

Token Reciprocity for Network Digital Wallets

Visa and Mastercard reached an agreement on December 12, 2016, to connect their respective digital wallets with each other's token service. Those services replace primary account

> see p. 5

Behavioral Biometrics from Leumi Card

Bank Leumi, the second largest credit card issuer in Israel, will offer its cardholders the opportunity to opt in to a new way to secure payments initiated by their iOS or Android phones. After

> see p. 8

Software "Chip" to Secure Mobile Payments

On Singles Day (11/11/16), the biggest shopping day of the year in China, 82% of all purchases on Alibaba.com, the China-based wholesale marketplace, were initiated by a mobile device. Those

> see p. 6

Largest Maestro Issuers Worldwide

The 100 largest issuers of Maestro brand debit cards based on purchases at merchants for calendar year 2015 are listed on page 9. The issuers represented 41 countries.

> see p. 9

Mobile Card Management System from Amdocs

Amdocs entered mobile payments in 2006 when it acquired direct carrier biller Qpass. With the 2014 acquisition of Utiba Mobility, Amdocs added a platform that supported mobile phone top-ups,

> see p. 8

Card Manufacturer Shipments — Part 3

Shipments by manufacturer of high-security and other payment cards were shown in issue #1092. Cards not shown there included SIM cards, prepaid and other phone cards, private label prepaid

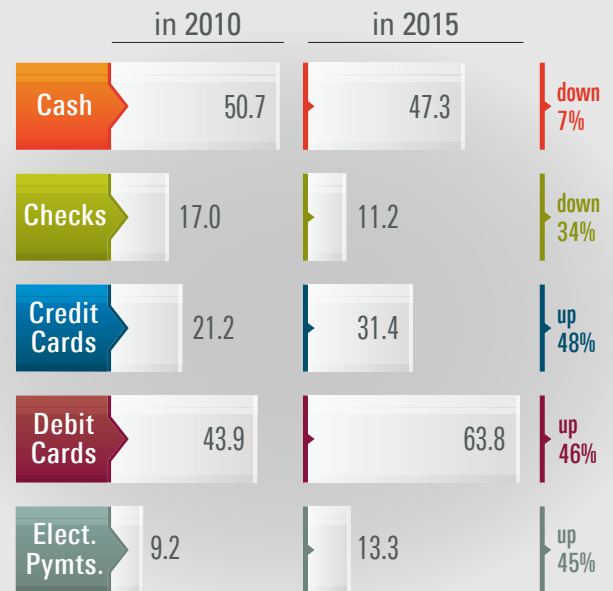
> see p. 7

Visa Debit Routing Rules

Most big-box retailers and supermarket chains would prefer that debit card transactions disintermediate the predominantly signature-based Visa and Mastercard networks for predominantly

> see p. 12

Purchase Transactions on U.S. Consumer Payment Systems (Bil.)



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U.S. Consumer Payment Systems

Personal consumption expenditures (PCE) totaled \$12.284 trillion in the United States in 2015. Purchases of goods and services accounted for 77.75% or \$9.550 trillion of personal consumption. The remaining 22.25% or \$2.734 trillion of PCE did not involve a purchase. However, the Bureau of Economic Analysis, part of the United States Department of Commerce, which calculates PCE, includes in its total monetary value transactions for which no payment was made. For example, it imputes a monetary value for meals furnished to employees and military personnel. Other examples of "nonpurchases" are shown on page 11 in the footnote below the chart titled "Personal Consumption Expenditures in the U.S."

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FAST FACTS

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GREEN DOT and **MASTERCARD** have agreed in U.S. District Court, Central District of California to pay \$6.4 million in compensation to prepaid Walmart Moneycard customers who were denied access to their funds earlier this year owing to service interruptions in the cardholder account processing system. Mastercard provides processing for more than 60 million prepaid Green Dot accounts.

PAYSIMPLE'S ecommerce platform for services provides mobile-friendly storefront, registration, and checkout specifically designed for one-time and billed services. Selling a service requires a different and often lengthier approach versus retail sales. PaySimple's system provides order management, customer reconciliation, real-time business insights, and reporting. *Eric Remer is CEO, (303) 242-8360, eric@paysimple.com, www.paysimple.com.*

VANTIV, the 2nd largest U.S. acquirer measured by purchase transactions processed, will offer its ecommerce merchants noncard payment methods from Europe and Asia, including direct debit, bank transfers, cash-based epayments, and ewallets, through a partnership with PPRO Group. Merchants will gain 100+ alternative payment methods through a single integration. *Simon Black is CEO at PPRO Group, 44 (203) 837-8680, simon.black@ppro.com, www.ppro.com. Sayid Shabeer is VP, Merchant Product at Vantiv, (978) 275-5219, sayid.shabeer@vantiv.com, www.vantiv.com.*

JACK HENRY & ASSOCIATES, which has offered P2P services since 2005 through its iPay Solutions, will resell Early Warning's Zelle P2P service to its nearly 3,000 financial institution clients. *Greg Adelson is General Manager, Payments Solutions Group at Jack Henry, (270) 706-9200, gadelson@jackhenry.com, www.jackhenry.com. Lou Anne Alexander is Group President, Payments at Early Warning, (480) 656-6880, louanne.alexander@earlywarning.com, www.earlywarning.com.*

CACHET FINANCIAL SOLUTIONS developed and deployed a prepaid mobile banking platform for CereTel, a telecom company with more than 6 million U.S. customers. The CereTel program includes the Select Mobile Money Prepaid MasterCard that is paired with a multilingual mobile app. The card is issued by Central Bank of Kansas City. *Larry Blaney is EVP of Sales at Cachet, (952) 698.6993, lblaney@cachetfinancial.com, www.cachetfinancial.com.*

MASTERCARD SEND is being used by Wells Fargo Treasury Management and Wells Fargo Merchant Services to speed payments to consumers and small businesses for insurance claims, rebates, emarketplace payouts, shared economy payouts (to sellers), social benefits, and tax refunds. *Matt Barr is SVP, Digital Payments & Labs at Mastercard, (914) 249-2328, matt_barr@mastercard.com, www.mastercard.com. Keith Theisen is EVP & Head of Product Management, Treasury Management Group at Wells Fargo, (612) 667-9958, keith.k.theisen@wellsfargo.com, www.wellsfargo.com.*

