

Mobile Payment: The Linchpin of the Mobile Commerce Economy

If you think of mobile payment as just another way consumers can pay for things, don't. Mobile payments will likely emerge as the way to pay, ultimately eliminating your dependence upon credit and debit cards, checks—and even cash.

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Author's note

Mobile devices are revolutionizing how consumers monitor their financial resources, make important purchasing decisions and, perhaps most notably, pay for transactions. As part of First Data's series on the ongoing development of mobile commerce solutions, this paper focuses on mobile payment—which is really at the heart of all commerce. It is my hope that this paper will help you continue the important planning within your organization and with your strategic partners that will position all of us for success in mobile commerce. None of us can afford to sit by and wait while others define the standards, suggest common practices and divide revenue streams.

All Commerce Is About Payment

Commerce is making payment and receiving payment. If there is no payment, there is no commerce.

This statement is every bit as true for mobile commerce as it is for traditional commercial activity. But how does payment actually work in a mobile commerce economy? Let's take a look, and pretend you are a commuter taking the Bay Area Rapid Transit (BART) to work every day.

On a typical day you race out of the house and head to your transit station, wave your phone at the turnstile's electronic reader, dash down to the platform and just make your train. Perhaps you read the morning paper as you pass under San Francisco Bay. The train pulls into your stop, and as you step off, you notice a panel advertisement for a Jack in the Box® mango smoothie. The ad has a logo signifying it's a smart ad—an advertisement that transfers information to your phone when you tap it on the logo.

You tap the smart ad and your phone displays the nearest Jack in the Box location: there's one on San Francisco's Mission Street, right by your station. You leave the station, step around the corner and order that smoothie. You pay for it by tapping your phone at the checkout stand. You remember that, because of your enrollment in a loyalty program, you also downloaded a 10 percent discount coupon when you tapped the smart ad. That amount was automatically deducted from the price of the smoothie.

What does this simple transaction mean to you as a merchant or financial entity? What will it cost you? How does it affect the shopping experience and your ability to build customer relationships? And what does it mean to traditional credit and debit card payments?

To answer these questions and understand how central mobile payment is to the entire mobile commerce ecosystem, let's take a closer look at what's behind a simple mobile purchase. Later in this paper, I'll talk more about the technology that made this transaction happen, but for now, take a look at the transaction itself, because this is at the heart of commerce—exchanging value for value and receiving payment from the customer. In this case, the merchant produces the mango smoothie, and you enter a code into your phone, wave the phone near a reader, receive a 10 percent discount, see a display of the transaction details and then are on your way.

What was special about this transaction?

First, it was fast. The merchant did not need to ask if you had a coupon or a discount card or some other customer-loyalty incentive. Nor did you need to dig around for a coupon or punch card. If you had signed up for these incentives, they would already be in the mobile device and automatically calculated during the transaction. Also, the merchant did not need to receive cash or make change, nor did the merchant need to handle a debit or credit card. Just as significantly, you as the customer did not have to deal with cash or cards. It was a faster and simpler transaction for both the merchant and you.

Pilot programs in Europe have shown that mobile purchases cut the average transaction time in half. A study recently conducted by First Data demonstrates this as well. The study, carried out in several corporate cafeterias around the country, measured factors related to the use of prepaid contactless stickers. A contactless sticker is like a miniature adhesive gift card with a Near Field Communication (NFC) chip inside. The study showed that contactless payments are typically two to three times faster than cash or no-signature card payments, and about five times faster than card payments requiring a signature.

The second big difference between this mobile transaction and a more traditional payment is that there was no leather wallet full of cash and credit cards involved. You left your traditional wallet at home.

Third, just before swiping your phone near the reader, you entered a short personal security code that enabled the transaction. The phone's purchasing capability automatically locked as soon as the transaction was complete. This means that if you lost your phone, nobody would be able to use that mobile device to make unauthorized purchases. This provides a markedly higher level of security compared to credit cards or other payment methods that typically reside in the leather wallet.

On the merchant side of the transaction, the point-of-sale is equipped with an NFC chip reader. As I will explain later, your phone is equipped with an NFC chip. When the phone passes close to the reader, the reader is able to pull essential personal identification and account information from the phone, similar to the data contained on the magnetic strip of a credit or debit card. The NFC terminal reads this information in much the same way a credit card swipe is read (although no physical contact is needed to read the NFC chip), and the account information is transmitted to the transaction processing entity (First Data, for instance). The payment transaction is then processed in the conventional way.

