grown during the last quarter and will open new opportunities moving forward.

## Customers and partners

Crunchfish have signed an agreement with Change2 in Italy for a Proof-of-Concept project to enable virtual try-ons. The target is to develop a joint offering that enable virtual try-ons for the e-shopping market. Crunchfish's XR Skeleton product will be integrated in Change2's 3D environment to enable any mobile device with powerful object visualizations for an amazing virtual try-on and e-shopping experience.

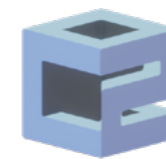
Change2 offer software and services to famous luxury brands. Crunchfish's technology for hand detection and tracking in combination with Change2's customer network and ability to develop 3D web solutions is a perfect fit to enable virtual try-ons of eg. watches, bracelets and rings. Therefore, the companies have during Q1 entered a partnership to develop a joint solution targeting this exciting market.

In short, a virtual try-on is the way a customer can try on a product through mobile or other devices equipped with a camera. Thanks to an underlying AR technology, future customers can see themselves in a beloved product on the screen of their smartphone. It is a huge market that is growing rapidly.

**Crunchfish and SpectreXR have since earlier a partnership** that targets to offer customers a powerful object interaction solution in AR/VR. XR Skeleton has successfully been integrated into SpectreXR's OctoXR product to showcase gesture interaction with virtual objects. The core ability of this is to grab and manipulate objects, which require both a robust hand tracking technology as well as interaction components that enable all the dynamics and physics behind virtual objects.

In Q1 2023, SpectreXR and Crunchfish presented a demo app targeting e-shopping that shows an immersive shopping experience in Augmented Reality. The demo app specifically shows how a sneaker shoe can be picked up and turned around to get a closer look before a purchase.

An integrated solution using Crunchfish and SpectreXR software is now available and reduces the time to develop interactive AR/VR apps for e-shopping. The solution is also applicable for manufacturers of AR/VR devices for design and implementation of e.g. user interfaces.



"We are thrilled to start this collaboration with Crunchfish, as we strongly believe that VTO solutions are getting more and more important for luxury fashion brands. This strong partnership could possibly create the best in class virtual try-on solutions for the luxury brands",

**says Lorenzo Corazza & Alberto Malavasi, Founder at Change2.**

During the quarter, important customers like Lenovo, OPPO and Ximmerse have continued to make good progress and several new device models - including Crunchfish's hand tracking technology - target shipment during 2023. This includes both AR-glasses and mobile devices.

Ximmerse's new AR-glasses are now shipping with Crunchfish's latest hand tracking technology - XR Skeleton Mono - and more devices as well as usecases are in development. There is also ongoing integration work of XR Skeleton Stereo in Ximmerse Rhino AR-glasses.



# Products and roadmap

During the last quarter, XR Skeleton for Web was launched, that enables Crunchfish's hand tracking technology to run in web-browsers. Also, updates of XR Skeleton Mono and XR Skeleton Stereo has been shipped to customers during the period. The updated product releases included new functionality as well as improved performance and show the great flexibility of Crunchfish Skeleton platform as well as the capabilities of the sharp development team.

## XR Skeleton products

XR Skeleton is Crunchfish's 4th generation gesture control product, where each generation still is part of Crunchfish's offering and target different usecases and hardware. The first product - Selfie A3D - is based on traditional image analysis and target mobile devices and tablets for use of pose-interaction. From 2015 the priority was AR/VR devices and the following products (XR Pose etc.) were trained and optimized for different AR/VR devices. For every new product, the technology became more and more based on neural networks and XR Skeleton is based only on neural networks. With Crunchfish's inhouse developed tools and processes for eg. generating training data, XR Skeleton became the foundation of the XR Skeleton platform.

Crunchfish Skeleton platform forms the basis of the continued development of existing and new products and have during the quarter generated new and updated product releases such as XR Skeleton for Web. The platform itself consists of a number of different components including inhouse developed tools, camera rigs, inhouse designed neural networks and processes for generating synthetic data.

## Release of XR Skeleton for Web

Crunchfish released an upgraded version of XR Skeleton that executes in web-environment called XR Skeleton for Web. This release enables Crunchfish's hand tracking technology to execute in any browser and computing device which opens exciting business opportunities within e-shopping.

