

# 451 MIS

## Market Insight Service

### Impact Report

## RFinity launches near-field-enabled mobile payment system

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Idaho Falls, Idaho-based startup **RFinity** is launching an offering that combines near-field transactions, mobile payment, and strong authentication and cryptography on mobile phones that it claims can be used for person-to-person and person-to-vendor transactions, as well as other utilitarian tasks, such as college campus payments, hotel payment and room-access, and event ticketing and sales. The mobile payment industry has been seeking for years to streamline the process of using one's mobile phone as payment mechanism. SMS (text) messaging is clunky and clumsy; there are no guarantees of performance or of message delivery. Mobile vendors have looked to RFID chips, such as those used in EZ-Pass or London's Oyster card, however, the definition of product offerings and prices must be predetermined, and assent is given merely by the swipe of the credential. Several vendors are looking to change that through the use of near-field payment chips that allow bi-directionality that supports peer-to-peer, ad hoc purchase and sale. Among them are authentication giant, **Gemalto** and mobile soft-token vendor **Diversinet**. The latest driver for this market is the recently announced **Nokia** 6216 smartphone, which is a SIM-based NFC device that can leverage carrier mobile payment services.

### The 451 Take

RFinity brings two key advantages to the table. It is using authentication and transaction technology that was created to meet the needs of top-secret work environments at the US Department of Energy's Idaho National Lab (RFinity has an exclusive worldwide license to exploit the relevant patents filed by INL), and its use of elliptic-curve crypto to sign and encrypt is simple, elegant and secure. It solves some vexing problems around large-scale and inexpensive provisioning by doing the authentication and confirmation on board a user-swappable microSD card that sits within a protected area of most any mobile phone (although not iPhone). Focusing on emerging markets, a significant window is available for RFinity to leverage before device vendors catch up.

### Context

RFinity was founded in 2008 by Aaron Turner and Steve McCown, both alumnus of **Idaho National Laboratory**. McCown ran INL's mobile-phone hacking efforts for five years, and prior to his work as a security researcher at INL, Turner spent seven years in many of **Microsoft's** security divisions. RFinity has taken down \$4m of a total commitment of more than \$10m (it's asked us not to reveal the total amount) in series A venture funding from a British Virgin Islands-based company with ties to Hong Kong-based **Horizons Ventures** (this differs from Horizon in San Francisco). Horizons is a Hong Kong-based firm that has made investments in telecommunications, media and tech firms, including **Skype**, **Facebook**, **UMPAY**, **NBA China**, **Joost** and others. RFinity has four full-time employees and several contractors working on R&D, UI and other technical work.

### Customers

The firm has no current paying customers. It is launching an unpaid pilot at a private university with more than 13,000 full-time students in which RFinity devices will be used by 100 students to conduct on-campus financial transactions (initial tests in fall 2009 begin with 100 students, which expands to 1,000 in January 2010). RFinity claims it is in discussions with a multinational financial institution and several telecom carriers to conduct pilot programs (it has asked us not to name them or the university). It targets

universities, travel and leisure firms, telecom carriers, and payment-card providers as customers.

### Products

RFinity provides an SD (secure digital)-card-based product, upon which resides a self-contained OS, crypto and transaction system that empowers SD-capable mobile devices to conduct near-field or network transactions, bi-directional authentication with the server and two-factor authentication for users and vendors.

A typical use case (one in which a standard RFID card might also be used), the one that its private university is trialing, involves a buyer and seller in proximity of one another. The student user enters the bookstore, makes product selections and approaches the cash desk. When totaled, the user's mobile phone would show the selected products, unit price and total. Based on settings by both buyer and seller, a password may be required. Once authenticated, the student selects the 'Purchase' button. Once buyer and seller devices (that is, point of sale terminal and buyer's mobile device) agree to the transaction, metadata about it from both buyer and seller are transmitted over a secure socket layer tunnel to the RFinity server, where the transaction metadata is compared and reconciled; account (bank, credit or student) funds are verified, and, upon authorization, RFinity's server sends both buyer and seller confirmation of the transaction.

