mobile payments

A Developer's Guide to Processing Money

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Executive Summary

There is a huge opportunity in mobile payments

As consumers get more comfortable with the technology, begin to see consumer value in it and gain confidence that it is a secure option, they likely will reach for their digital wallets more often. A Gartner report released last June forecasts the mobile payments market to be worth $721 billion, with more than 450 million users by 2017.

How does this affect developers?

App makers face many choices in how to collect money, which operating systems to use, and which payment providers to use based on fee structures, technical support and security.

Two Types: Native App-Based E-commerce and Acceptance

Mobile payments can be divided into two broad types: native app-based e-commerce and native app-based acceptance.

- Mobile e-commerce, through card networks, app stores and telephone carriers, does not require credit cards to be present for sales.
- App-based acceptance creates sales opportunities for merchants that want to swipe consumers' physical cards via smartphones and tablets. It encompasses:
    - Smartphone solutions that combine an app with a card reader and merchant account;
    - Point-of-sale (POS) solutions that combine a full-blown POS app with a card reader and tablet; and
    - Developer platforms that combine software development kits with a card reader and a payment gateway.

How to pick a payments partner or provider

App makers and companies must decide which payment providers or partners can best manage their mobile transactions. The choice warrants a thorough analysis based on everything from pricing and security to user experience and technical support.

Payment providers for developers

Providers offer both server-side and client-side solutions via APIs, where developers can unload the complexity of accepting payments onto a provider and focus on building great products.

This guide defines the current state of the mobile payments landscape and helps players in the app industry explore their options.

Mobile Payments:
A Developer's Guide to Processing Money

Earlier this year, Forbes.com contributor Gene Marks asked a question that gets to the heart of commercial transactions in the digital age: "With all the advances in technology, and all the things our smartphones do, why aren't we paying for everything using a mobile app?"

Marks posed the question in the context of his prediction that Starbucks will be the "kingmaker" in the world of mobile payments, but until there is a king, app makers and companies that wish to leverage mobile devices to sell their products and services face many choices. They have to decide how to collect money, which operating systems to use, and which payment providers have the friendliest fee structures, best support and most security.

Xconomy Deputy Editor Gregory Huang captured the essence of the challenge. "There are so many players coming in from different angles and at different levels of the value chain," he wrote. "Besides all the techies with apps and software platforms, you've got retailers, brands, banks, credit card companies, payment-processing firms, and a slew of loyalty and rewards programs, all vying for a piece of the pie."

This guide will define the current state of the mobile payments landscape, which continues to evolve rapidly, and help players in the app industry explore their options.

The methods to mobile payment prosperity

The term mobile payments has many different meanings, from consumers using smartphones or tablets instead of their laptops to make purchases from their homes to merchants swiping credit cards on tablets or smartphones. But none of them are mainstream yet by any stretch.

The third annual Global Mobile Payments Index released in January found that such payments comprise only about 20 percent of global transactions. But that figure was up from 13 percent of transactions the previous year, a growth rate of 55 percent. The index is based on data for transactions made through Ayden, which processes payments for more than 3,500 medium, large and enterprise-sized organizations mainly operating multi-national businesses.

The realities of modern culture are certainly favorable toward even greater adoption of mobile payments. According to the Pew Internet and American Life Project, 90 percent of Americans have cell phones, 58 percent have smartphones, 42 percent own tablet computers and 32 percent own e-readers. Research by BI Intelligence tells a similar global story, noting that consumers around the world have purchased 1.3 billion smartphones in just four years -- and the penetration of tablet devices into the market is double what it has been for smartphones.

Mobile device owners are already making mobile transactions, most notably by buying apps and other digital goods. Parks Associates data from Q1 2014 reveals that 10% of smartphone owners paid to download an app in the 30 days prior to the survey and 17% paid to purchase digital content like a song, movie or e-book; these rates are even higher among tablet owners. As consumers get more comfortable with the technology, see consumer value in it and gain confidence that it is a secure option, they likely will reach for their digital wallets more often. A Gartner report released last June forecasts the mobile payments market to be worth $721 billion, with more than 450 million users by 2017.