Earlier releases of Crunchfish's gesture control software supports Android operating system and integration in Android apps, while XR Skeleton for Web works in web pages and runs in any browser such as Safari and Chrome and different operating systems including e.g. Windows. The end users can then get a stunning e-shopping experience with augmented reality without downloading any apps.

With Crunchfish Skeleton platform as base, the development team has again proven their strong capabilities. In a very short timeframe, XR Skeleton was adapted to the web interface and also optimized for e-shopping purposes such as virtual try-ons.

## Release of upgraded XR Skeleton Mono and Stereo

The development of XR Skeleton Mono and XR Skeleton Stereo is an ongoing work, where improvements and more functionalities are added in new releases of the products. Since the AR/VR market is still rather early, hardware configurations and components vary between different vendors, which then require tweaks and changes in the gesture control software. Current release versions are XR Skeleton Mono 2.2 and XR Skeleton Stereo 1.3. Both releases are commercially available.

## Product roadmap

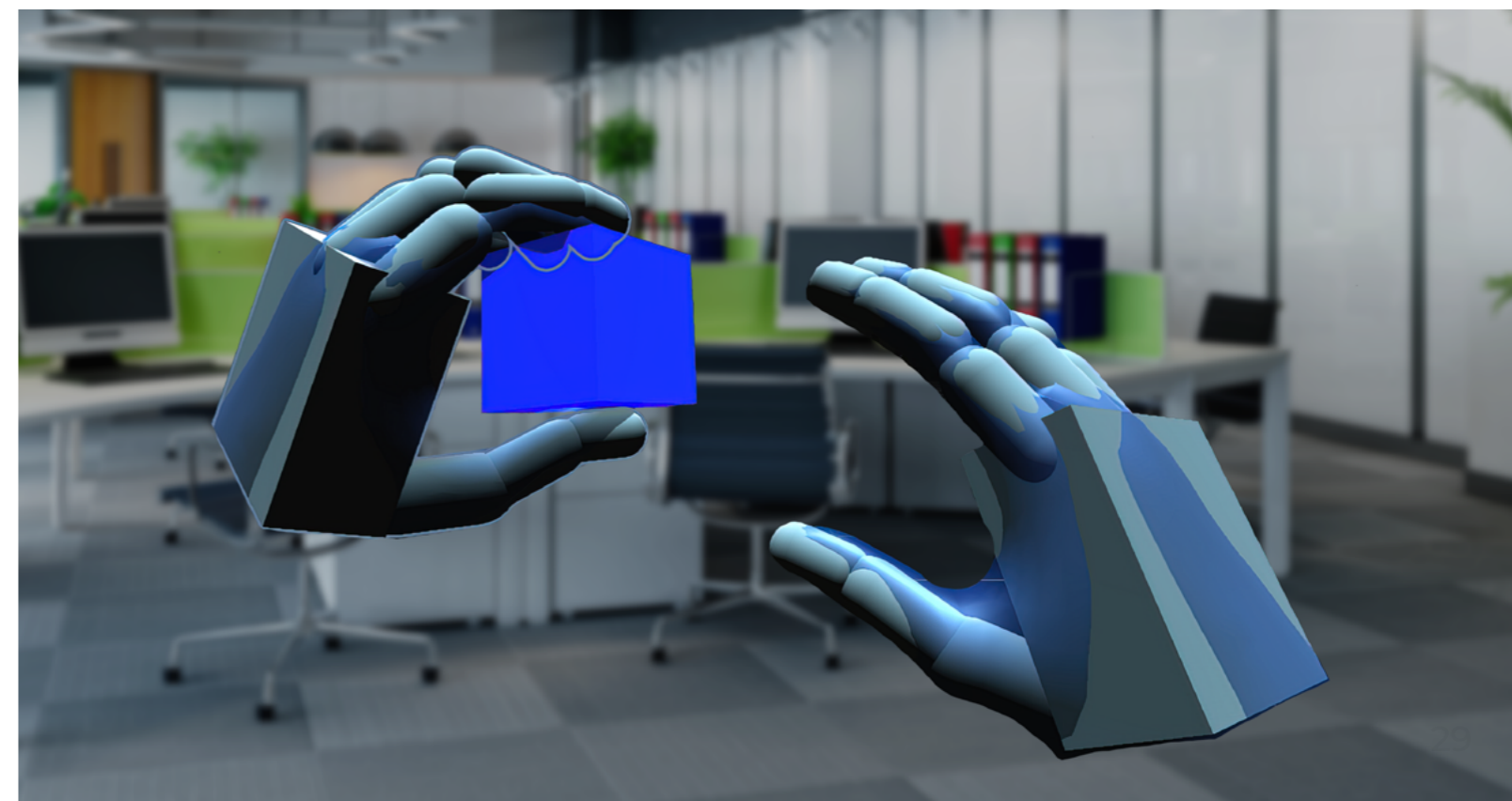
The hardware in future generations of XR (AR/VR) products will certainly be faster, smaller and more energy efficient. They will also support more advanced camera configurations, creating even more gesture interaction opportunities. Therefore, support for multiple camera sensors (stereo camera configuration) that increases precision in all three dimensions, as well as tracking of two hands simultaneously will be very important. For optimal performance, Crunchfish's products also need to be able to execute on custom processors such as Graphics Processing Unit (GPU) and Neural Processing Unit (NPU).

