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COST-EFFECTIVE,  
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# HOW YELLOWPEPPER INVENTED A UNIQUE DIGITAL PAYMENTS ECOSYSTEM THAT IS SECURE, COST-EFFECTIVE, AND FLEXIBLE

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How does YellowPepper manage to provide such a broad range of business benefits for digital payment technologies that serve so many different groups of individuals and businesses? Achieving that goal is critical for the Miami-based digital payment ecosystem builder.

Alex Sjogren, YellowPepper's chief technology officer, says that "from a business standpoint, we saw a big opportunity to do real-time payments in Latin America, whether they are person-to-person, person-to-merchant, corporate-to-corporate or corporate-to-person." In each of these settings, digital payments provide several advantages to both businesses and their customers, relative to the use of cash.

According to Payments.io, which operates an electronic platform that enables title companies and real estate brokerages to accept digital money transfers, these advantages include:

➤ Digital payments are faster: Counting out cash can take a long time and is subject to human error. This can lead to wasted time and energy for both customers and cashiers, negatively impacting the overall customer experience.

➤ Digital payments are more secure: When large amounts of cash are stolen or lost, it is unlikely that they will be recovered or replaced – unlike the case with stolen or lost credit cards. This is particularly a problem for those people who become targets for criminals because they are known to carry large amounts of cash. Moreover, online payment processors take the time to verify identities, to ensure there is enough money in an account before a business accepts the transaction.

➤ Digital payments are more convenient for consumers, especially when it comes to purchasing costly products such as real estate, or home appliances. When consumers are ready to make a purchase, they can use a credit or debit card, without having to go to a bank or go home to get enough cash to make a purchase.

“We see ourselves as an enabler for financial institutions to do transactions with and between different methods. Instead of integrating individually to PayPal or Visa or MasterCard, or locally to On-US, Ripple, or other local methods, you simply integrate with YellowPepper. With YP you have a single point of integration that enables all these different payments.”

- Alex Sjogren,  
YellowPepper's CTO



Bringing that vision to life required YellowPepper's engineering team to take an innovative approach. Explains Sjogren, "From a technological standpoint, when we are doing a real-time payment system, we are integrating a lot of different 'rails';" the various payment methods used by the broad range of YP bank customers who have various goals in mind. To satisfy all of those users, YellowPepper "needs to be extremely versatile in the way we integrate to these systems."

And so, YP has built "a microservice architecture that makes it quite easy to contain and use different technologies when we are doing the integration work," notes Sjogren. Rather than build a single platform in which everything is intertwined, YP opted for a 'container strategy.' This architectural style builds functions into various containers so that software developers can make targeted changes within those containers that don't wind up affecting the entire platform. "If you make a change in one container, it doesn't influence the [overall structure.] You don't build the entire infrastructure at once; you build it by containers. So, you build fewer points of failure and less risk." Adds Sjogren, "Containerization allows the system to be more flexible and configurable for the individual banks in terms of services consumed, business rules" and so forth. Sjogren said that this approach, which provides a single point of connectivity to multiple market rails, "removes the complexity of development due to its orchestration and program-management capabilities." Real-time transfers can be made between any rails in the segment

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***It provides different rail options to execute money movements based on customer-defined business rules.***

***And it supports any integration technology (API, Blockchain, ISO 8583, ISO20022).***

with a time-to-market of approximately two to four weeks for standard implementations. "This optimizes transfer and processing fees, by routing transactions to the most convenient rail."

YP's brand-agnostic platform offers a single point of connectivity that enables access to multiple rails such as Visa Direct, Mastercard Send, ACH, xBorder, and RTP, among others. It provides different rail options to execute money movements based on customer-defined business rules. And it supports any integration technology (API, Blockchain, ISO 8583, ISO20022).


Thus, various financial institutions on YP's "Yepex" ecosystem in Peru – such as Banbif, BBVA, Caja Arequipa, Interbank, and Scotiabank – can tailor their offerings of digital payment services to meet their various marketing strategies and address the specific needs of their particular groups of customers. Explains Sjogren, "Through the financial institutions, we provide an API layer where [the banks] can integrate" on the YP platform, which holds a secure



database of customer information. YP's 'program manager' is a business-rule engine that enables the various banks to set up different business rules that they want for their banks.

In Peru, YellowPepper has deployed this ecosystem for those three major local banks, "using robust technology that is scalable and flexible." YP has enabled a common directory, (various) transaction roads – Visa Direct, On-US, and MasterCard MoneySend – and connections with banks using API technology for "easy integration."Ç This system enables transfers of funds to be made in real-time, 24 hours a day, seven days a week; something that was not possible in the past.