One other critical action took place during this transaction. Before you passed your phone over the reader, you made an important choice. Because mobile devices will be provisioned with several payment accounts, you can choose which account to debit the cost of the smoothie against. You may select a credit or debit card account, or (and this is of great significance to the merchant) a merchant-specific prepaid stored value account—something like a refillable gift card. Commerce-enabled mobile devices today can manage multiple accounts. This capability puts merchant-sponsored prepayment incentive programs on exactly the same footing as major credit and debit cards—or cash—from the customer's usability perspective. And that opens a whole new world of opportunity for merchants to build customer loyalty and possibly even lower their transaction costs.

This transaction has implications for the entire mobile commerce value chain, which includes merchants, point-of-sale equipment manufacturers, financial entities and transaction processors, mobile phone manufacturers and mobile carriers who provide the network. Many people do not realize that most of the infrastructure needed to support this mango smoothie transaction is in place today—all around the world. In fact, the mobile payment scenario discussed above actually took place in San Francisco in early 2008 as part of a First Data pilot program.

The Technology behind Mobile Payments

There are five technological building blocks essential for a fully operational network that supports mobile payments. They are:

1. **Contactless payment readers.** These are devices at checkouts and other points-of-sale that read mobile commerce-enabled phones, smart cards, contactless stickers and other contactless payment instruments. They are based on NFC technology and a high-frequency, low-range (a few inches) transmitting device (see the sidebar below for more about NFC). Turnstiles in the BART system are already equipped with contactless readers. Commuters participating in the mobile commerce pilot program could pass through by simply waving their phones near the reader. Many points-of-sale today are already equipped with contactless payment readers.
2. **A network that connects contactless payment readers to transaction processors.** This network exists today. It is the same network used by credit and debit card readers. It transmits account information pulled from a phone or smart card to a service provider (like First Data) who validates the account and processes the transaction.
3. **NFC-equipped phones.** Mobile phones equipped with NFC chip sets are able to exchange account information with contactless payment readers, just like smart cards and contactless stickers.
4. **A network for provisioning mobile devices with personal account information.** This network exists today. It is the mobile network provided by phone service carriers. And the process for placing personal account information into mobile devices, called Over-the-Air (OTA) Provisioning, is in use by mobile phone carriers today.
5. **Electronic wallet software that provides a user interface (UI) on the mobile device and a back-end server-based application.** The UI allows users to manage their transactions and accounts, while the server-based applications do the heavy lifting of payment processing and managing account activity. These applications exist today. In fact, many smart phones being delivered today come with electronic wallet applications already installed.

Although large portions of this infrastructure are in place, merchants at the front lines of consumer purchasing are likely to be most interested in the prevalence of NFC-equipped mobile devices and point-of-sale readers.

NFC-Enabled Mobile Devices:

The incremental cost of equipping a mobile phone with NFC capability is relatively small, adding perhaps \$10 to \$15 to the cost of a phone. Some phone manufacturers are already equipping their next-generation phones with NFC chips as part of the standard package. Phones that are most likely to support mobile purchases in the near term are smart phones that have the capacity for full-featured electronic wallet applications. These are also the mobile devices most likely to come with data plans that enable low-cost promotions and target marketing. The cost of building NFC-enabled phones is low, and some phone manufacturers are already bringing them to market.

What's NFC?

Near Field Communication (NFC) is a short range radio frequency communication technology that enables NFC devices located no more than a few centimeters from each other to exchange data.

NFC devices are totally compatible with existing contactless technologies like smart cards and contactless stickers. NFC is also compatible with most existing contactless payment readers which are already prevalent in transportation systems and ever more common at retail points-of-sale.

In addition to enabling payment transactions between mobile phones and contactless readers, NFC chips placed on products in stores and on billboard display ads can transmit pricing, promotions and other special product information to consumers. In this way the payment technology also becomes a technology for product marketing.