The roadmap for 2023 includes work with the next generation's neural network and further balance the solution with large amounts of data, simulated backgrounds, synthetic objects, lighting & shadow conditions, etc., to secure that XR Skeleton will be able to meet even the toughest requirements from customers and end users. A new commercial product release of XR Skeleton Mono

as well as XR Skeleton Stereo was delivered to customers during the period and commercial AR products including the software are expected to ship during 2023.

The development of combined solutions with XR Skeleton, UF Skeleton and the full body solution FB Skeleton, will continue in order to fully support requirements from e.g. the automotive industry and there is a plan to define a specific product track for automotive. With the SpectreXR collaboration a more full stack solution can be enabled and naturally it will be important to also support other types of camera sensors to enable new future use cases.

To broaden the business and open new market segments, adaptation to new platforms like the recently released Web-based XR Skeleton solution will also continue. Due to the flexibility in Crunchfish Skeleton Platform, Crunchfish can quickly branch out new products that are adapted to specific hardware configurations and usecases, which is a tremendous benefit for customers and prospects.



# Financials



## Financial report

### Sales and earnings for the quarter

Net sales amounted to SEK 171 (216) thousand for the first quarter and operating expenses amounted to SEK 11,511 (11,013) thousand. EBITDA for the period amounted to SEK -5,732 (-5,323) thousand. Loss before tax for the first quarter amounted to SEK -6,828 (-6,733) thousand and has been charged with amortization of intangible assets of SEK 986 (1,393) thousand and tangible fixed assets of SEK 53 (56) thousand.

### Investments

During the first quarter, the Group invested SEK 4,104 (3,435) thousand in intangible fixed assets and 0 (60) in tangible fixed assets. Investments in associated companies amounted to SEK 0 (0) thousand.

### Liquidity and financing

At the end of the first quarter the Group's cash and cash equivalents amounted to SEK 19,029 (23,583) thousand. Cash flow from operating activities during the first quarter amounted to SEK -6,229 (-5,650) thousand.

### Associated companies

Blippit AB is an associated company, and the holding is reported in the consolidated accounts using the equity method. The equity method means that the value of the shares in the associated company reported in the Group corresponds to the Group's share in the equity of the associated company. Crunchfish's share of the associated company's earnings is reported as a separate item in the consolidated income statement.

### Staff

As of March 31, 2023, the number of employees was 22 (19).

### Risks and uncertainties

A number of different risk factors could impact Crunchfish's operations and industry negatively. It is therefore very important to consider relevant risks in addition to the Company's growth opportunities. Relevant risks are presented in the prospectus issued by Crunchfish AB in October 2021 and the annual report for FY 2022, which can be found at [crunchfish.com](https://crunchfish.com).

### Related party transactions

Company management and administrative staff are employed in the parent company Crunchfish AB. Reported sales in the parent company consists of income from services rendered for management and administration of the company's two subsidiaries.