YP's digital-payment ecosystem has been shown to be an efficient alternative to traditional card payments since only simple mobile phones are required, for which "there are many excellent services and prices" in Peru, noted a YP executive in that country. This enables transaction costs to be much lower. In addition, because no additional hardware is required, the payments process can be 100% digital, without anyone going to a bank branch.



Sjogren added, "We see ourselves as an enabler for financial institutions to do transactions with and between different methods. Instead of integrating individually to PayPal or Visa or MasterCard, or locally to On-US, Ripple, or other local methods, you simply integrate with YellowPepper. With YP


you have a single point of integration that enables all these different payments."

According to Serge Elkiner, CEO and co-founder of YellowPepper, 70 percent of YellowPepper's development is done internally, while the remaining 30 percent is done by an outsourcing partner that helps with product development (coding).

YellowPepper hosts all its services on Google Cloud Platform and uses Docker and Kubernetes, according to Sjogren. The major public cloud computing providers, including Amazon Web Services, Microsoft Azure, and Google Cloud Platform, have embraced container technology, offering container software such as the popular choices of Docker, Apache Mesos, rkt (pronounced "rocket"), and Kubernetes. Sjogren also stressed that it is extremely important to secure all the information in the YP ecosystem, in compliance with the highest standards of security. Apart from its strategic use of container software, YellowPepper uses such tools as Apache Camel, Hibernate, Java Spring Framework, Kubernetes, MongoDB, Redis, and Vault.

## **USING DIGITAL TECHNOLOGY TO OVERCOME THE WEAKNESSES OF OLD-FASHIONED CASH**

Even before the worldwide onset of COVID-19, there was widespread awareness that "some characteristics




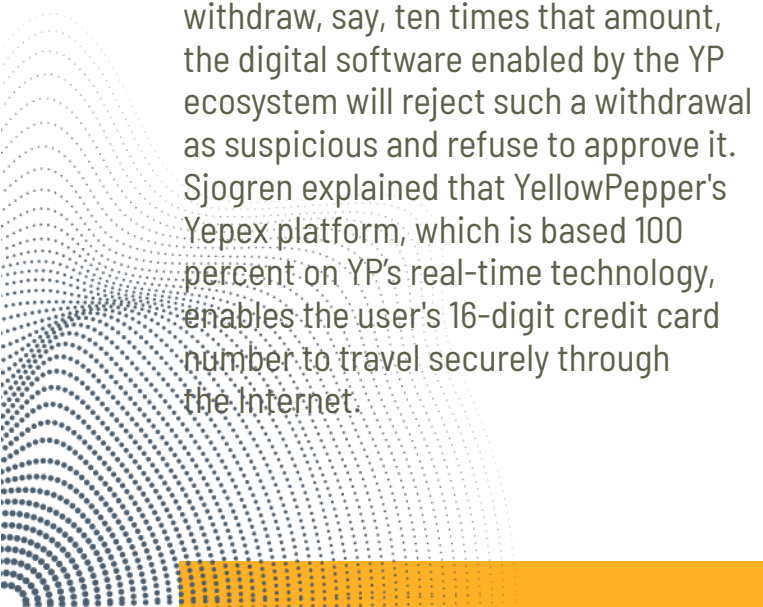
of cash are bad," said Elkiner, such as its vulnerability to theft and its potential contamination by viruses and other pathogens. The banking sector already realized that to remediate such risks effectively, banks would "need to be able to track the movement of money; and do it in real-time," Elkiner added.

With the implementation of real-time payment solutions such as YP's YEPEX platform, if an individual has stolen your mobile phone, all you have to do is call your bank and block the use of your mobile wallet, explained Jonathan Scaillon, YP's chief commercial officer. No unauthorized party can successfully use your mobile phone to access the funds in your bank account. And even if you didn't realize that someone has stolen your phone, you only have to inform your bank of your username, password, or other identifying information. Depending on the amount of funds, various additional security levels and rules will automatically apply; always testing the validity of requested withdrawals or transfers or other movements that do not match your conventional patterns of behavior. Thus, if you normally withdraw fifty dollars a day, and someone tries to withdraw, say, ten times that amount, the digital software enabled by the YP ecosystem will reject such a withdrawal as suspicious and refuse to approve it. Sjogren explained that YellowPepper's Yepex platform, which is based 100 percent on YP's real-time technology, enables the user's 16-digit credit card number to travel securely through the Internet.