Mobile payments have particular appeal to the "unbanked" who don't have bank accounts or credit cards. While the population of the unbanked is larger in developing countries, the unbanked in the United States, including young people, also turn to mobile payments as a purchasing solution.

In September 2012, the Federal Reserve Bulletin noted that 11 percent of Americans are unbanked and another 11 percent are "underbanked." Many of them have smartphones or mobile phones and use them for various transactions. "Mobile technologies offer the potential to better integrate the unbanked and underbanked into the mainstream financial system," the Federal Reserve Board concluded in its "Survey of Consumers and Mobile Financial Services."

All of that is good news for app makers, whose business models often depend upon mobile payments, for companies that want to offer credit-card transactions on the go, and for retailers that are transitioning toward advanced point-of-sale solutions. But it also means they all need to understand how to make mobile payments work to their advantage.

The monetization method will be a factor in the decision. Developers who are selling apps may benefit from a well-known mobile payments method that is easy for consumers to use. Marketplaces where users have payment methods on file may be ideal. The relationship between the payment processor and the customer is more important when selling out-of-app goods or services. A pull payment method such as a credit card likely will offer a better experience than a push method such as Amazon Flexible Payments Service or PayPal Express Checkout.

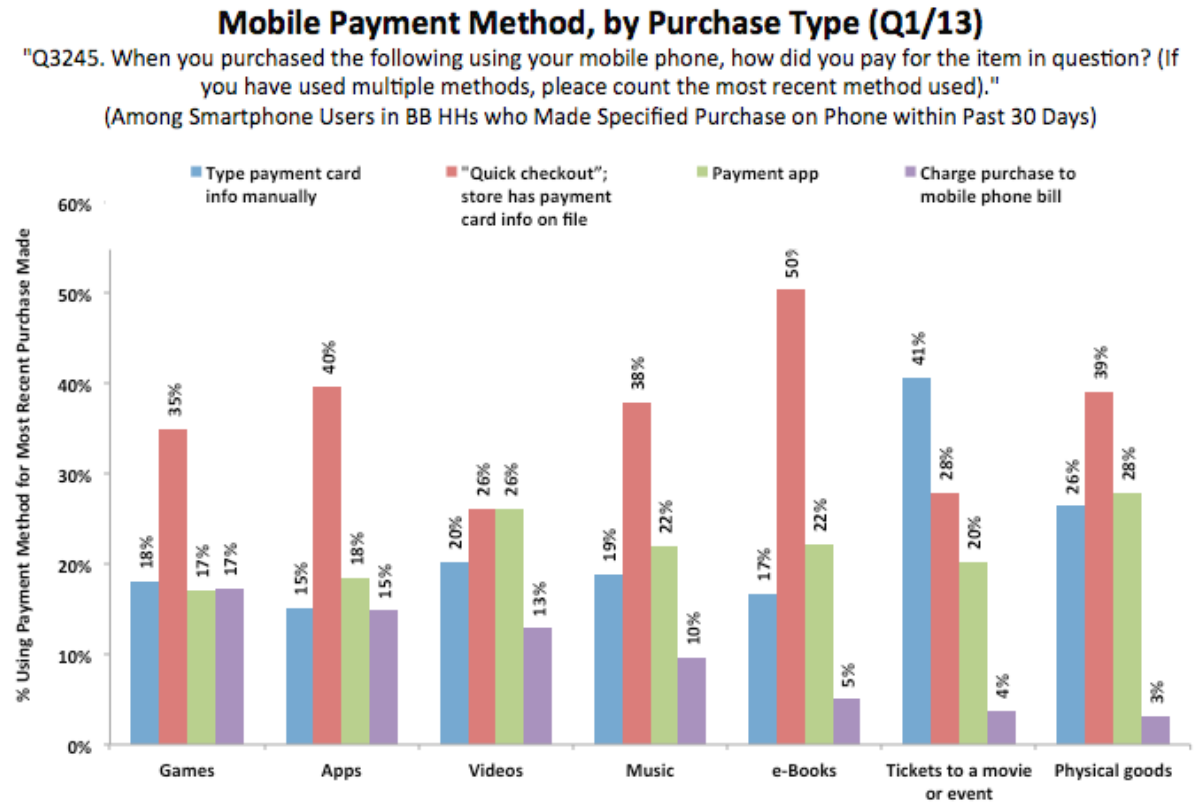
Gloebit CEO Christopher Colosi, whose company offers digital currency tokens that can be exchanged for goods and services, recommends micro-transactions for selling in-app goods. He mentioned the gaming industry's movement toward mobile apps as proof of the value of that approach. "They discovered that they could make more from a user via repeated 10-cent purchases than from one $60 purchase of a box off a store shelf," Colosi said.