Crunchfish Digital Cash AB has performed development and administrative services for the jointly owned company Blippit AB. Of the groups net sales for the first quarter, SEK 0 thousand (63) relates to fees invoiced to Blippit.

### Sales and earnings for the quarter, parent company

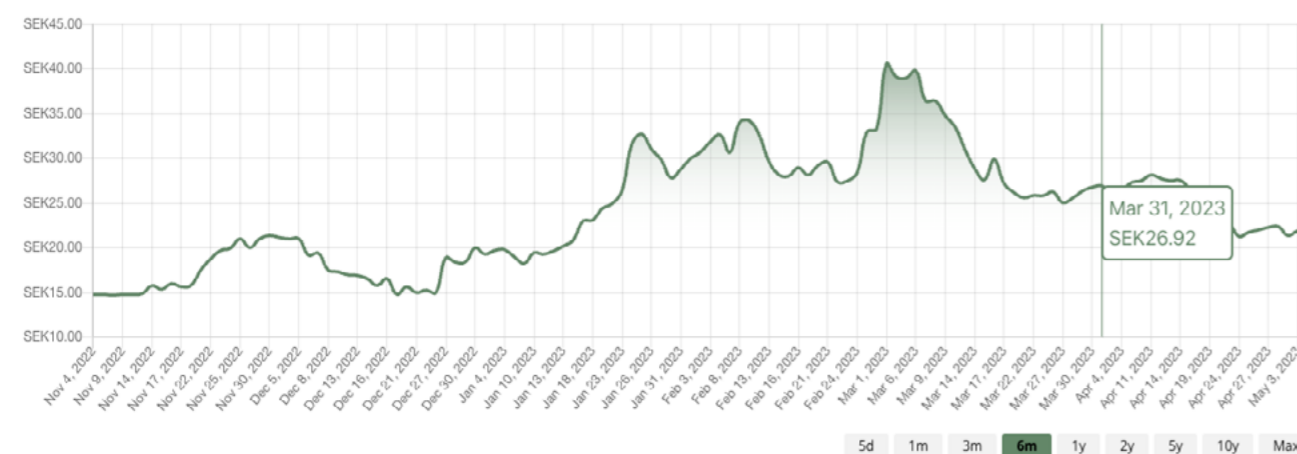
The parent company's net sales amounted to SEK 4,307 (4,676) thousand for the first quarter and operating expenses to amounted to SEK -4,757 (-5,197) thousand. EBITDA for the period amounted to SEK -17 (52) thousand. During the first quarter, the parent company invested SEK 0 (0) thousand in intangible fixed assets and SEK 0 (60) thousand in tangible fixed assets.



## Major shareholders for Crunchfish AB (publ) as of March 31st 2023

Shareholder	number of shares	% of shares
Femari Invest AB (CEO Joachim Samuelsson & Petra Samuelsson)	7,500,000	22.70
Corespring Invest AB (Chairman Göran Linder)	5,985,441	18.12
Paul Cronholm (Founder & CTO)	1,100,601	3.33
Carlquist Holding AB	1,000,000	3.03
Mikael Kretz incl. company holdings	720,000	2.18
Håkan Paulsson incl. family and company holdings	625,000	1.89
Lars Andreasson incl. family	440,000	1.33
Claes Capital Consulting AB	363,480	1.10
Granitor Invest AB	314,818	0.95
Mats Kullenberg	264,829	0.80
<b>Total, ten largest shareholders</b>	<b>18,315,169</b>	<b>55.43</b>
<b>Other shareholders (approx. 7,000)</b>	<b>14,723,998</b>	<b>44.57</b>
<b>Total</b>	<b>33,039,167</b>	<b>100.00%</b>

## Share price development during 6 months



## Financial calendar

Crunchfish AB publishes financial reports after each quarter. Upcoming reports are planned to be published according to the schedule below:

### Interim report Q1 2023

May 22, 2023, 8:30 am CET

### Annual General meeting (Malmö) 2023

May 22, 2023, 10:00 am CET

### Half-year report 2023

August 24, 2023, 8:30 am CET

### Interim report Q3 2023

November 15, 2023, 8:30 am CET

### Year-end report 2023

February 15, 2024, 8:30 am CET

## Accounting principles

This report has been drafted according to the Annual accounts act (Årsredovisningslagen) and BFNAR 2012:1 (K3).

