triPOS: Building a next generation POS starts with the right payment solution
Developers of integrated point of sale (POS) applications face a variety of challenges. From the shift to EMV, to concerns about security, developers have a lot on their plate. Merchants also increasingly demand seamless customer experiences in-store, on the web and across mobile devices to meet the commerce and payments demands of consumers. Integrated software vendors (ISVs) as a result race to deliver new functionality, to enhance and differentiate their offerings, and to provide new innovations for the merchants they serve.

In this paper, we discuss integrated payments, and the increasing importance of payment middleware. We explore how choosing the right technology in this area can help ISVs reduce development costs, and get to market faster with the cutting-edge features that merchants demand. We cover Vantiv’s triPOS product line in detail, and explain how together with Vantiv’s Express Gateway, triPOS can help simplify and accelerate the development of next generation point of sale applications.

INTEGRATED PAYMENTS

Modern POS platforms do much more than just accept payments quickly and reliably – they add intelligence at the point of sale, boosting efficiency, enabling new services that delight customers, improve loyalty, and add to the merchant’s bottom line. As a few examples, integrated POS platforms can:

• Enable reservations, provide wait list functionality, and manage guest pagers in restaurants to improve efficiency, customer service, and boost revenue
• Increase brand and customer loyalty through gift-cards and various promotions
• Offer enhanced services including cashback and additional payment methods
• Manage inventory and interface with various back-office systems including CRM, workforce management and accounting platforms
• Generate detailed reports identifying the busiest times of day, most popular products sold and performance of various up-sell, cross-sell strategies

While integrated payment providers continue to innovate in a variety of industries, a common denominator behind all these systems is the need for fast, efficient and reliable payments.

NEW CHALLENGES FOR ISVS

As point of sale providers compete to deliver new functionality, they face several challenges.

• **Security**: Merchants are increasingly concerned about a variety of security related issues like fraud, cyber-security and the business risks posed by handling customer data.
• **EMV Chip Cards**: The EMV liability shift has given merchants a reason to revisit their POS and supplier relationships as they modernize to support chip cards, leaving VARs and POS solution providers vulnerable to displacement.
• **Mobile**: While adoption is slow, mobile wallet technology is advancing quickly. Consumers increasingly expect NFC tap payments, and many businesses are implementing or piloting functionality like order-ahead or pick-up-in-store with mobile app integrations to give them a leg-up on competitors.
• **Omnichannel**: With the rise of eCommerce, as merchants revisit the POS, they are looking at payments more holistically. They are seeking payment solutions that address all their payment channels including in-store, online and mobile devices.

EMV poses several technical challenges for developers. Unlike mag stripe readers that appear as simple keyboard devices to a host operating system and application, EMV
devices are considerably more complex. EMV readers interface with micro-processor equipped smart cards and generate a unique cryptogram for every payment transaction. There are multiple options for EMV deployments that both POS providers and merchants need to grapple with. Unlike mag stripe readers, interfacing to EMV peripherals requires bi-directional communication. Also, the software interfaces provided by EMV device manufacturers are complex, making them time consuming and costly to integrate to, with each manufacturer exposing different APIs and their own value-added feature sets.

Every EMV acceptance solution, including the application and associated devices, requires certification with each card brand. This means that developers potentially need to revisit or recertify their applications and EMV integrations every time they choose to support a new device, a manufacturer’s upgrade to a device, or they make significant changes to their software. Clearly, integrating to EMV devices adds cost and complexity to the software development lifecycle.

Aside from challenges specific to EMV, security broadly is an area of increasing concern for both merchants and ISVs. Fines potentially levied by banks and credit card institutions for PCI non-compliance can range anywhere from $5,000 to $500,000 according to FocusonPCI.COM by NeoSpire Inc., depending on the PCI level and duration of the non-compliance period. Even for organizations that are fully PCI compliant, fines can be levied in the range of $50 to $90 per card holder¹ and suspension of credit card acceptance. This is in addition to brand damage and possible civil litigation from breached customers. For applications in Payment Application Data Security Standard (PA-DSS) scope, certifications can cost upwards of $30,000, further complicating development and slowing time to market.

**SEMI-INTEGRATED: A BETTER APPROACH**

In traditional integrated payment solutions, the software that runs on the point of sale platform handles all facets of the payment transaction. This includes reading from barcode scanners, managing inventory and communicating with a payment provider to authorize credit card or debit card payments. The challenge with this approach is that the software on the POS is in PCI scope because it is handling, transmitting and potentially storing sensitive information. Also, if the POS provider is integrating directly to an EMV hardware device, they are required to certify their solution with the card brands as explained above.

For most POS providers, a semi-integrated approach as shown in Figure 1 is a better solution. In a semi-integrated environment, the application logic that runs on the POS is de-coupled from the payment environment.

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The point of sale application sends simple transaction data to secure payment middleware, for example, a request to authorize a payment. The payment middleware then communicates with the payment terminal and manages the process of relaying the transaction to the payment processor, resulting in an approval or denial that is relayed back to the application.