This trend will accelerate rapidly, and for a good reason. Mobile commerce offers significant revenue opportunities for phone service carriers in the form of higher-priced data plans to customers who want to have mobile commerce capabilities in their phones, revenue from advertising carried over their networks and possible revenue from transactions. A key calculation for the carriers is Average Revenue per User (ARPU), which is overall revenue divided by total number of users. A fundamental business strategy for phone carriers is to increase ARPU, and mobile commerce provides an opportunity to do that in a big way.

For carriers, though, the critical question is this: Will mobile commerce-inspired increases in ARPU be enough to offset the added cost of NFC-enabled handsets? The tricky part of this calculation is recognizing that until mobile commerce really catches on, a percentage of those handsets—possibly a large percentage—will never be activated for mobile commerce and therefore won't help raise ARPU immediately. Net gains in ARPU must cover the costs of all the commerce-enabled phones, even the ones not generating commerce revenue.

Mobile commerce will ultimately provide increased revenue opportunities for mobile carriers, but until it spreads more widely into the market, carriers will be careful how they release costlier commerce-enabled phones. They may even adopt lower cost technologies like contactless stickers configured to attach to phones. We'll return to this and take a closer look at these "bridge" technologies later in the paper.

Contactless Payment Readers at the Checkout: Point-of-sale NFC readers present a somewhat different challenge for merchants. Although they are not significantly different in cost compared to standard credit or debit card readers, traditional card readers cannot be retrofitted with NFC capability. That means merchants will need to invest in new equipment to support mobile purchases. Contactless readers are readily available today. ViVOtech is the largest manufacturer of these readers, and units typically cost about \$150 per checkout lane.

It's not, however, difficult for retailers to recover this investment. Because mobile transactions are so much faster than cash or card transactions, more customers move through the checkout lane in a given period of time, raising the operational efficiency of the checkout. There is also a significant customer satisfaction benefit. The First Data study cited earlier also found that 40 percent of contactless sticker users indicated they visited the employee cafeteria more often when they had their sticker, and 17 percent of users spent more per visit to the cafeteria.

Forward-looking businesses most likely to be affected by high-volume mobile purchasing are already preparing for the transition. Right now, nearly 30 percent of the points-of-sale at leading chains in high-volume-transaction businesses such as quick-service restaurants, convenience stores and drug stores are currently equipped with NFC readers. These terminals not only work with NFC-capable mobile devices, but also with radio frequency identification (RFID)-enabled cards being issued today. These include devices such as RFID tags in key chains, smart cards, stickers and other portable formats.

The necessary technological infrastructure is mostly in place. Both NFC-enabled mobile devices and NFC readers are available, and they are penetrating the market to the point where there is very nearly the critical mass needed to make mobile purchasing a commonplace form of transaction.

There is, however, one potential roadblock to the progress being made on the technological front.

An Essential Service: Managing Consumer Account Information

It is not enough just to have an NFC-enabled mobile device to buy that mango smoothie. The mobile device must also contain all the essential account information that is specific and personal to that customer. Every credit and debit card has a magnetic strip that contains this key information. The process for getting that information onto the card is called provisioning. Provisioning is a service provided by companies like First Data that obey strict rules governing the secure handling of personal and financial information as well as the prevention of fraud.

Traditional provisioning works fine for credit and debit cards, but a mobile device is much more than an electronic credit card. It is a single device that can handle multiple accounts from many different issuing businesses, whether they are banks, credit card companies, merchants or even (in the case of the BART pilot) a local government agency responsible for a rapid transit system. All this account information needs to be in the phone. Furthermore, users will be able to directly manage their accounts. This means the account activity that users initiate must also be "serviced."

The role that provides this breadth of account management service for mobile devices, which we call Trusted Services Manager (TSM), is far more involved than traditional credit and debit card provisioning. And it just so happens that everybody in the mobile commerce ecosystem wants to control TSM. Let's see why.

Trusted Services Manager: The Art of Mobile Device Provisioning

The answer to the question of why so many are vying to be the TSM is easy to see. Whoever fulfills the TSM role manages access to mobile consumers. The TSM can potentially have a certain amount of influence over all of mobile commerce, which one day could represent most consumer spending.