## Auditor's review

This report has not been subject to review by the company's auditor.

## Company information

Crunchfish AB (publ), corporate registration number 556804-6493, is a limited company seated in Malmö, Sweden.

## Certified Adviser

Västra Hamnen Corporate Finance AB is the company's Certified Adviser.

E-mail: ca@vhcorp.se

Phone: +46 40 200 250

## Further information

For further information, please contact:

Joachim Samuelsson, CEO

ir@crunchfish.com

Crunchfish AB (publ)

Stora Varvsgatan 6A

211 19 Malmö

## Statement by the Board of Directors and the CEO

The Board of Directors and the CEO hereby assures that this interim report gives a fair overview of the company's operations, financial status, and result.

Malmö, May 22, 2023

The Board of Directors  
Göran Linder (chairman)  
Robert Ekström  
Susanne Hannestad  
Joachim Samuelsson  
Malte Zaunders

*This information is information that Crunchfish AB is obliged to publish in accordance to the EU Market Abuse Regulation. The information was provided by the contact person above for publication on May 22, 2023.*



## Group income statement (SEK)

	Q1 2023	Q1 2022	2022
<b>Operating income</b>			
Net sales	170 572	216 349	6 186 821
Own work capitalized	4 103 996	3 434 568	13 555 352
Other operating income	464 738	590 550	1 975 692
<b>Total operating income</b>	<b>4 739 306</b>	<b>4 241 467</b>	<b>21 717 865</b>
<b>Operating expenses</b>			
Other external expenses	-4 314 628	-4 209 908	-16 174 705
Personnel expenses	-6 154 205	-5 322 149	-21 734 875
Depreciation of tangible and intangible fixed asset	-1 039 491	-1 449 299	-6 138 787
Other operating expenses	-2 286	0	-1 856 868
Loss from participations in associated companies	-340	-32 089	-67 871
<b>Total operating expenses</b>	<b>-11 510 950</b>	<b>-11 013 445</b>	<b>-45 973 106</b>
<b>Operating profit</b>	<b>-6 771 644</b>	<b>-6 771 978</b>	<b>-24 255 241</b>
<b>Financial items</b>			
Profit/loss from participations in group companies	0	0	-9 330
Other interest income and similar profit items	2 149	43 614	254 527
Interest expense and similar loss items	-58 864	-4 473	-20 488
<b>Profit or loss from financial items</b>	<b>-56 715</b>	<b>39 141</b>	<b>224 709</b>
<b>Profit or loss after financial items</b>	<b>-6 828 359</b>	<b>-6 732 837</b>	<b>-24 030 532</b>
<b>Profit or loss before tax</b>	<b>-6 828 359</b>	<b>-6 732 837</b>	<b>-24 030 532</b>
<b>Taxes</b>			
Tax on income for the period	0	0	0
<b>Profit or loss for the period/year</b>	<b>-6 828 359</b>	<b>-6 732 837</b>	<b>-24 030 532</b>
<b>Key figures</b>			
EBITDA	-5 732 153	-5 322 679	-18 116 454
Earnings per share	-0,21	-0,22	-0,77
Number of shares, average	33 039 167	30 295 298	31 313 537
Number of shares at balance sheet date	33 039 167	30 925 298	33 039 167
Earnings per share after full dilution	-0,21	-0,21	-0,77
Number of shares after full dilution, average	34 672 967	32 338 098	32 527 045
Number of shares after full dilution, balance sheet date	34 672 967	32 338 098	34 615 467