AFFIRM, which lets U.S. shoppers pay for online purchases over time with simple-interest loans, has added Kibo Commerce, BigCommerce, AspDotNetStorefront, and Zen Cart as ecommerce platforms that offer its loan service to their merchants. Those four join the Salesforce Commerce Cloud (formerly Demandware), Magento 1.x and 2.0, Shopify, and Shopify Plus. *Carl Gish is CMO at Affirm, (415) 987-0490, carl@affirm.com, www.affirm.com.*

ALLIANCE DATA'S ID Self-Scan software lets credit card applicants take a photo of their driver's license or state-issued I.D. when applying for a new account. ID Self-Scan prepopulates as much as 70% of the application form. Alliance Data owns a portfolio of more than \$10 billion in retail card outstandings. *Adam Koltnow is Senior Director of Strategy and Integration, (614) 729-4340, adam.koltnow@alliancedata.com, www.alliancedata.com.*

Conferences & Seminars

9th Healthcare Payments

Innovations 2017: January 30-31, 2017. The Phoenix Marriott Tempe at The Buttes, Tempe, Arizona. Estimated attendance: 120. Cost for the two-day conference ranges from \$695 to \$2,095 depending on market sector. **Subscribers to The Nilson Report will receive a \$300 discount. (Use code NILSON300.)**

Contact Kathleen Daffner at Strategic Solutions Network, (203) 209-0520, kathleen@strategicsolutionsnet.com. Register at www.hcpaymentsinnovations.com.

SEAA 2017: March 20-22, 2017. The Le Meridien, Charlotte, North Carolina. Estimated attendance: 750-800. Cost for the three-day conference is \$99 in advance, \$150 at the door. Contact John McCormick at General Credit Forms, (314) 216-8600, info@southeastacquirers.com. Register at www.southeastacquirers.com.

SCA 2017 Payments Summit: March 27-30, 2017. The Renaissance Orlando at Seaworld, Orlando, Florida. Estimated attendance: 900. Cost for the four-day conference is \$1,045 until 1/13/17, \$1,245 until 3/3/17, and \$1,495 after that. **Subscribers to The Nilson Report will receive a 20% discount. (Use code NILSDISC.)** Contact Bryan Ichikawa at Smart Card Alliance, (703) 582-7862, bichikawa@smartcardalliance.org. Register at www.scapayments.com.

THE UNITED STATES PATENT AND TRADEMARK OFFICE (USPTO)

has denied CPI Card Group's challenges to the validity of several claims of Gemalto's U.S. Patent No. 5,944,833. Gemalto patents describe fundamental measures used in EMV cards to prevent security breaches and card cloning. Gemalto asserted USPTO No. 5,944,832 and No. 6,786,418 against CPI Card in lawsuits filed in U.S. District Court for the District of Colorado. The court put the case on hold while the USPTO completed its analysis. That case can now resume. *Bertrand Knopf is SVP of Secure Transactions, North America at Gemalto, (512) 257-3806, bertrand.knopf@gemalto.com, www.gemalto.com.*

KOUNT CENTRAL is a comprehensive fraud protection suite for online payment processors, payment gateways, host payment pages, and ecommerce platforms. Four new protection features have been added to the company's legacy system including a continuous underwriting function, which monitors and reacts to a risk level change for each merchant and each transaction processed. *Don Bush is VP Marketing, (208) 489-3346, don.bush@kount.com, www.kount.com.*

CARDTEK is the first company to receive qSparc Contactless Level 2 Certification for RuPay, the national payment card system of India. The certification enables different types of terminals including tablets, parking devices, outdoor payment terminals, transit validation, and retail terminals. *Erdal Yazmaci is General Manager of Digital Payment and EMV Business Unit at Cardtek, (773) 510-0239, erdal.yazmaci@cardtek.com, www.cardtek.com.*

NET 1 UEPS TECHNOLOGIES has obtained two Electronic Money Institution licenses — one in the United Kingdom and one in Malta. The U.K. license was granted to Net1's Transact24 subsidiary. The Malta Financial Services Authority approved Net1's acquisition of C4U-Malta, a licensed electronic money institution. These licenses allow Net1 to issue payment cards, acquire card transactions, handle money transfers, and more. *Serge Belamant is CEO at Net1, 27 (11) 343-2000, sergeb@net1.com, www.net1.com.*

PROVUS GROUP, a subsidiary of Wirecard, was the first card processing service provider in Romania. Its Romcard ewallet product has been integrated in the new Carrefour Pay mobile app, which can be used in all Carrefour stores in Romania. Carrefour Pay, available for both Android and iOS, is QR code-based. *Utku Orgendil is Managing Director at Provus Group, 40 (21) 202-6900, utku.orgendil@wirecard.com, www.wirecard.com.*

SOCIETE GENERALE has signed a merchant acquiring partnership with American Express in eight countries in Sub-Saharan Africa. Those countries are Benin, Burkina Faso, Cameroon, Chad, Guinea, Ivory Coast, Madagascar, and Senegal. The agreement involves online and in-store payments. *Andrew Stewart is VP and GM, Bank Partnerships at American Express, 44 (127) 321-6389, andrew.b.stewart@aexp.com, www.americanexpress.com. Alexandre Maymat is Head of Africa Region at Societe Generale, 33 (1) 4214-2000, alexandre.maymat@socgen.com, www.societegenerale.com.*

NET ELEMENT, which operates a payment-as-a-service transaction and value-added services platform for small to midsized businesses, will use Conformance Technologies as its preferred provider for data compliance. Conformance's PCI, Cyber Attack Readiness, and InConRadar toolsets are available in Chinese, English, Russian, and Spanish. *Oleg Firer is CEO at Net Element, (786) 923-0523, ofirer@netelement.com, www.netelement.com. Darrel Anderson is President at Conformance Technologies, (775) 336-5533 ext. 155, danderson@conformancetech.com, www.conformancetech.com.*

Featured Conference

PAYEXPO AMERICAS 2017

Two-Day Conference
March 7-8, 2017
The Hotel Marquis Reforma
Mexico City, Mexico

Topics include: trends in Latin America, digital government for financial disbursement, payments for empowerment, market spotlight on Peru, payments security: trust and transparency in payments, understanding different cashless models, introduction to cryptocurrency, eliminating cash for B2B and B2P payments, what is the outlook for Latin America in the next 12 months?, international examples of building large ecosystems. Speakers represent: BBVA, America Móvil, Interbank, Cámara de Compensación Electrónica, Tienda Pago, Digicel Group, Bitcoin LatAm Foundation, Grupo Financiero Banorte, Startupbootcamp Fintech LATAM, Comisión Nacional Bancaria y de Valores, CTS EMBARQ, Accenture, and more. Cost for the two-day conference is \$1,299. Register before January 6 and save \$800. (Save a further 20% using promo code TNR20.) *Contact Andrew Earle at Clarion Events, 44 (207) 384-7893, andrew.earle@clarionevents.com. Register at www.payexpo.com/americas.*