Telecommunications carriers feel that they are the natural entities to perform this service, because they own the networks that provide access to all the mobile devices. It would be an extension of the data services they already provide, as well as (potentially) a significant source of revenue for them. There is a catch, though: Telecoms have no infrastructure for handling the vast amounts of account data, nor do they have data centers that comply with payment industry security standards. Furthermore, they would need to establish many thousands of relationships with all the financial institutions that hold personal accounts with credit card companies, processors, regulators and other entities—relationships they currently do not have. They would need to completely reconstruct their own infrastructures and business relationships to fulfill a TSM role—something they are unlikely to undertake.

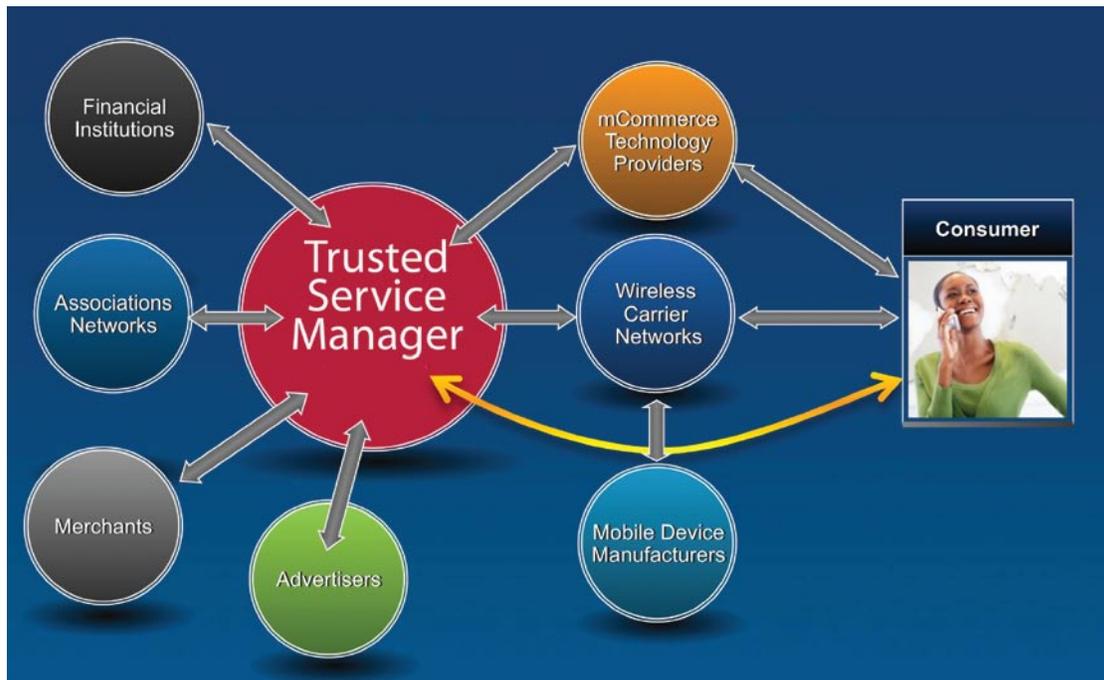
Credit card associations believe they are excellent candidates to fulfill the TSM role, and it makes sense from their perspective. The TSM role would make it much easier for them to issue new credit accounts and expand the number of accounts they have. They already have an infrastructure for handling their credit accounts. But there are problems with this approach, as well. Credit card associations lack access to a complete set of banking data, and they may not be able or willing to reach agreements to share data among competing entities. This would likely force consumers to choose, for example, a mobile device that could only hold a Visa® card or only a MasterCard® card, but not one that works with both. No credit card association would likely give favorable treatment to merchant programs such as stored-value loyalty accounts that completely bypass the traditional credit card instruments and are favored by consumers and merchants alike.

Financial institutions like banks would benefit greatly by serving in the role of TSM. This would put them in a position to serve their customers with the bank's own credit accounts and the ability to manage other accounts at their institutions. Citigroup has offered a mobile phone with just these capabilities, but it only works with Citibank accounts and credit cards. If banks serviced accounts from other entities, they would likely charge a fee for that service to encourage use of their own cards and accounts (conceptually similar to the current practice when using non-network ATMs). With thousands of independent banks all competing for customers, it is unlikely that the partnerships and alliances necessary to adequately serve multiple accounts from multiple banks across multiple carrier networks could ever work on a large enough scale to be effective. The market would fragment into mobile devices with limited purchasing capabilities, leading to great consumer dissatisfaction and the slowing of mobile commerce adoption.