## Group balance sheet (SEK)

	Mar 31, 2023	Mar 31, 2022	Dec 31, 2022
<b>Assets</b>			
<b>Fixed assets</b>			
<b>Intangible assets</b>			
Capitalized expenses for development work	36 626 753	29 363 801	33 508 932
<b>Total intangible fixed assets</b>	<b>36 626 753</b>	<b>29 363 801</b>	<b>33 508 932</b>
<b>Tangible fixed assets</b>			
Equipment	481 848	700 256	535 164
<b>Total tangible fixed assets</b>	<b>481 848</b>	<b>700 256</b>	<b>535 164</b>
<b>Financial assets</b>			
Participation in associated companies	68 313	104 435	68 653
<b>Total financial assets</b>	<b>68 313</b>	<b>104 435</b>	<b>68 653</b>
<b>Total fixed assets</b>	<b>37 176 914</b>	<b>30 168 492</b>	<b>34 112 749</b>
<b>Current assets</b>			
<b>Current receivables</b>			
Account receivables	544 594	580 505	1 547 884
Receivables from associated companies	0	15 688	0
Other receivables	612 352	960 982	449 987
Prepayments and accrued income	2 140 276	1 412 015	1 089 417
<b>Total current receivables</b>	<b>3 297 222</b>	<b>2 969 190</b>	<b>3 087 288</b>
<b>Cash and bank balances</b>			
Cash and bank balances	19 029 405	23 582 586	29 292 563
<b>Total cash and bank balances</b>	<b>19 029 405</b>	<b>23 582 586</b>	<b>29 292 563</b>
<b>Total current assets</b>	<b>22 326 627</b>	<b>26 551 776</b>	<b>32 379 851</b>
<b>Total assets</b>	<b>59 503 541</b>	<b>56 720 268</b>	<b>66 492 600</b>



## Group balance sheet cont. (SEK)

	Mar 31, 2023	Mar 31, 2022	Dec 31, 2022
<b>Equity and liabilities</b>			
<b>Equity</b>			
<b>Equity attributable to parent company shareholders</b>			
Share capital	1 519 802	1 422 564	1 519 802
Other contributed capital	276 131 340	249 140 087	276 001 326
Other capital including profit or loss for the year	-225 578 043	-201 451 989	-218 749 684
<b>Total equity</b>	<b>52 073 099</b>	<b>49 110 662</b>	<b>58 771 444</b>
<b>Current liabilities</b>			
Lease liabilities	358 668	502 405	383 485
Accounts payable	1 107 475	1 297 887	1 914 397
Other liabilities	780 608	1 083 679	777 788
Accrued expenses and accrued income	5 183 695	4 725 635	4 645 486
<b>Total current liabilities</b>	<b>7 430 446</b>	<b>7 609 606</b>	<b>7 721 156</b>
<b>Total equity and liabilities</b>	<b>59 503 545</b>	<b>56 720 268</b>	<b>66 492 600</b>
<b>Key Figures</b>			
Equity-assets-ratio	87,5%	86,6%	88,4%
Debt-to-equity ratio	0,7%	1,0%	0,7%
Interest-bearing net debt	n/a	n/a	n/a

## Changes in the group equity (SEK)

	Q1 2023	Q1 2022	2022
Equity at beginning of period/year	58 771 444	55 843 499	55 843 499
Share issues	0	0	26 077 445
Issue costs	0	0	-589 378
Warrant premiums	130 014	0	1 470 410
Profit or loss for the period/year	-6 828 359	-6 732 837	-24 030 532
<b>Equity at end of period /year</b>	<b>52 073 099</b>	<b>49 110 662</b>	<b>58 771 444</b>



## Group cash flow statement (SEK)

	Q1 2023	Q1 2022	2022
<b>Operating activities</b>			
Operating profit or loss	-6 771 644	-6 771 978	-24 255 241
Adjustments for non-cash intems	1 039 827	1 481 388	7 618 349
Interest received etc.	2 149	13 539	30 585
Interest paid	-23 689	-4 473	9 748
Income tax paid	0	0	0
<b>Cash flow from operating activities before changes in working capital</b>	<b>-5 753 357</b>	<b>-5 281 524</b>	<b>-16 596 559</b>
<b>Cash flow from changes in working capital</b>			
Decrease(+)/increase(-) in receivables	-209 934	312 333	194 235
Decrease(-)/increase(+) in current liabilities	-265 893	-680 851	-450 381
<b>Cash flow from operating activities</b>	<b>-6 229 184</b>	<b>-5 650 042</b>	<b>-16 852 705</b>
<b>Investing activities</b>			
Investments in technology development	-4 103 996	-3 434 568	-13 555 352
Investments in equipment	0	-60 202	-60 202
<b>Cash flow from investing activities</b>	<b>-4 103 996</b>	<b>-3 494 770</b>	<b>-13 615 554</b>
<b>Financing activities</b>			
Share issue	0	0	25 488 067
Amortization of financial leasing agreements	-24 817	-58 179	-177 099
Warrant premiums paid	130 014	0	1 470 410
<b>Cash flow from financing activities</b>	<b>105 197</b>	<b>-58 179</b>	<b>26 781 378</b>
Change in cash and cash equivalents	-10 227 983	-9 202 991	-3 686 881
Cash and cash equivalents at beginning of period/year	29 292 563	32 755 502	32 755 502
Exchange rate difference in cash and cash equivalents	-35 175	30 075	223 942
<b>Cash and cash equivalents at end of the year</b>	<b>19 029 405</b>	<b>23 582 586</b>	<b>29 292 563</b>