But developers first need to know the types of mobile payments that exist. These can be divided into two broad categories: native app-based e-commerce and native app-based acceptance. Retailers who opt for the latter method replace traditional technologies such as credit-card

swipers with mobile tablets or smartphones, which is common among food trucks along city streets. And like app makers who have to pick the best operating system for monetization, companies also must decide which platforms they will use to accept mobile payments.

App-based e-commerce

The options for mobile e-commerce include payments through card networks, app stores, telephone carriers and various other alternatives. Card networks typically are used to collect money for services like food, hospitality or transportation, while app stores and carrier billing are more common for subscriptions or upgrades.



Some vendors allow developers to accept payments inside their apps via traditional card networks like Visa and MasterCard. A consumer who wants to use the luxury car service Uber, for instance, can register a credit card through the company's app and then hail a ride. The payment is handled behind the scenes using Card.io to capture the credit details via a picture, with no physical swiping necessary once the car arrives. The Lyft ride-sharing app works the same way.

The Jump Rope app also uses a card network to give its users priority access to the venues, events, products and services of its partners, including nightclubs and restaurants. A user enters her credit-card details, identifies a Jump Rope location and then moves to the front of the line at

that location by presenting her phone and pressing the “Use This Jump” button. The food-delivery app Eat24 and the OpenTable restaurant reservation app also employ card networks to accept mobile payments. In all of these cases, consumers are entering their credit-card details directly into the relevant app or mobile-optimized website.

Most mobile games and free apps that let users upgrade to paid versions collect their payments through app stores. Developers can build in-app sales capability into The App Store for iOS apps, Google Play for Android apps and the Windows Store for Microsoft’s mobile operating system. All three services offer an array of written guides to explain the process to developers and help them implement the integration. For these scenarios, app stores rather than developers manage the collection of consumer card details and payment method preferences.

To use Google Play, app makers must open merchant accounts through Google Wallet. This enables them to take payments through debit cards, credit cards, loyalty cards and gift cards. Consumers also can redeem sales promotions on their devices via Google Wallet.

Using traditional card networks has its limits, however. It is not viable in countries with some of the fastest-growing smartphone markets because of low credit-card penetration there. The penetration rate is 33 percent in Brazil, 19 percent in Russia and a mere 1.5 percent in India, so most users in those places do not have cards to make mobile payments. Google Play also is not available in China, where developers have to rely on third-party payment providers such as Alipay or mobile operators to process payments.

Some consumers also can submit mobile payments directly through their phone companies, which take a cut of the sales for handling the transactions. This method is more popular with the unbanked. App makers that use carrier billing include the music-streaming service Rhapsody and the Internet phone service Skype.

Amdocs, a software and services provider in the telecommunications industry, dubbed direct carrier billing “the world’s most popular mobile payment” in an infographic on the topic. The graphic notes that there are 6.8 billion mobile phone accounts in the world compared with 3.5 billion people who have bank accounts.

While iTunes does not yet work directly with phone carriers, Google Play experienced 300 percent annual growth in such mobile payments in the 14 markets where it is possible. The option is available in 50 markets through BlackBerry World and 36 through Nokia Store.

Market estimates for carrier billing range from $11 billion by 2016, according to the Yankee Group, to $13 billion by 2017 as estimated by Juniper Research. TechCrunch was more cautious about carrier billing, however, in a February 2013 report about the mobile payment company Bango’s investment in the space. “Carrier billing services may hold a lot of promise but they are not paying huge dividends yet.”

Other app-based e-commerce alternatives include Amazon Payments and PayPal. Amazon Payments uses the payment and shipping information in people's Amazon.com accounts. The touch-and-tap process works with Amazon's Kindle products, as well as with Android and iOS devices. PayPal also works with Android and iOS, and developers can gain access to 190 markets and collect payments in more than 25 currencies.