Existing transaction processors who also engage in credit and debit card provisioning may be best suited to fulfill the TSM role. These companies now serve as multiple-account payment processors and card provisioners, and they have extensive relationships with banks, merchants, credit card associations and stored-value account service providers. They also have an enormous infrastructure for securely handling financial and transactional data. They are agnostic about the credit and debit instruments they service; therefore, they come closest to being able to offer a "free trade" zone in the mobile commerce economy. But they, too, need to forge new relationships, especially with mobile carriers, and expanded relationships with banks if they are to fully service consumer account management.

In reality, the ideal candidate for fulfilling the role of a TSM may be an entity that does not yet exist, a consortium of a select few businesses that offers complete and secure service open to all organizations that offer accounts of any kind, and that can process proprietary customer data in a secure, leak-proof way. This would go a long way toward maximizing the commercial potential of mobile commerce by minimizing the temptation of major key players to fragment the market as they pursue their own special interests.

The following illustration shows how the ideal TSM provider fits into the mobile commerce ecosystem:



Bringing multi-account TSM services to a variety of mobile devices accessed through a variety of proprietary networks is the biggest challenge to realizing simple, transparent mobile payments in the mobile commerce ecosystem.

Although the big, market-influencing players in mobile commerce will be tempted to take proprietary approaches to the TSM issue to preserve, monopolize and incrementally grow their existing market shares, in fact, their greatest opportunity lies in a neutral TSM entity. This is because a neutral TSM opens the entire mobile commerce economy to everyone and affords each player the greatest opportunity to grow their positions through expanded service offerings.

Let's see what some of those opportunities are from the mobile purchasing perspective.

Accelerating Commerce by Lowering Barriers to Consumer Acceptance

Think back to our hypothetical situation in which you're a commuter interested in buying a mango smoothie. You selected an account against which to debit your purchase, and let's say you selected a special Jack in the Box JackCash™ account that the company has had in place for some time. By selecting that account, you saved Jack in the Box two percentage points on the cost of that transaction.

One of the most exciting and—for some current providers—frightening aspects of mobile payments is the ability for new and alternate payment options to take hold quickly. Traditionally, it has been difficult to establish alternate payment methods because of the almost-insurmountable obstacles of scale. For a payment system to be adopted and come into use, three things must happen:

- The payment mechanism must physically get into the hands of consumers
- Consumers must accept the payment mechanism
- Merchants must accept the payment mechanism

The infrastructure supporting mobile payments and mobile devices suddenly lowers the threshold to achieving each of these objectives.

In the case of putting the payment mechanism into the hands of consumers, it's already there. Each consumer is attached to his or her mobile device. It doesn't matter where they are; providing them with a new kind of account is a simple OTA provisioning process delivered by the TSM.

The threshold of customer acceptance is also lower. Using the new purchasing method is as simple as pressing a button on their mobile devices. If doing so is tied to a simple incentive, such as a discount or reward, the decision becomes even easier for them.

And finally, there is a lower barrier to merchant acceptance because the transaction is likely to be lower cost (since it may avoid credit card interchange fees), encouraging the merchant to accept this new payment method. Further, the mobile device transaction enables special accounts, coupons, incentives or other programs the customer chooses. The NFC reader will accept it the same as any other payment method. Of course, many more readers must be placed at retail points-of-sale, but this is already under way.

Because it's so easy to issue and accept different mobile payment methods and programs, new ones will not have to reach such high critical mass to be successful. Indeed, it's a simple matter to implement local and specialized payment plans, which open the door to a world of incentive opportunities for merchants and purchasing choices for consumers. These include merchant-specific payment plans, person-to-person payment options, easy global transactions across multiple currencies and even direct bill paying at service providers and non-retail establishments (such as municipalities or utility providers). Consider also customer loyalty programs that tie into the more practical and mundane payment arrangements that reside on the

customer's mobile device, such as a child's lunch fund or bookstore account at college or a "fast pass" account for paying tolls. The possibilities for accelerating commerce and building customer loyalty are endless.

Bridge to the Future

Do you have to wait for the industry to solve this TSM challenge? No, you do not. There are technologies available now that serve as bridge technologies to mobile payments. I've already mentioned contactless stickers, which can be affixed to the back of mobile phones.