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20%

Management Changes

Mike Norton has been appointed Managing Director, Malta at **Payscout**, 44 (203) 874-5384, mike@payscout.com. **Matt Lanford**, formerly at Mastercard, has been appointed Senior Vice President and General Manager, Financial Services at **InComm**, (678) 265-9266, mlanford@incomm.com. **Marcy Grimm** has been appointed Vice President of Partner Relations at **National Merchants Association**, (951) 401-7531, mgrimm@nationalmerchants.com. **Jeff Dumbrell**, formerly at Verifone, has been appointed General Manager, North America at **AEVI**, (404) 428-7848, jeff.dumbrell@aevi.com. **Chris Shimek** has been appointed Vice President of Global Operations at **Travel Tags**, (651) 554-8517, cjshimek@traveltags.com. **Daniel Mitchell** has been appointed Vice President Sales and Business Development at **iATS Payments**, (778) 945-0047, daniel.mitchell@iatspayments.com. **Travis Schipper** has been appointed Senior Vice President of Finance at **TMG**, (515) 457-2000, travis.schipper@tmg.global.

MAURITIUS COMMERCIAL BANK has added PayPal-enabled services to its Juice mobile payment and banking platform. Juice offers a network of merchants, funds transfer services, cardless ATM withdrawals, mobile banking, and exclusive offers. *Alain Law Min is Deputy Chief Executive, Head of Retail at Cards SBU, (230) 202-5198, alain.lawmin@mcb.mu, www.mcb.mu.*

SMART PACKAGING SOLUTIONS (SPS) has received Mastercard Card Quality Management certification for its contact modules, dual-interface modules, contactless modules, dual-interface inlays, and contactless inlays. *Olivier Brunet is Product & Marketing Director at SPS, 33 (4) 4253-8444, olivier.brunet@s-p-s.com, www.s-p-s.com.*

CARDTEK'S Mobile Services Manager payment platform has been integrated into DC Payments' card management system to function as a gateway connecting issuers, DC Payments, and multiple tokenization service providers in Canada. *Adel Elassal is Mng. Dir. Americas at DC Payments, (490) 461-2626, aelassal@directcash.net, www.directcash.net. Murat Goksenin Guzel is CCO at Cardtek, (949) 556-8909, murat.guzel@cardtek.com, www.cardtek.com.*

FIME'S Japanese laboratory has achieved accreditations for functional testing on contactless payment terminal kernels for American Express's Expresspay and EMV C-4. *Arnaud Peninon is VP Global Laboratories at Fime, 886 (2) 6636-0430, arnaud.peninon@fime.com, www.fime.com.*

Investments & Acquisitions — November 2016

Below is a list of 41 mergers, acquisitions, and corporate financing deals that occurred in 19 countries in November 2016. In the first 11 months of 2016 we identified 500

transactions in 54 countries. Charts published for prior months appear in issues 1098, 1096, 1094, 1092, 1090, 1088, 1086, 1084, 1082, and 1080.

Investments & Acquisitions November 2016

Company	Buyer/Investor	Amount (mil.)	Country	Company	Buyer/Investor	Amount (mil.)	Country
CREDIT CARD				VersaPay Merchant Serv.	BluePay Canada ⁶	\$7.6	Canada
Coles	Citi ¹	\$660.0	Australia	MICROLENDING			
CREDIT INFORMATION				Ascend Money	Ant Financial ¹⁵	*	Thailand
Ximu Credit	Series A ²	\$15.0	China	AYE Finance	Series B ¹⁶	\$10.0	India
DATA ANALYTICS				MOBILE PAYMENTS			
Now Interact	undisclosed ³	\$ 1.6	Sweden	Mobile Credit Payment	undisclosed round ¹⁷	\$5.0	Singapore
DEBT MANAGEMENT				VNPT Epay	UTC ⁶	\$33.8	Vietnam
AvidXchange	undisclosed round ⁴	\$18.0	U.S.	MONEY TRANSFER			
Intrum Justitia	Lindorff ⁵	*	Sweden	Toast	pre-Series A ¹⁸	\$1.5	Singapore
ECOMMERCE				P2P PAYMENTS			
Dalberry	IBID Group ⁶	*	U.K.	CashCodes	seed funding ¹⁹	\$0.3	Ireland
HARDWARE				Cookies	Klarna ⁶	*	Germany
Buerkle	Otto Kuennecke ⁷	*	Germany	PERSONAL FINANCE			
Smartrac	Linxens ⁸	*	Netherlands	Albert	seed funding ²⁰	\$2.5	U.S.
LENDING				CompareCards	LendingTree ⁶	\$130.0	U.S.
SmartFunding	seed funding ⁹	\$0.5	Singapore	PROCESSING			
LOYALTY				DST Billing Solutions	Hansen Technologies ⁶	*	U.K.
Bonusway	debt financing	\$3.4	Finland	Klever Logic	undisclosed round ²¹	\$3.0	U.S.
Bonusway	undisclosed round ¹⁰	\$3.9	Finland	PayCar	seed funding ²²	\$1.4	France
CheckBonus	undisclosed round ¹¹	\$2.1	Italy	Wynd	Series B ²³	\$31.5	France
Expert Personal Shopper	IBM ⁶	*	U.S.	SECURITY			
Groupon Malaysia	KFit ⁶	*	Malaysia	Lifelock	Symantec ⁶	\$2,300.0	U.S.
MERCHANT ACQUIRING				Veridu	Global Risk Technologies ¹⁹	*	U.K.
C4U-Malta	Net1 International ⁶	\$3.9	Malta	SOCIAL PAYMENTS			
CFG Merchant Solutions	line of credit ¹²	\$4.0	U.S.	Bluebridge (church app)	Pushpay ⁶	\$3.1	U.S.
Excel Corporation	loan facility ¹³	\$25.0	U.S.	PayKey	Series A ²⁴	\$6.0	Israel
Moneris Solutions	Vantiv ⁶	\$425.0	U.S.	SOFTWARE			
Safeguard Bankcard	Finical ⁶	*	U.S.	figo	Series B ²⁵	\$7.1	Germany
Stripe	undisclosed round ¹⁴	\$150.0	U.S.	Problem Solved	Matica Technologies ²⁶	*	U.S.
Sync Payments	Focus ⁵	*	U.S.				