Each of the methods described above has different fee structures, which can affect the net proceeds to the developer. They also have different levels of consumer friction in providing payment details and completing the purchase, which may affect gross sales. But within the app space, improved trust and clarity in the transaction process may be worthwhile trade-offs for any friction that consumers experience.

"It is much more important to build a compelling experience that hooks the user than to reduce friction," Gloebit's Colosi said. "For a small developer, lack of trust that new users may have is an additional reason to use a third party and not build your own payments or digital currency system."

App-based acceptance

All of those "card not present" options have limited reach because even though modern commerce is increasingly mobile, 90 percent of credit transactions still occur in person. With 500 million credit cards in the United States alone, many merchants want to be able to swipe via smartphones and tablets the cards that consumers already have.

Such app-based acceptance of payments also is valuable because of the costs of taking cash -- longer transaction times at the point of sale, back-office employee time for cash management, losses to theft and fraud, and reduced sales to customers who want or need to pay with cards. The technology also creates new sales opportunities, such as credit transactions in the field for services like pizza delivery and for retailers looking for multiple sales touchpoints via e-commerce and in stores.

App-based acceptance falls into three buckets: 1) smartphone solutions like Intuit's GoPayment, PayPal Here and Square that combine an app with a card reader and merchant account; 2) point-of-sale solutions like Breadcrumb, Clover, Leaf, Revel and ShopKeep that combine a full-blown POS app with a card reader and tablet; and 3) developer platforms like CardFlight and Card.io that combine software development kits with a card reader and a payment gateway.

Smartphone solutions work best for micro-merchants, sole proprietorships or companies with just a few employees whose businesses are as mobile as the devices they now have at their disposal to take payments. The card readers usually are free, and the pricing is simple. But the technology has only basic functionality, and neither the pricing nor app experience can be customized. However, a seller benefits from getting the app, hardware and merchant account from a single vendor.

Tablet-based POS solutions offer more customization to retail chains and quick-serve restaurant environments. The Android and iOS-based tablets act as the electronic equivalent of cash registers. The companies that use these solutions often can get the equipment via subscription on a software-as-a-service basis, and they can use preferred merchant accounts. The disadvantages include expensive per-device pricing if large deployments of the technology are required and limited integration into back-office systems.

Merchants who desire maximum flexibility in designing the product experience should consider developer platforms, which make it easy to accept credit in person within an app. The platforms are great for vertical app developers and companies building their own POS solutions. Providers include CardFlight and Card.io.

The platforms enable customers to create hardware and apps that showcase their own brands and to integrate the acceptance of payments with services such as event ticketing, appointments and electronic health records. In addition to merchants building their own customized mobile POS, vertical solution providers are building integrated solutions that combine payment acceptance and the associated data with other features like customer relationship management, loyalty, inventory management and back-office reporting.

The publicly available documentation eases the integration process, and the technology mitigates the compliance requirements of the payment card industry. But app developers must be willing to invest the time necessary to build their own native apps.

Operating System

Companies that deploy mobile payment technology also have to decide which operating systems to use. For mobile game makers or companies like Uber that sell products or services through apps, that means choosing whether to build for iOS or Android, for both of those platforms, or for all platforms including those with minor market shares. Retailers, meanwhile, have to pick which smartphones or tablets they want for taking orders.

Market share in the mobile payments space may influence the decision, and Ayden's Global Mobile Payment Index, now in its third year, offers some insight on that front. The index shows that 41 percent of shopping transactions during last fall's holiday season were completed through Apple iPads, followed by 32 percent through iPhones.

Android-based smartphones and tablets were used in a combined 27 percent of those transactions. But between April and December, Android's overall share jumped from 31 percent to 39 percent, and Apple devices were used for 9 percent fewer transactions.

Colosi said developers should assess the distribution benefits of a marketplace, the restrictions, fees and engineering work they will face, and the terms of service or merchant services agreement to assess what restrictions apply to their applications. While iOS has been the

dominant choice for app launches, Colosi said some developers are now choosing to launch on the Web and Android first because of iOS restrictions.