## Parent company income statement (SEK)

	Q1 2023	Q1 2022	2022
<b>Operating income</b>			
Net sales	4 307 418	4 675 871	17 915 726
Other operating income	429 353	567 395	1 948 733
<b>Total operating income</b>	<b>4 736 771</b>	<b>5 243 266</b>	<b>19 864 459</b>
<b>Operating expenses</b>			
Other external expenses	-2 137 217	-2 631 969	-10 147 595
Personnel expenses	-2 614 699	-2 558 935	-9 199 908
Depreciation of tangible and intangible fixed asset	-3 010	-6 472	-20 646
Other operating expenses	-2 286	0	-405 611
<b>Total operating expenses</b>	<b>-4 757 212</b>	<b>-5 197 376</b>	<b>-19 773 760</b>
<b>Operating profit</b>	<b>-20 441</b>	<b>45 890</b>	<b>90 699</b>
<b>Financial items</b>			
Profit/loss from participation in group companies	0	0	-28 700
Other interest income and similar profit items	22 882	56 211	541 405
Interest expense and similar loss items	-35 226	-1 808	-2 486
<b>Profit or loss from financial items</b>	<b>-12 344</b>	<b>54 403</b>	<b>510 219</b>
<b>Profit or loss after financial items</b>	<b>-32 785</b>	<b>100 293</b>	<b>600 918</b>
<b>Profit or loss before tax</b>	<b>-32 785</b>	<b>100 293</b>	<b>600 918</b>
<b>Taxes</b>			
Tax on income for the period	0	0	0
<b>Profit or loss for the period/year</b>	<b>-32 785</b>	<b>100 293</b>	<b>600 918</b>
<b>Key figures</b>			
EBITDA	-17 431	52 362	111 345
Earnings per share	0,00	0,00	0,02
Number of shares, average	33 039 167	30 295 298	31 313 537
Number of shares at balance sheet date	33 039 167	30 925 298	33 039 167
Earnings per share after full dilution	0,00	0,00	0,02
Number of shares after full dilution, average	34 672 967	32 338 098	32 527 045
Number of shares after full dilution, balance sheet date	34 672 967	32 338 098	34 615 467



## Parent company balance sheet (SEK)

	Dec 31, 2022	Dec 31, 2022	Dec 31, 2022
<b>Assets</b>			
<b>Fixed assets</b>			
<b>Tangible fixed assets</b>			
Equipment	48 129	65 313	51 139
<b>Total tangible fixed assets</b>	<b>48 129</b>	<b>65 313</b>	<b>51 139</b>
<b>Financial assets</b>			
Participations in group companies	123 057 790	91 973 208	123 057 790
Receivables from group companies	10 792 179	9 640 767	0
<b>Total financial assets</b>	<b>133 849 969</b>	<b>101 613 975</b>	<b>123,057,790</b>
<b>Total fixed assets</b>	<b>133 898 098</b>	<b>101 679 288</b>	<b>123 108 929</b>
<b>Current assets</b>			
<b>Current receivables</b>			
Account receivables	544 594	580 505	1 547 884
Other receivables	364 252	274 148	211 928
Prepayments and accrued income	1 312 300	1 262 017	1 089 417
<b>Total current receivables</b>	<b>2 221 146</b>	<b>2 116 670</b>	<b>2 849 229</b>
<b>Cash and bank balances</b>			
Cash and bank balances	18 241 899	22 908 437	28 509 210
<b>Total cash and bank balances</b>	<b>18 241 899</b>	<b>22 908 437</b>	<b>28 509 210</b>
<b>Total current assets</b>	<b>20 463 045</b>	<b>25 025 107</b>	<b>31 358 439</b>
<b>Total assets</b>	<b>154 361 143</b>	<b>126 704 395</b>	<b>154 467 368</b>