* Terms not disclosed. ¹Purchased credit card portfolio. ²Including Kinzon Capital. ³From SEB. ⁴Led by Fifth Third Capital. ⁵Merger. ⁶Acquisition. ⁷Purchased card manufacturing assets. ⁸Purchased the Secure ID and Transaction division. ⁹Led by FinTech Asia. ¹⁰Led by Buran Venture Capital. ¹¹Led by Mediaset. ¹²From i2B Capital. ¹³From Great American Capital. ¹⁴Co-led by CapitalG and General Catalyst.

¹⁵Purchased 20% equity stake. ¹⁶Led by LGT Impact Ventures. ¹⁷Led by 2W Group. ¹⁸Led by Aetius Capital. ¹⁹Investors not disclosed. ²⁰Led by 500 Startups. ²¹From Austin Ventures. ²²Led by BNP Paribas Private Equity. ²³Including Sodexo Ventures and Orange Digital Ventures. ²⁴Led by e.ventures. ²⁵Including DB1 Ventures. ²⁶Purchased majority interest.

Amex Pay Launches in Canada and the U.K.

This month American Express started promoting mobile payments to consumer, small business, and corporate cardholders in Canada and the U.K. who use Android devices (KitKat 4.4 or higher). Amex calls its payment application, which is available in the American Express Mobile App, Amex Pay. The Android operating system uses host card emulation software to support NFC contactless payments at the point of sale.

Cardholders can enroll in Amex Pay with a few taps. When they do, the American Express Token Service delivers a token to their phone. When purchases are made at merchants using contactless card readers, the token is delivered

No numbers are stored on the cardholder's phone.

from the phone. No primary account numbers are stored on the cardholder's phone. Amex Pay transactions can be initiated by a fingerprint, by a pattern code, or by keying in a password.

Other features of the American Express Mobile App include the ability to review card purchases,

available line of credit, and account statements. Cardholders can review their Membership Rewards points too. They can also redeem points for their most recent purchase as soon as that purchase appears on the statement in their mobile app.

Both Canada and the U.K. have large merchant acceptance networks for contactless payments. Issuers in both countries, including those with Visa and Mastercard portfolios, automatically send dual contact/contactless chip cards to their customers.

Amex cardholders in Canada have had access to Apple Pay since November 2015. American Express was the first issuer in the country to offer Apple Pay. Android Pay, which is promoted by Google, is not yet available in Canada. Neither is Samsung Pay.

Apple Pay has been in the U.K. since July 2015. American Express was the first issuer. Android Pay launched in the U.K. in September 2016. Samsung Pay is not yet available in the country.

Kenoy Kadakia is Director, Product & Capability Development at American Express Canada in Toronto, (416) 893-4699, kenoy.kadakia@aexp.com, www.americanexpress.com/canada/.



Token Reciprocity for Network Digital Wallets

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mastercard

numbers with representations — tokens — that if stolen cannot be used to obtain authorization for a purchase. The reciprocity agreement allows Mastercard to request tokens for

Visa cards from the Visa Token Service and Visa to request tokens for Mastercard cards from the Mastercard Digital Enablement Service. The requested tokens will be provisioned to the Visa Checkout digital wallet

or Mastercard's Masterpass digital wallet.

Both companies offer digital checkout services including wallets for online and mobile (including in-app) payments to financial institutions worldwide. Masterpass goes further to support in-store purchases. Many of those financial institutions issue cards on both networks, which is the underlying reason for the reciprocity agreement.

No country is more in need than the United States, where consumers who have at least one Visa or Mastercard card average nearly five general

purpose cards including those that operate on the American Express and Discover networks. If cardholders have a digital wallet, they want all of their cards inside it regardless of brand.

Mastercard and Visa product teams will examine specifications of the other's APIs and write the code that will execute the token request and delivery.

Visa/Mastercard will connect their wallets with each other's tokens.

Both companies went through that process previously with

Token Reciprocity for Network Digital Wallets

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Apple, Samsung, and Google for their device-based mobile wallets.

Token reciprocity between Visa and Mastercard could be completed in the first half of 2017. To maximize value to consumers, future reciprocity deals will need to be completed with American Express, Discover, Diners Club, UnionPay, JCB, and domestic-only card brands.

In addition to what Mastercard and Visa need to do, merchant acquirers and gateway providers must make their systems flexible enough to accommodate tokens, which are dynamic compared to the static data of a primary account number included in legacy authorization requests. Acquirers and gateways already handling 3D Secure transactions, which

involve one-time passwords, will require fewer changes to their systems.

Visa and Mastercard have the same goal for their digital wallet services — reduced fraud and higher rates of completion for card-not-present purchases. That combination will serve to expand merchant acceptance for their wallets, which now number over 300,000 worldwide.

James Anderson is Executive VP, Digital Payment Products at Mastercard in New York, (917) 408-2862, james.anderson@mastercard.com, www.mastercard.com.

Vish Shastri is VP, Digital Products at Visa in San Francisco, California, (415) 805-4687, vishastr@visa.com, www.visa.com.

Software “Chip” to Secure Mobile Payments

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mobile payments amounted to almost \$18 billion. Alipay, a business unit of Ant Financial

Services Group, is the payment processor for online and mobile payments for all Alibaba Group marketplaces.

The 30 million users of Alipay mobile wallets who reside outside of China, and who make payments on AliExpress, one of Alibaba Group’s retail marketplaces, use software from V-Key to secure transactions.

AliExpress offers consumers the opportunity to buy goods directly from manufacturers and distributors in China. Buyers can be anywhere in the world.

Patented V-OS software from V-Key encrypts account and personal data in Alipay wallets. V-Key says it offers the industry’s

first “virtual smart card chip.” V-OS complies with Security Requirements for Cryptographic Modules, standards originally established for hardware-based security by The National Institute of Standards and Technology in the U.S. V-Key’s technology has been certified by FIPS 140-2 (U.S.) and the Info-Communications Development Authority in Singapore.

Trusted execution environments

are a secure area in a chip. V-OS creates a secure, isolated area in a mobile app where sensitive data can be stored and processed by trusted applications built within it. A V-OS-secured app binds itself to a device. However, it functions independently from the device’s operating system.