Because of the near-field properties, the same system could support several other use cases, including ad hoc transactions between a buyer and a seller of nearly anything legal (see Technology, below); at hotels (on receipt of reservation and payment, the user's phone could act as a room key for near-field-capable locking devices, removing the need to visit the front desk on check-in); or event ticketing, a use case that sees the phone used as a ticket to be used with near-field turnstile devices – or even to sell tickets that cannot be used via the device's network (wired, mobile wireless or Wi-Fi). Because of the strong and bidirectional authentication, the phone could be used as entry credential for any number of applications – we suspect this may have been a goal of development in the controlled environment of a national laboratory.

### Technology

The basic process is the same for many use cases, so this describes the workflow for a near-field, ad hoc sale. Two users with RFinity-powered devices agree on a transaction, the details of which are verbally agreed upon. The seller enters these details to his phone – date, item, price, etc. After authenticating via a PIN, an RFinity application on the phone sends the details from the phone to the microSD card, which digitally signs the details using a one-time signing key derived from internal keying material. The seller's card then sends the details (through near field, the cellular network, or wireless or wired network). The buyer's mobile device receives this signed transaction description, which is read by the microSD card, which calls on the phone display to show the buyer the details. If the buyer agrees, he accepts (possibly signing with a PIN) and the buyer's phone sends the microSD card the buyer's consent to the transaction, which the microSD card digitally signs using a one-time signing key. The cosigned details of the transaction are encrypted (primarily to protect the authentication signatures and, secondarily, the transaction details).

At this stage, either the buyer or the seller can send the details of the transaction to the RFinity server (for example – if one phone is out of service range and the other isn't, or if the seller's terminal is actually a dongle terminal to a cash register wired to a network). When the encrypted packets comprising the transaction data reach the RFinity server, they are decrypted, and the server retrieves the verification keys for the users. If the signatures match, the server then gets payment confirmation from the buyer's account – be it link, automated clearing house, university account, etc. If the payment is confirmed to RFinity, its server signs and encrypts (with a one-time code) an authorization, which is sent back to the parties' devices, which push it into the chip, which decodes and presents to the users the confirmation of the transaction. No personally identifiable information from either party leaves the devices at any stage of the transaction process.

### Competition

As a startup, RFinity is up against some serious competition – even with its massive series A funding and top-notch contacts. Between mobile-payment vendors, near-field contactless payment vendors and authentication vendors, we count more than 100 firms touching on RFinity's target space. Restricting the competitive landscape to only those that do two or more of those things reduces the field to more than 30 relevant competitors. No list of competitors should ignore pure-play mobile payment vendors **Obopay**, **Fiserv**, **Mpower Labs** or **Sybase 365**. Gemalto has made serious moves here and in near-field payments, which we will explore in upcoming reports.

Starting where RFinity plays, at the intersection of the three spaces, competition comes from **mFoundry**, **Qualcomm's Firethorn**, and **Moversa**. Moversa is a joint venture between **NXP Semiconductors** and **Sony** that exists to develop a secure contactless smartcard on a chip; it recently announced its Universal Secure Access Module (U-SAM) at

Mobile World Congress as the world's first chip to power universal contactless applications in NFC mobile phones.

Companies that combine authentication and mobile payments include **PayPal** Mobile, **ClairMail**, **Monitise** and **Efici**. Those in near-field payment and mobile payments include **Mocapay**, **Barclaycard**, **tyfone**, **Vivotech**, Union Mobile Pay and **Smart Transaction Systems**.

### SWOT analysis

#### Strengths

With a commitment of more than \$10m; more than \$4m in the bank; powerful, well-connected investors; and a nuclear-armed partner to defend the core patent portfolio, RFinity enjoys advantages of which few startups can dream.

#### Weaknesses

Although it may be well-funded and -connected, RFinity is a startup. There is intense, brutal competition from immense public and private firms, and RFinity must create and grow, not just sustain, a market for enough devices to make transactions commonplace. The US may not be the right market for this.

#### Opportunities

To date, we've not seen anything approaching the simple, elegant user experience of an RFinity transaction. Should it be able to get this in front of execs at carriers, large hotel chains, universities and large events, it's more than halfway to a contract.

#### Threats

Heartland, Qualcomm, Obopay, PayPal, Gemalto and other 800-pound gorillas in the space are already hot on RFinity's heels. As we wrote this, Nokia signed Obopay for a \$70m mobile-payment deal. Large forces line up against RFinity.

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