## TOKENIZATION TO FIGHT FRAUD

Although Brazil has one of the most mature e-commerce sectors in the region, that country has been suffering from "tremendous fraud rates," boosting the potential market for the tokenization product jointly developed by YellowPepper and Visa Token Service for Banco Bradesco. In March 2020, Bradesco launched "Credential on File" — a "tokenization" protocol that totally masks the identity of each cardholder by creating temporary sixteen-digit codes that exist only temporarily — for purchase or other financial transactions — and can only be used once before expiring immediately thereafter.

Scaillon explained that YellowPepper is "pushing our clients to the tokenization product" because it provides them with huge benefits when they go shopping both offline and online. Until now, users of such services have typically registered their credit cards on the Internet, but they often do not remember their own passwords. Providing their credit card information to more and more service providers, such as Uber, also opens hidden "opportunities for additional fraud" that no longer exists after the use of tokenization. "This is where [tokenization] will add a lot of value." He added, "It is not the password [for the credit card] that is tokenized; it is the full-length 16-digit PAN, and the CVV number on the card, and the expiration date. Everything is tokenized." This sort



of tokenization protocol is also useful for making recurring payments for recurrent online services such as Netflix, noted Scaillon. Tokenization also reduces the risk of fraud when consumers use their credit cards during a pandemic such as COVID-19.

Looking to the future, Sjogren is optimistic that banks in Latin America, Africa, and other emerging regions have a “tremendous opportunity” to learn from the mistakes Europe and the U.S. learned when they rolled out their digital services in the past. “They will definitely be able to leapfrog and become very sophisticated very fast.” He added that the process of “leapfrogging” has already proven to be powerful in such regions as the Baltic countries of Eastern Europe, which were far behind those of Western Europe in the early 2000s, and then caught up quickly. Taking advantage of the lessons learned in the West, “they didn’t have to make the big investments” in the Baltics that had been made earlier in the United Kingdom and Western Europe.

## A BRIEF GLOSSARY OF DIGITAL PAYMENTS TECHNOLOGIES

**ACH: AUTOMATED CLEARING HOUSE:** A U.S. financial network used for electronic payments and money transfers. Also known as “direct payments,” ACH payments are a way to transfer money from one bank account to another without using paper checks, credit card networks, wire transfers, or cash. ACH billing takes about 3-5 days to process, but most banks favor ACH transactions over paper checks when making funds available. Electronic Funds Transfer: EFT payments can be used interchangeably with ACH payments. They both describe the same payment mechanism.

» Source: Square Inc.

**LUKITA:** This service allows free and immediate transfers of funds through Plin between BBVA’s app among various savings accounts denominated in Peruvian soles. These transfers require only the cell number, without account numbers or interbank codes. The service is immediate, and operates 24 hours a day, 7 days a week.

**MOBILE WALLET:** An app that stores information about one’s credit cards, debit cards, coupons, and/or reward cards. Once the app is installed and the user inputs payment information, the wallet stores this information by linking a personal identification format, such as a number or a key, QR code, or an image of the owner to each card that is stored.

**MASTERCARD SEND:** Generally, within seconds, Mastercard Send facilitates the transfer of cash balances and P2P payments to the consumer’s bank account via their debit card, making outdated registration and validation methods obsolete and improving the user experience.

**P2P SERVICES:** A peer-to-peer (P2P) network is one in which interconnected nodes (“peers”) share resources amongst each other without the use of a centralized administrative system. Files can be shared directly between systems on the network without the need for a central server. In other words, each computer on a P2P network becomes a file server as well as a client.

**TOKENIZATION:** A process that substitutes sensitive data with surrogate values called tokens, which can then be used to represent the original (or raw) sensitive value. The concept of tokenization is widely used in industries like finance and healthcare to help reduce the risk of data in use, compliance scope and minimize sensitive data being exposed to systems that do not need it. Tokens can be generated to safeguard payments in any kind of mobile virtual wallets, such as Apple Pay, Google Pay, Samsung Pay, and banking applications like BBVA’s, in addition to payments in physical stores and online with vendors or service suppliers like Amazon or Netflix. Sources: Google Cloud, Mastercard

**WIRE TRANSFERS:** Wire transfers are processed in real-time, as opposed to ACH payments, which are processed in batches three times a day. As a result, wire transfer funds are guaranteed to arrive on the same day, while ACH funds can take several days to process. Wire transfers are also more expensive than ACH payments.



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