V-OS works on both iOS and Android devices. It is delivered to V-Key clients as a software development kit, and is then embedded in their apps.

Firmware can be updated over the air, in most cases without requiring the entire application to be updated.

In addition to cloud-based payments, V-OS also supports trusted digital identification and authentication for mobile banking apps and public key-based transactions as well as mobile applications from governments.

...creates an isolated area in an app where sensitive data can be stored.

V-Key clients include financial institutions DBS and UOB in Singapore and the government of Singapore.

Ant Financial was an investor in a \$12-million Series B funding round V-Key completed in 2014. The company has received a total of \$16 million in two rounds.

Benjamin Mah is CEO at V-Key in Singapore, (65) 6471-2524, benjamin.mah@v-key.com, www.v-key.com.

Card Manufacturer Shipments — Part 3

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cards, and transportation/ticketing cards. Shipments by manufacturer in 2015 of those cards are shown here along with nonpayment cards for healthcare, identification, access control, membership/loyalty, gaming, ecommerce/digital certificates, and promotions, as well as for driver's licenses.

Gemalto continued to be the largest manufacturer of SIM cards for mobile phones. XH Smartcard had the largest increase in units shipped, up 150.0 million, followed by Beautiful Card (up 115.2 million).

Workz had the largest number of prepaid phone cards shipped, and FutureCard continued as the top manufacturer of other phone cards. TravelTags and Abnote produced the most private label prepaid cards. China Card Group (Shanghai China Card Smart Card Co.) shipped the most transportation/ticketing cards, followed by Gemalto. The nonpayment card category was led by CPI Card Group and Exceet Card Group.

Telephone, Transportation, Prepaid & Nonpayment Card Shipments 2015

SIM Telephone Cards			Other Phone Cards			Private Label Prepaid Cards			Nonpayment Cards		
Rank	Manufacturer	Mil.	Rank	Manufacturer	Mil.	Rank	Manufacturer	Mil.	Rank	Manufacturer	Mil.
1	Gemalto	1,577.0	1	FutureCard	480.0	1	Travel Tags	495.6	1	CPI Card Group ¹	222.5
2	Safran	604.5	2	MCT Cards & Tech.	226.3	2	Abnote	342.1	2	Exceet Card Group	195.0
3	OT	534.0	3	Safran	92.0	3	Plastek Cards	150.0	3	Valid	157.3
4	G&D	515.0	4	Plastek Cards	25.0	4	Thames Card Tech.	104.4	4	Gemalto	123.9
5	Watchdata	494.3	5	Thames Card Tech.	5.9	5	CPI Card Group ¹	93.3	5	OT	101.0
6	Beautiful Card	383.8	6	Swiss Post Solutions	0.2	6	Exceet Card Group	60.0	6	OT	101.0
7	XH Smartcard	180.0	7	CPI Card Group ¹	0.1	7	Valerian Tech.	41.1	7	HID Global	96.0
8	Asia Credit Card	156.0	8	Swiss Post Solutions	35.0	8	Swiss Post Solutions	35.0	8	Swiss Post Solutions	88.3
9	Valid	123.1	9	Placard	34.3	9	Placard	34.3	9	Able Card	65.0
10	Jing King Tech	105.5	10	Beautiful Card	14.7	10	Beautiful Card	14.7	10	Safran	58.2
11	DZ Card	80.0	11	IntelCav	8.0	11	IntelCav	8.0	11	PGP Group	55.3
12	Inkript	58.5	12	FutureCard	7.5	12	FutureCard	7.5	12	Jing King Tech	50.5
13	Workz	37.9	13	Perfect Plastic	1.8	13	Perfect Plastic	1.8	13	G&D	46.4
14	NovaCard	31.4	14	Toppan Printing	1.8	14	Toppan Printing	1.8	14		
15	MK Smart	16.5	15	FoongTone	1.5	15	FoongTone	1.5	15		
16	FutureCard	12.0	16	Hogier Gartner	0.8	16	Hogier Gartner	0.8	16		
17	ImCARD	6.1	17	XH Smartcard	0.5	17	XH Smartcard	0.5	17		
18	Toshiba	3.6	18	Thomas Greg & Sons	0.3	18	Thomas Greg & Sons	0.3	18		
19	Exceet Card Group	3.0	19	Alioth	<0.1	19	Alioth	<0.1	19		
20	Takcere	<0.1	20	Toppan Forms	<0.1	20	Toppan Forms	<0.1	20		
Prepaid Phone Cards			Transportation/Ticketing								
Rank	Manufacturer	Mil.	Rank	Manufacturer	Mil.						
1	Workz	976.0	1	China Card Group	54.4						
2	DZ Card	250.0	2	Gemalto	48.6						
3	Hogier Gartner	230.0	3	ASK	45.0						
4	Inkript	184.0	4	G&D	33.5						
5	OT	139.0									
6	AbaciCard	120.0									
7	NovaCard	92.3									
8	Valid	52.3									
9	G&D	18.0									
10	Beautiful Card	9.9									
11	Toppan Forms	6.8									
12	Plastkart	6.0									
13	M-Tech Innovations	5.0									
14	FutureCard	4.0									
15	Asia Credit Card	2.0									

¹Some figures are estimates.

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Mobile Card Management System from Amdocs

from page 1...

money transfers, bill payments, and more. Over the last two years, Amdocs has invested in expanding Utiba's technology, which is

manages card specifications, card product definitions, and issuer identification number (IIN) ranges for both physical and virtual cards. Card numbers issued by the system are validated each time a payment request is processed.

Amdocs MFS is effectively a light core banking system. It can manage all funds paid to finance prepaid accounts, support

closed-loop payment technology including Indosat in Indonesia (Dompektu), True Thailand, and Strex Norway. State Bank of India and telecom company BNL will use Amdocs MFS for their soon-to-be-launched USSD-based mobile wallet.

Amdocs has annual revenues in excess of \$3.60 billion. Clients are mostly in the telecom, broadband cable, and satellite industries. They use the company's revenue management, customer management, operations systems support, network control, and other products and services.

Amdocs operates using a per-transaction revenue model. If it takes three years before a client starts seeing a return on their investment, Amdocs can wait with them, which makes it a strong competitor to mobile payment platform providers with smaller balance sheets.

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amdocs

limited to support of closed-loop payment systems, to support for global brand and domestic-only general purpose debit and prepaid cards.