Apple only allows distribution via its App Store, so for iOS devices, the marketplace and platforms are essentially the same. The company's policies require in-app digital items to run through the in-app purchase system, which charges a 30 percent fee, and the system does not allow physical goods sold in the app or digital items that could be used across apps.

There is no Android-wide policy regarding payments. The platform is open and users can download apps directly from a website or from a multitude of app stores with their own policies. Google Play is popular, but developers must use its in-app billing service as the method of payment, among other policies.

Companies also may want to explore browser-based e-commerce. Two years ago, PaymentOne started offering its PayOne HTML5 application programming interface so companies could use its technology to take mobile payments through browsers. And Google Wallet integrates with the Chrome Web Store, which is for apps that run on computers.

The Web is an open platform where developers release their applications from their own websites, some of which are accessible from mobile devices, or on Web or mobile platforms. Facebook is one such platform. Each approach has its own restrictions. Colosi said the mobile Web is an evolving payments space, and while the restrictions of each marketplace hinder that evolution, the platform is becoming more open rather than more restrictive.

How to pick a payments provider or partner

In addition to choosing the technology platform(s) where they want to do business, app makers and companies must decide which payment providers or partners can best manage their mobile transactions.

The choice warrants a thorough analysis based on various features including pricing, security and fraud protections, service availability by location and device, user experience, support and the integration capability offered by each service. TSYS Merchant Solutions, which offers a mobile payment solution, included several of those topics in its 10 tips for companies to consider.

"Choosing the most appropriate payment solution provider can be a challenge for most businesses," Element Payment Services added in its guide on the subject. "The continuous change of technology and regulations creates a complex payment industry to navigate, especially because payment providers need to remain flexible to keep up with regulations, trending technologies and competitive demand."

Pricing encompasses everything from transaction fees and a percentage of sales to setup fees, monthly fees and the cost of hardware. A common fee structure among e-commerce payment providers is to charge 2.9 percent and 30 cents per transaction, with no setup or monthly fees. APIs and plug-ins to process transactions are free.

Conversion rates are another important component of pricing calculations, especially for micro-purchases when people want to return to their games quickly, and on that issue, carrier billing may offer an edge to companies that take mobile payments. The Juniper report on carrier billing noted that app stores with integrated carrier billing solutions "have seen a [five to six times] increase in conversion rates compared with credit-card billing, together with an uplift in average transaction values."

Conversion rates tend to be higher for carrier billing because consumers do not have to sign up or enter any information other than their phone numbers to make mobile purchases. That's a bonus for people who may be concerned about fraud if they have to provide financial details to complete transactions. Direct carrier billing is always a one-click experience.

Anyone storing credit-card data is required to comply with Payment Card Industry Data Security Standards. Known by the shorthand PCI-DSS, the standards are the work of the PCI Security Standards Council and encompass hundreds of requirements across 12 key topics. As summarized by TSYS Merchant Solutions, the standards cover firewall configurations, password protections, antivirus software, cardholder data encryption and storage, access to that data, and security monitoring and testing.

Given the complexity and expense of ensuring PCI compliance, many developers choose to keep all card data outside of their own systems, and instead leverage service providers such as their payment processors. App makers and merchants that take mobile payments should be sure that their providers are PCI-DSS-compliant.

Fraud is an important consideration because concerns about the possibility of it occurring may deter consumers from making purchases via mobile devices. Although, consumers rarely bear the direct costs of fraud. Jerome Cle, the founder and CEO of the Singapore-based mobile payments company SCCP Group, noted in The Huffington Post that 53 percent of consumers are concerned about storing sensitive data on phones, and 47 percent don't want to transmit information to a seller's device.

Developers should explore how fraud is handled. The issues include whether a mobile payment method imposes a chargeback fee (in addition to reversing the charge), whether it puts the burden of proof on the consumer or merchant and whether it gives the merchant any tools to reduce chargebacks. Many systems fine merchants $10 to $25 even if they do everything possible to prevent fraud.

But Ilan Oosting, a co-founder and the CEO of the mobile technology firm Jmango, said in Mobile Payments Today that existing fraud protection is high quality. In addition to the password protection and other security features built into mobile devices themselves, he touted security-related advances in e-signature technologies, virtual scanners like those used by Card.io and Jmango's Jumio brand, and electronic receipts. Merchants should evaluate the security features of potential mobile payments providers and partners.