## Parent company balance sheet cont. (SEK)

	Mar 31, 2023	Mar 31, 2022	Dec 31, 2022
<b>Equity and liabilities</b>			
<b>Equity</b>			
<b>Restricted equity</b>			
Share capital	1 519 802	1 422 564	1 519 802
<b>Total restricted equity</b>	<b>1 519 802</b>	<b>1 422 564</b>	<b>1 519 802</b>
<b>Unrestricted equity</b>			
Profit brought forward	149 171 615	121 579 444	148 440 683
Profit or loss for the year	-32 785	100 293	600 918
<b>Total unrestricted equity</b>	<b>149 138 830</b>	<b>121 679 737</b>	<b>149 041 601</b>
<b>Total equity</b>	<b>150 658 632</b>	<b>123 102 301</b>	<b>150 561 403</b>
<b>Current liabilities</b>			
Accounts payable	466 727	469 296	978 120
Other liabilities	751 376	778 101	766 808
Accrued expenses and accrued income	2 484 408	2 354 697	2 161 037
<b>Total current liabilities</b>	<b>3 702 511</b>	<b>3 602 094</b>	<b>3 905 965</b>
<b>Total equity and liabilities</b>	<b>154 361 143</b>	<b>126 704 395</b>	<b>154 467 368</b>
<b>Key Figures</b>			
Equity-assets-ratio	97,6%	97,2%	97,5%
Debt-to-equity ratio	0,0%	0,0%	0,0%
Interest-bearing net debt	n/a	n/a	n/a

## Changes in parent company equity (SEK)

	Q1 2023	Q1 2022	2022
Equity at beginning of period/year	150 561 403	123 002 008	123 002 008
Share issues	0	0	26 077 445
Issue costs	0	0	-589 378
Warrant premiums	130 014	0	1 470 410
Profit or loss for the period/year	-32 785	100 293	600 918
<b>Equity at end of period /year</b>	<b>150 658 632</b>	<b>123 102 301</b>	<b>150 561 403</b>



## Parent company cash flow statement (SEK)

	Q1 2023	Q1 2022	2022
<b>Operating activities</b>			
Operating profit or loss	-20 441	45 890	90 699
Adjustments for non-cash items	3 010	6 472	20 646
Interest received etc.	22 882	30 647	461 235
Interest paid	-125	-1 808	-2 516
Income tax paid	0	0	0
<b>Cash flow from operating activities before changes in working capital</b>	<b>5 326</b>	<b>81 201</b>	<b>570 064</b>
<b>Cash flow from changes in working capital</b>			
Decrease(+)/increase(-) in receivables	628 083	220 556	-512 003
Decrease(-)/increase(+) in current liabilities	-203 454	-648 156	-60 949
<b>Cash flow from operating activities</b>	<b>429 955</b>	<b>-346 399</b>	<b>-2 888</b>
<b>Investing activities</b>			
Investments in equipment	0	-60 202	-60 202
Disposal of shares in subsidiaries	0	0	16 300
Repayment of shareholder contribution	0	370 000	370 000
Loans provided to group companies	-10 792 179	-9 640 767	-31 412 918
<b>Cash flow from investing activities</b>	<b>-10 792 179</b>	<b>-9 330 969</b>	<b>-31 086 820</b>
<b>Financing activities</b>			
Share issue	0	0	25 488 067
Warrant premiums paid	130 014	0	1 470 410
<b>Cash flow from financing activities</b>	<b>130 014</b>	<b>0</b>	<b>26 958 477</b>
Change in cash and cash equivalents	-10 232 210	-9 677 368	-4 131 231
Cash and cash equivalents at beginning of period/year	28 509 210	32 560 241	32 560 241
Exchange rate difference in cash and cash equivalents	-35 101	25 564	80 200
<b>Cash and cash equivalents at end of period/year</b>	<b>18 241 899</b>	<b>22 908 437</b>	<b>28 509 210</b>