In this environment, it is the payment middleware that is certified by the card brands for various EMV devices and not the point of sale application software itself. This means that application providers can change their software freely without needing to worry about recertification every time they release a new version of their POS platform.

Depending on the implementation, developers can avoid the need for the POS application to handle sensitive payment information. This means that the POS application can potentially be taken out of PA-DSS scope as well, further simplifying development and reducing costs.

The challenge for developers is how to retain the benefits of the integrated payment functionality where applications have full visibility to payment details (like card on file functionality, capturing customer identity, or dealing with temporary communication outages as examples) in this semi-integrated environment. This is where the functionality of the payment middleware becomes important.

TRIPOS: A SMARTER PLATFORM FOR THE MODERN POS PROVIDERS

Vantiv’s triPOS product line is a powerful solution for point of sale application developers and ISVs. triPOS is certified for use with multiple devices including Verifone Vx805, Mx series (915/925) Ingenico iSC series (250/480) iPP series (320/350) and iCMP.

The triPOS product family is comprised of distinct solutions depending on the nature of the point of sale payments integration. These include:

- **triPOS PC** – Payment application middleware that can be distributed along with your Windows or Linux based POS applications to simplify integration with various EMV, NFC and mag stripe capable devices
- **triPOS mobile** – An SDK for mobile platforms that similarly manages various payment devices simplifying integration with mobile apps
- **triPOS cloud** – Payment application middleware similar to triPOS PC, but hosted in the Microsoft Azure cloud, accessible via a REST API that allows your on-premises or cloud resident POS solution to easily interface to on-premises payment terminals

All of the members of the triPOS family (discussed in detail below) help ISVs avoid the need to certify to individual EMV devices and additionally help reduce PA-DSS scope for their applications.

By using triPOS, developers and ISVs become out-of-scope for PA-DSS and EMV device certifications, and businesses benefit from reduced PCI DSS scope when triPOS is combined with point-to-point encryption (P2PE) and tokenization. A typical triPOS deployment involving triPOS PC is shown in figure 2.

The triPOS client installs directly on a Windows or Linux operating system that controls the point of sale environment. Once installed, triPOS exposes a RESTful API via a web-server on an internal TCP/IP port that the point of sale application uses to communicate to the triPOS middleware using JSON format messages.

triPOS gives point of sale developers a single API to handle payments. triPOS looks after communicating with EMV and NFC capable payment devices, and communicating with various payment processors through Vantiv’s Express Gateway. The triPOS middleware is a conduit to the Express gateway, so developers don’t need to worry about coding to Express directly unless they choose to do so for other reasons.
TRIPPOS FEATURES
The triPOS payment API exposes its own set of features while also exposing features of the Express Gateway. Express is an excellent solution for ISVs and merchants alike because it is a single gateway that can be used for both card-present (POS) and card-not-present (eCommerce and mobile) applications. It supports enhanced data and extended parameter sets so that ISVs can code their applications to maximize the chances of successful authorizations. Providing rich data also help merchants qualify for the best possible interchange rates, a key selling point for merchants.

Among the capabilities supported by triPOS are:
- Lane management functionality for stores with multiple checkout locations
- Broad payment support: Credit, Debit, EMV, FSA & EBT
- Cashback functionality
- Store N Forward functionality (for PC and mobile only)
- Convenience fee support
- Incremental authorizations
- Recurring and scheduled payment transactions (via interfaces to Express)

- Account updater functionality
- Gift card support
- Tokenized transactions
- Validated point to point encryption (P2PE)
- Support for multiple payment processors: Vantiv, First Data, Global Payments, Chase Paymentech among them

triPOS also exposes numerous features of the Express Gateway that serve vertical market requirements in retail, eCommerce, Direct Marketing, Auto Rental and Lodging. This makes it easier for POS ISVs to enhance their applications to address new market requirements. Some examples are:

- **Restaurants**: Support for tip amounts and authorization completions
- **Hotel / lodging**: Lodging program codes, prestigious property codes, check-in / check-out dates, room amounts, room taxes, no show indicators, stay durations etc.
- **Automotive**: Pickup & drop off dates and locations, agreement numbers, no show indicators, rental durations, vehicle classification codes, distance traveled, audit adjustment codes etc.
• **Healthcare**: Support for Visa and MasterCard Healthcare/ FSA cards with multiple healthcare account types and amount types, healthcare charge types (clinic, dental, prescription, vision etc.)

**TRIPOS DEPLOYMENT MODELS**

Because merchants have diverse needs for point of sale systems, triPOS can be deployed in various configurations. triPOS can be embedded in the point of sale platform, it can be used with a tablet based mobile acceptance solution, or the payment middleware can reside in a Vantiv managed cloud service (presently Microsoft Azure). The various deployment models are each discussed briefly below.

**TRIPOS PC**

An example deployment of triPOS PC is pictured in Figure 2. This is also referred to as triPOS Distributed, because the triPOS software is distributed by the ISV along with the POS solution. As explained previously, the software is self-contained and installs on Windows or Linux. The POS application software communicates to triPOS via a REST API exposed by an internal web-server. This provides a clean demarcation point between the ISV’s application software and the functionality provided by triPOS. By providing a clean REST API, developers don’t need to worry about client-side libraries or SDKs. They can simply write to the REST API spec allowing the triPOS middleware and the application software to be upgraded independently of one another.