The cloud-based card management system

from Amdocs Mobile Financial Services (MFS), lets mobile wallet providers in telecom and other industries, including retail and financial services, expand their business by offering a payment card product to the more than two billion people in emerging markets who do not have the ability to pay for purchases with any instrument other than cash.

MFS can quickly integrate with card service bureaus for printing and personalization. An interface

...lets mobile wallet providers offer payment cards in emerging markets.

mobile wallets, and facilitate loyalty point (card and phone) updates. Fraud fighting and other services available from third-party providers can be features of MFS.

Mynt, one of Globe Telecom's subsidiaries in the Philippines, will use Amdocs Mobile Financial Services for its new Casa service. Casa will enable Mynt to offer retailers a white-label digital money platform. MFS is being offered to other Amdoc customers that use its

Behavioral Biometrics from Leumi Card

from page 1...

nearly a year of testing, Leumi says behavioral biometrics technology from Israeli startup SecuredTouch, which will be embedded in the Leumi Card mobile app, is overwhelming likely to determine if transactions are being initiated by a valid cardholder. When Leumi card transactions occur, SecuredTouch sends the issuer a risk score from 0 to 1000. Leumi can set thresholds for automatic approval, rejection, or further review. SecuredTouch never sees the exact name or any other personal details of the cardholder.

Identification is based on unique attributes of the cardholder gathered when they interact with their own phone including the size of their finger,



the pressure of its touch, and the number of used touchscreen pixels it triggers. The SecuredTouch algorithm in the Leumi card app profiles cardholders' initial sessions. Once enough data is captured, these behavioral biometrics can be verified in real time and used to determine whether the card owner is the one operating the app or if a single criminal or automated bot is attempting fraud. SecuredTouch's identity verification continuously monitors every in-app activity, in addition to the initial login stage.

> see p. 12

Largest Maestro Issuers Worldwide 2015

Rank	Issuer, Country	Purchase Volume (mil.)	Cards (000)	Rank	Issuer, Country	Purchase Volume (mil.)	Cards (000)
1	BBVA Provincial Venezuela	\$72,700.2	3,562	51	KEB Hana Card South Korea	\$1,044.6	1,975
2	Banesco Venezuela	\$64,040.1	4,013	52	Migros Bank Switzerland	\$1,015.0	175
3	ING Netherlands, Belgium, France ¹	\$41,288.8	12,970	53	Santander Bank Germany	\$999.2	369
4	Commonwealth Bank Australia	\$28,840.1	4,800	54	RBC Royal Bank Trinidad & Tobago ²	\$966.3	554
5	ABN Amro Netherlands	\$24,335.7	6,628	55	Ahli United Kuwait	\$861.4	134
6	Itau Unibanco Brazil	\$18,884.0	31,194	56	DZ Bank Germany	\$848.5	8,000
7	BancoPosta Italy	\$17,709.4	7,785	57	Banco Sofitasa Venezuela	\$773.6	310
8	Mercantile Banco Venezuela	\$17,015.9	3,867	58	PBZ Croatia	\$700.3	611
9	Sberbank Russia	\$13,127.7	42,105	59	National Bank Greece	\$675.2	1,996
10	Caixa Economica Federal Brazil	\$12,523.4	44,307	60	Borgun Iceland	\$669.1	140
11	Banco de Venezuela Venezuela	\$10,570.4	5,032	61	Santander Totta Portugal	\$646.7	242
12	Clydesdale Bank United Kingdom	\$8,522.2	1,846	62	Euro6000 Spain	\$646.6	314
13	UBS Switzerland	\$8,480.5	1,307	63	Maduro & Curiel's Curacao, Aruba ³	\$619.5	482
14	Bancaribe Venezuela	\$8,415.6	770	64	Raiffeisen Bank Romania	\$568.8	746
15	National Commercial Saudi Arabia	\$7,177.8	3,052	65	Belfius Bank Belgium	\$566.2	3,228
16	Raiffeisen Switzerland	\$6,516.3	1,237	66	Cartao BRB Brazil	\$557.2	1,084
17	Credit Agricole France	\$6,245.9	2,184	67	T. Is Bank Turkey	\$550.2	3,308
18	Banco Santander Brazil	\$6,219.9	20,005	68	Banco Itau Chile	\$547.6	191
19	Banco Occidental Venezuela	\$6,083.5	612	69	The Saudi Investment Bank Saudi Arabia	\$544.0	167
20	KB Kookmin Card South Korea	\$6,033.4	6,918	70	BW-Bank Germany	\$543.5	355
21	Deutsche Bank Germany	\$5,663.7	3,893	71	VakifBank Turkey	\$534.2	5,977
22	Bancolombia Colombia	\$4,541.3	7,234	72	Slovenska Sporitelna Slovakia	\$514.4	285
23	Intesa Sanpaolo Italy	\$4,323.6	6,560	73	Standard Bank South Africa	\$504.5	1,211
24	Credit Suisse Switzerland	\$3,855.8	676	74	Akbank Turkey	\$465.5	3,173
25	NongHyup Bank South Korea	\$3,600.0	7,535	75	BNL Gruppo BNP Paribas Italy	\$419.8	1,668
26	Shinhan Card South Korea	\$3,470.4	4,628	76	Mauritius Commercial Mauritius	\$415.0	647
27	ANZ Bank New Zealand	\$3,277.6	549	77	BRD Romania	\$392.9	1,257
28	Banco Santander Chile	\$3,199.4	3,242	78	Erste & Steiermarkische Croatia	\$368.0	557
29	Commerzbank Germany	\$2,985.6	2,126	79	Banco Comercial AV Villas Colombia	\$344.5	1,394
30	Banco Nacional de Credito Venezuela	\$2,854.2	983	80	BPH Poland	\$343.1	265
31	Riyad Bank Saudi Arabia	\$2,837.7	1,812	81	Nordea Europe	\$329.5	81
32	Bank Pekao Poland	\$2,364.3	1,518	82	Nedbank South Africa	\$320.1	880
33	Absa Bank South Africa	\$1,964.7	4,777	83	PKO Bank Poland	\$291.8	193
34	Caixa Geral de Depositos Portugal	\$1,849.6	1,439	84	KBC Bank Belgium	\$286.2	2,201
35	Erste Bank Austria	\$1,826.1	584	85	Swedbank Lithuania	\$261.6	550
36	Credit Mutuel France	\$1,825.3	285	86	BCR Romania	\$260.3	745
37	BancoEstado Chile	\$1,720.7	1,796	87	Erste Bank Hungary	\$243.6	274
38	BFC Banco Fondo Comun Venezuela	\$1,689.5	1,273	88	Banco Corpbanca Colombia	\$237.5	465
39	Swedbank Estonia	\$1,509.7	564	89	BIB Serbia	\$224.4	675
40	Banco Davivienda Colombia	\$1,370.7	3,102	90	Abanka Vipva Slovenia	\$222.5	152
41	Swedbank Sweden	\$1,366.5	393	91	Moneta Czech Republic	\$213.4	273
42	OTP Bank Hungary	\$1,362.0	2,123	92	Banco Security Chile	\$210.0	79
43	Ziraat Bankasi Turkey	\$1,355.5	10,560	93	Yapi Kredi Bankasi Turkey	\$194.3	1,238
44	Banco Caroni Venezuela	\$1,216.3	279	94	Barclaycard Germany	\$181.6	469
45	Banco Bicentenario Venezuela	\$1,215.2	511	95	CBC Banque Belgium	\$173.3	213
46	Frankfurter Sparkasse Germany	\$1,153.7	668	96	SKB Banka Slovenia	\$162.0	143
47	Banco de la Nacion Argentina	\$1,122.9	4,043	97	TEB Turkey	\$158.9	920
48	SABB Saudi Arabia	\$1,103.3	229	98	Alior Bank Poland	\$154.3	116
49	Rabobank Netherlands	\$1,099.3	7,519	99	BMN Spain	\$150.6	133
50	BNP Paribas Fortis Belgium	\$1,074.0	3,702	100	Banco Colpatria Colombia	\$138.2	373