In a separate column, Oosting added that the need for secure transactions should be balanced with maintaining user experience, which merchants also should consider when studying provider options. "The key reason why mobile apps use has skyrocketed is because they are so easy to pick up and use on a whim," Oosting wrote. "Apps are always on; there is no need to wait for them to boot up, they're always connected and, best of all, they go wherever you go." Good providers should be able to ensure the three experiences that he said users value most: speed, ease of use and functional features.

Merchants also should gauge how many devices can transmit payments to a platform and where around the world that merchant can take payments. PayPal, for instance, offers services that work with both Android and iOS devices, while Fortumo works with Android and Windows phones, any mobile browser or HTML5 app, and even the Barnes & Noble Nook. Merchants should also consider the global extent of payment coverage because of countries where credit-card penetration is much lower.

For merchants who want to reach into emerging markets, mobile providers that offer direct carrier billing may be worth a close look. Amdocs noted in its infographic, for example, that 83 percent of Windows Store purchases in Indonesia go through phone carriers. The services also are used for parking meters in Norway and soccer tickets in Turkey, and for adding funds to the PlayStation Store in the United Kingdom.

The ease of the technology integration may influence merchant decisions about mobile payment providers, too. Merchants should explore how long it would take to get set up to receive payments, which coding languages can be used on the platform and how much flexibility there is in pricing. Another consideration is how quickly developers expect to receive their funds. If they intend to funnel profits directly into marketing, a delay of two months or more between a purchase and the platform delivering or releasing the funds may not be the best option.

Payment providers for developers

App developers have multiple options when choosing payments partners. Although it is not an exhaustive list, here are several of the key providers:

Amazon
Braintree
CardFlight
Dwolla
Fortumo
Gloebit
Intuit
LevelUp
Mastercard
PayPal
Stripe

Many of these providers offer solutions for integrating mobile payments into an app. Providers offer both server-side and client-side solutions via APIs where developers can unload the complexity of accepting payments onto a provider and focus on building great products. These providers allow developers to process credit cards and other payments without directing users to an external website or app store.

Server-side activities can include managing subscriptions and billing, issuing payouts, storing card information and logging transactions. These APIs are commonly written in backend languages like JavaScript, PHP, Python and Ruby. For example, PayPal offers a recurring billing API for developers to bill their customers on a regular schedule. This API is part of PayPal's Payflow Gateway software development kit and is available in Java, OSCommerce and .NET.

On the client side, providers offer APIs for features like encryption, payment forms and one-tap payment features. These APIs are commonly written in Android, BlackBerry, iOS and Windows Phone languages for mobile devices and JavaScript for payments in mobile or desktop Web browsers. For example, Stripe has created a complete guide for Android for accepting credit cards on the platform and sending them to a secure server.

Differentiating among these platforms is a matter of personal preference and will vary with the type of app and desired platforms. Providers such as Stripe and Braintree have extremely similar offerings, but providers like Dwolla, Stripe and MasterCard are neither equal substitutes nor competitors. Developers must look closely at each provider and be sure that its offerings apply to their apps.

Some of the common features include support across device type (desktop, mobile phone, tablet, etc.), support across operating systems (Android, HTML5, iOS, Windows, etc.), free support, fraud protection, zero setup or monthly fees, and volume-based pricing where the cost is a flat percentage of each transaction.

Some of these providers distinguish themselves with unique offerings:

- Intuit offers a portfolio of accounting and merchant services software, including QuickBooks that easily integrate with apps.
- Amazon and PayPal have networks of users whose information, such as name and credit-card numbers, already is stored in user accounts. This helps increase conversion rates with fewer steps during the payment process.
- CardFlight offers a white-label service that lets developers build customized, mobile POS applications without the typical complexity of building payments solutions from scratch.
- While many of the providers offer a flat percentage rate per transaction, Dwolla provides a fee structure where any transaction of less than $10 is free.

There are many other key features that separate one provider from the next. Developers can use these examples in their research process to ensure that they are choosing the partners that best suit their needs.