Among the advantages of triPOS PC to POS providers are:

- No need to certify or recertify application software with EMV capable devices
- Reduced PA-DSS scope and certification related costs
- Have complete control over the packaging of the POS and the merchant experience by distributing the triPOS software along with your POS platform

**TRIPOS MOBILE**

For developers building POS solutions on mobile tablets, triPOS Mobile provides similar functionality as triPOS PC except that it runs on iOS and soon, Android as well. Merchants can continue to use supported EMV terminals using wired or Bluetooth connections, but the business logic is driven from the mobile device. ISVs can help merchants supplement the in-store mobile point of sale solution with eCommerce capabilities with a website or mobile app that communicates directly through the Express Gateway using the same Merchant ID (MID). Vantiv offers various solutions to make it easy to add eCommerce functionality including hosted checkout page support.

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**Figure 3** - triPOS mobile allows ISVs and developers to build mobile POS solutions
triPOS mobile provides an SDK that simplifies coding to the “point-of interaction” (POI) devices supported by triPOS. The SDK provides an abstraction layer that developers can use to create interactions on a payment terminal (displaying text, accepting keyboard inputs or obtaining yes/no answers to questions as examples) without the need to write code for each specific terminal. The SDK also simplifies setting up and communication payment transactions through the Express Gateway.

Among the benefits of the triPOS Mobile solution are:
- No need to certify or recertify application software with EMV capable devices
- Reduced PA-DSS scope and certification related costs
- Drive payment interactions directly from a mobile tablet anywhere in the store
- Easy integration to EMV payment devices via Bluetooth
- A lower cost, easier to support POS solution for small merchants
- Store and forward (offline transaction functionality)

**TRIPOS CLOUD**

triPOS Cloud is the newest deployment model for the triPOS payment middleware. It uses a software-as-a-service (SaaS) deployment model to simplify installation and ongoing maintenance. For ISVs moving all or part of their POS functionality to the cloud to improve flexibility or reduce costs, triPOS Cloud can be a good choice.

In the cloud deployment model, the triPOS software is hosted by Vantiv, and the REST API is exposed via the internet. Merchants can connect to the cloud service from an on-premises POS or may choose to implement their POS application logic entirely in the cloud and make it accessible to merchants through any device capable of accessing the internet. EMV PIN Pads will continue to reside at the merchant’s location as points of interaction, but other software components can reside in the cloud.

Lane management features in triPOS Cloud allow integrators to pair multiple payment terminals to the cloud service. Figure 4 illustrates the interaction between a POS provider’s software running in the cloud, the PIN Pad (on premises), triPOS Cloud, and the Express payment gateway, also running in the cloud.

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**Figure 4**

The POS application interacts with the triPOS Cloud REST API
https://tripos.vantiv.com

One or more EMV P2PE PIN Pads at the merchant location paired to cloud service

The POS application interacts with the triPOS Cloud REST API
https://tripos.vantiv.com

Express Payment Gateway

or other payment processors
At present, Verifone’s Mx915 is certified for use with triPOS Cloud and additional devices are on the way. The Mx915 provides a bright 4.3 inch color display and supports EMV chip cards, swipe transactions as well as NFC tap functionality allowing customers to pay using Mobile wallets such as Apple Pay and Android Pay.

Among the benefits of the triPOS Cloud solution are:

- No need to certify or recertify application software with EMV capable devices
- Reduced PA-DSS scope and certification related costs
- ISVs don’t need to worry about packaging, deploying or maintaining the triPOS software
- Application software can be updated independently of triPOS
- ISVs have increased deployment flexibility with the option to deploy POS application services on premises or in the cloud, leveraging triPOS cloud in the same manner

SUMMARY

For point-of-sale application developers, choosing the right payment middleware is an important decision. ISVs need a solution that allows them to easily access the latest EMV capable hardware without the need to re-certify their application to every device. They also need strategies to help reduce PCI scope so they can spend their time focusing on the functionality of their application and the merchants they serve.

Vantiv’s triPOS payment middleware is a powerful solution that supports a variety of deployment models. It supports state-of-the-art EMV Pin Pads and simplifies application development by avoiding the need to code to multiple physical devices. Instead, developers code to a single, easy-to-use REST API, insulating them from the underlying hardware and helping them reduce PCI scope.

The triPOS middleware connects to Vantiv’s Express Gateway, a high-performance, flexible gateway that exposes rich functionality for multiple industry verticals. The gateway supports both card present and card not present features allowing developers to use a single gateway for point of sale, eCommerce and mobile applications, enable developers to support a variety of omnichannel use cases.

To learn more about Vantiv Integrated Payments solutions please visit https://developer.vantiv.com/community/point-of-sale

For technical information triPOS and its various deployment options, developers can visit https://developer.vantiv.com/community/point-of-sale/pages/integrations