¹Also Germany, Italy, Luxembourg, Poland, Romania, Spain, Turkey. ²And Eastern Caribbean. ³And St. Maarten, Bonaire.

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U.S. Consumer Payment Systems

from page 1

Another caveat about personal consumption expenditures in the U.S. is that an unknown amount of commercial spending is included. This occurs because there is no definitive way airlines, restaurants, hotels, and other businesses can separate consumer from commercial spending when they report those figures to the U.S. Department of Commerce.

The Nilson Report created its model for measuring U.S. consumer payment systems to focus exclusively on the purchases component of PCE. The model measures the 11 methods of payment that generated the \$9.550 trillion purchases component of PCE. In 2015 that figure was up 3.4% over 2014. The model, which is shown below, also includes commercial spending, particularly \$1.066 trillion tied to Visa, Mastercard, American Express, and Discover commercial card products. The paper-based payment methods are cash, checks, money orders, travelers cheques, and official checks. In 2015, these products generated \$2.496 trillion or 26.14% of all consumer payment systems volume. Paper-based volume market share fell from 28.20% in 2014, and

is expected to continue to fall every year. By 2020, its market share is projected to be 16.85%.

The four card-based methods of payment are credit, debit, prepaid, and electronic benefits transfer. In 2015, these products generated \$5.665 trillion or 59.32% of all consumer payment systems volume.

The purchases component of PCE amounted to \$9.550 tril. in 2015.

Card-based volume is expected to increase every year through 2020, when these methods collectively are projected to account for 69.69%.

The two electronic-based systems are remote payments and preauthorized payments. In 2015, these products generated \$1.389 trillion or 14.54% of all consumer payment systems volume. Electronic-based volume is expected to decrease slightly through 2020, when these methods collectively are projected to account for 13.46% in 2020.

Credit card, debit card, prepaid card, and EBT card transactions totaled 104.19 billion in 2015. These

purchases of goods and services included both private label and general purpose products. Cash transactions from ATMs or over the counter at bank branches were not included in The Nilson Report model, nor were those transactions included in the government's PCE figure.

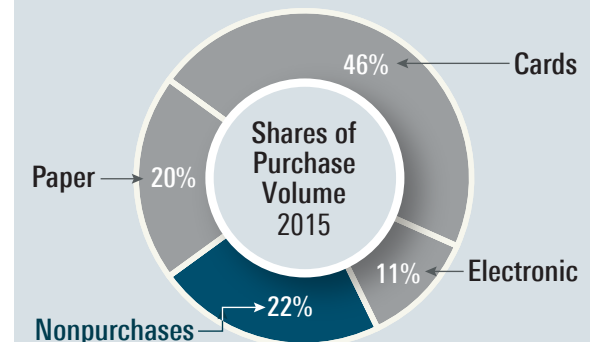
The monetary value (volume) of checks and the number of check transactions shown in the table for U.S. consumer payment systems excluded those written to pay for mortgages, child support, and alimony. Those amounts were not counted in the U.S. government PCE figure.

The Nilson Report model also excluded indirect payments that prepay or repay other payment systems. An example of a repayment are checks used to pay credit card statements. An example of a prepayment are the purchases of prepaid cards with credit cards

Discounting for repayments and prepayments avoids duplication when measuring spending.

Checks counted here included only direct payments such as those made for a bill payment or in a retail store.

Personal Consumption Expenditures in the U.S.



Nonpurchases include food furnished to employees (including military)... food produced and consumed on farms... standard clothing issued to military personnel... imputed rental of owner-occupied nonfarm housing... owner-occupied farm dwelling space rent... employees' lodging... rental value of nonresidential fixed assets owned and used by nonprofit institutions serving households... financial services furnished without payment... life insurance... employer contributions for group health insurance and workers compensation... indirect commissions... premium supplements for property and casualty insurance for persons and nonprofit institutions serving households.

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U.S. Consumer Payment Systems