Contactless stickers (like First Data's GO-Tag™ product) work like gift cards—they store value, and consumers can reload them with money (and soon, the stickers may work for credit and debit transactions, too). They are totally compatible with the contactless payment readers now appearing at many checkouts. Some companies offering electronic wallet applications also offer contactless stickers so that consumers can move money into their "sticker" account from their handset, just as they would move money between accounts with their computers. In that way, consumers can always have money available for a mobile payment.

Here are just a few things merchants and carriers can do right now with contactless stickers:

- A major carrier like AT&T, Sprint, T-Mobile or Verizon can issue or co-issue a contactless sticker with any credit card association like Visa or MasterCard. The carrier can earn revenue from selling that sticker product, and possibly earn a tiny fraction of every contactless sticker transaction. This becomes a very low-cost way for carriers to earn a portion of the mobile commerce revenue that they will ultimately receive when everything is in the phone.
- A fast food business like Dunkin' Donuts or McDonald's could issue a contactless sticker that has no affiliation with a credit card association. It becomes their own branded payment instrument. They could sell it, or they could give it away in an effort to lower their cost of transactions at the point-of-sale. When consumers pay with this kind of closed-loop sticker, the cost to the merchant is significantly lower than when a customer uses a credit card or an association-affiliated sticker.

As a merchant, when your sticker is on the phone you get some of the benefit you will ultimately receive when you are inside the mobile commerce-enabled phone. It's quite possible we will see near-term competition for sticker real estate on the back of the handset. That space represents a revenue opportunity for merchants, carriers and associations, and currently there is only room for one or possibly two stickers on the phone. Clearly, being on the phone is the first step to being in the phone.

Summary

If you're a merchant, keep these key points in mind about mobile payment. First, the infrastructure is there, the technology is there, and it is advancing very quickly. More and more NFC-enabled mobile devices are showing up in the market, and more and more merchants are adopting contactless readers. If you don't have a strategy for implementing NFC readers at your points-of-sale, you should develop one quickly. The advantages afforded to merchants who can tie marketing strategies and incentives to the mobile device used for transactions will be dramatic.

If you're a financial entity, look to expand your customer base rather than trying to protect yourself with limited, proprietary mobile commerce strategies. Strategies designed to preserve customers by limiting account service options to only your customers and accounts will cause you to lose customers in the long run, because those customers will always opt for the service that provides them with the greatest options for payment and the most purchasing power. The winning strategy for financial entities will be to build partnerships that give them the greatest possible reach among existing and potential new customers.

I'm always interested in your thoughts on this or any other mobile commerce topic. So please, contact me or any member of my team. We not only want to help, we want to listen. I can be reached directly at: barry.mccarthy@firstdata.com.

For more information, look for these white papers at <http://www.firstdata.com/about/whitepapers.htm>:

- The Risks and Opportunities in a Mobile Commerce Economy
- Going Direct with Mobile Marketing
- Mobile Account Management: The Mobile Commerce Enabler
- The Role of Trusted Service Managers in Mobile Commerce



About The Author

Barry McCarthy was appointed to lead the newly formed **Mobile Commerce Solutions business unit of First Data** in January 2008. He has responsibility for commercializing all First Data assets globally for use in mobile commerce. In this role, McCarthy and his team work closely with a variety of industry partners, from the largest wireless carriers to young start-ups, financial institutions, technology providers and terminal manufacturers.

Previously, McCarthy led Global Product and Business Development for First Data and before that, product development for the Commercial Services business unit. Prior to joining First Data, McCarthy was Vice President and General Manager of VeriSign's Internet Payments & Risk Management business unit, a NASDAQ 100 technology company.

Before VeriSign, McCarthy co-founded and later sold MagnaCash, a Silicon Valley micro-payments company that is currently owned by Digital River (NASDAQ: DRV). Previously serving Wells Fargo (NYSE: WFC) as Vice President and General Manager of the ATM business, McCarthy had P&L responsibility for \$110 billion in annual transaction volume and 14 million active ATM cards. McCarthy started his career at Procter and Gamble (NYSE: PG), where he spent 12 years in roles of increasing responsibility, first in sales and sales management and later in customer marketing and brand management. He earned a Masters in Business Administration from the Kellogg School of Management at Northwestern University and completed his undergraduate studies at the University of Illinois, Urbana.

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