	2010					2015				
	Volume (bil.)	Share	Trans. (bil.)	Share	Avg. Amt.	Volume (bil.)	Share	Trans. (bil.)	Share	Avg. Amt.
PAPER	\$3,011.25	38.26%	68.54	45.62%	\$44	\$2,495.94	26.14%	59.10	33.46%	\$42
Cash	\$1,461.65	18.57%	50.73	33.77%	\$29	\$1,509.26	15.80%	47.26	26.76%	\$32
Checks	\$1,446.17	18.38%	16.99	11.31%	\$85	\$910.69	9.54%	11.24	6.36%	\$81
Money Orders	\$77.20	0.98%	0.65	0.43%	\$120	\$56.00	0.59%	0.46	0.26%	\$121
Official Checks	\$21.79	0.28%	0.13	0.09%	\$170	\$16.94	0.18%	0.10	0.06%	\$166
Travelers Cheques	\$4.43	0.06%	0.05	0.03%	\$85	\$3.05	0.03%	0.03	0.02%	\$95
CARDS	\$3,810.31	48.42%	72.48	48.25%	\$53	\$5,665.31	59.32%	104.19	58.99%	\$54
Credit Cards	\$1,939.32	24.64%	21.19	14.10%	\$92	\$2,931.84	30.70%	31.35	17.75%	\$94
Debit Cards	\$1,632.05	20.74%	43.87	29.20%	\$37	\$2,420.43	25.34%	63.85	36.15%	\$38
EBT Cards	\$66.58	0.85%	2.30	1.53%	\$29	\$68.90	0.72%	2.50	1.41%	\$28
Prepaid Cards	\$172.36	2.19%	5.13	3.41%	\$34	\$244.15	2.56%	6.49	3.67%	\$38
ELECTRONIC	\$1,048.10	13.32%	9.21	6.13%	\$114	\$1,388.81	14.54%	13.34	7.55%	\$104
Preauthorized Payments	\$547.45	6.96%	4.46	2.97%	\$123	\$772.50	8.09%	6.64	3.76%	\$116
Remote Payments	\$500.65	6.36%	4.74	3.16%	\$106	\$616.31	6.45%	6.70	3.79%	\$92
TOTAL	\$7,869.66	100.00%	150.23	100.00%	\$52	\$9,550.07	100.00%	176.62	100.00%	\$54

Prepayments (e.g., credit cards, debit cards, or checks used to buy prepaid cards or travelers cheques) and **repayments** (e.g., checks and remote payments used to pay credit card charges) have been subtracted from volume and transactions for the appropriate medium of exchange to avoid double counting. Volume and transactions are counted in the medium in which the direct debit

was made. **Checks** access funds on deposit at financial institutions. Only direct payments are included here. Repayments and prepayments involving other payment systems are excluded (see above for explanation). **Cash** includes cash advances/withdrawals on credit and debit cards and personal checks written solely to obtain cash. **Official checks** include cashier's checks,

Paper, Cards, Electronic

	2020					10-Year Change	
	Volume (bil.)	Share	Trans. (bil.)	Share	Avg. Amt.	Volume	Transactions
PAPER	\$1,946.12	16.85%	57.17	26.14%	\$34	-35%	-17%
Cash	\$1,404.29	12.16%	50.29	23.00%	\$28	-4%	-1%
Checks	\$490.42	4.24%	6.48	2.97%	\$76	-66%	-62%
Money Orders	\$40.00	0.35%	0.32	0.15%	\$125	-48%	-50%
Official Checks	\$10.34	0.09%	0.06	0.03%	\$166	-53%	-51%
Travelers Cheques	\$1.06	0.01%	0.01	0.01%	\$109	-76%	-81%
CARDS	\$8,051.75	69.69%	144.52	66.09%	\$56	111%	99%
Credit Cards	\$4,471.10	38.70%	48.67	22.25%	\$92	131%	130%
Debit Cards	\$3,223.98	27.91%	86.15	39.40%	\$37	98%	96%
EBT Cards	\$53.31	0.46%	1.88	0.86%	\$28	-20%	-18%
Prepaid Cards	\$303.37	2.63%	7.82	3.58%	\$39	76%	53%
ELECTRONIC	\$1,555.15	13.46%	16.99	7.77%	\$92	48%	85%
Preauthorized Payments	\$859.04	7.44%	8.47	3.87%	\$101	57%	90%
Remote Payments	\$696.11	6.03%	8.52	3.90%	\$82	39%	80%
TOTAL	\$11,553.02	100.00%	218.68	100.00%	\$53	47%	46%

teller checks, and certified checks. **Prepaid cards** counted here are private label. General purpose prepaid cards are counted with debit cards. **Remote payments** are made using a computer or telephone, and include payments made during online banking sessions, person-to-person money transfers, check conversions at the point of sale, as well as bill payments made at ATMs,

self-service kiosks, and clerk-assisted machines at supermarkets. **Preauthorized payments** are handled electronically end to end through the automated clearing house system. They include payments for insurance premiums and recurring bills such as utilities and gym memberships. Mortgage payments are excluded.

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Behavioral Biometrics from Leumi Card

from page 8

Just as important as fraud fighting to Leumi is that behavioral biometrics technology does not inhibit the cardholder's experience when making a mobile purchase. Cardholders are not required to



do anything they would not otherwise do. There is friction for cardholders with generating a one-time password for ecommerce or mcommerce. Mobile users in particular want a different solution.

Physical biometrics, such as the thumbprint used for TouchID that secures all Apple Pay and some Samsung Pay transactions and facial recognition leveraging a camera in a device as Mastercard is currently promoting, do have some friction tied to the need for prior registration. However, physical biometrics are certainly part of the future of

protecting mobile devices against payment fraud and cybersecurity threat. Behavioral biometrics are complementary. While physical biometrics offer excellent assurance the valid user has initiated a transaction, behavioral biometrics work well to monitor the validity of a session in progress.

Some Android-based handset manufacturers in China will add SecuredTouch's operating system code libraries to support behavioral biometrics in their devices next year.

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...works well to monitor the validity of a session in progress.

Yair Finzi is CEO at SecuredTouch in Tel Aviv, Israel, 972 (77) 210-5157, yair@securedtouch.com, www.securedtouch.com.

Visa Debit Routing Rules

from page 1...

PIN-based regional networks led by Star, Nyce, Pulse, and Accel. PIN-based networks save merchants pennies per transaction.

Until this month, Visa had a policy that inhibited merchants from asking cardholders to use PINs, whether through prompts on a POS terminal or the suggestion of a sales clerk. Visa has modified that policy following recently issued clarifications from the Federal Reserve Board regarding

routing options available to merchants for debit card payments. Visa's change was also motivated by a Federal Trade Commission inquiry.

...lets merchants ask or prompt a cardholder to enter a PIN.

The policy allows merchants to automatically ask, or prompt, a Visa cardholder to enter a PIN, as long as the cardholder can still request to authorize the transaction with a signature instead.

Network routing and processing on Visa debit cards are facilitated by two payment application identifiers (AIDs) on the card's chip — the U.S. Common Debit AID and the Visa Debit AID. The Common Debit AID allows merchants to select from more than a dozen regional U.S. debit networks. The policy change on routing rules permits merchants to use the Common Debit AID exclusively.

David Robertson, Publisher
December 21, 2016

A handwritten signature in blue ink that reads 'David Robertson'.