

# Web Services for Point of Service applications, Part 1: Retail store peripherals and Web services with POS open standards

Skill Level: Intermediate

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This article, Part 1 of a series, demonstrates how an emerging standard, Web Services for Point of Service (WS-POS) peripherals, allows interoperability between retail peripheral devices (printers, scanners) and point-of-service (POS) applications, irrespective of the platform (Java™ or Microsoft® .NET®) to which they are physically connected. All the major Web services players support the Web services stack that's used to build the WS-POS open standard. This means that peripherals aren't required to adhere to a single platform, but can instead behave as true services.

## Introduction

WS-POS is a new standard in development at the Association for Retail Technology Standards (ARTS), which addresses the future requirement of sharing peripheral devices, such as printers and scanners, between multiple POS terminals in a retail store. Peripheral sharing makes new retail scenarios possible, which can transform

the customer experience. This article briefly reviews the concepts underlying this forthcoming standard and the types of business processes it enables at the retail store.

## Overview

In the world of retail IT, new and innovative solutions bring many devices and peripherals into the store. In the past, the in-store technology focus for retailers included the traditional front-end point of sale (that is, cash register), associated receipt printers, scanners, and displays. However, the current retail environment includes traditional technology and new POS devices, such as cart-mounted tablets, store associate PDAs, self checkout, and kiosks, to name a few. Outfitting every POS solution in store with a scanner, printer, display, magnetic stripe reader (MSR), and payment device would be too expensive. That's why peripheral sharing in the store is imperative—to provide these new employee and customer touch points and drive accessibility to peripherals regardless of the user's location or the device used in a store. WS-POS offers an open standards-based methodology for enabling these solutions.

## Benefits of WS-POS

The fundamental benefit of WS-POS is the ability to provision POS peripherals as services that can be accessed by remote POS applications, including mobile POS solutions. Retailers can then use the power of Service-Oriented Architecture (SOA) to allow access to their existing peripherals anywhere in the store through these services. WS-POS holds potential benefits for all members of the retail ecosystem.

For **retailers**, benefits include:

- **Ease of integration:** Retailers can integrate mobile devices and newer customer and employee touch points in the store with POS peripherals in the store in a vendor-neutral and application-neutral manner.
- **Faster checkout solutions:** Checkout time might be reduced through discovery of peripherals closest to a mobile device, for example.
- **Fewer peripherals required:** Sharing peripherals between self-checkout and regular POS lanes, for example, reduces the number of printers required in the store. Similarly, customer-owned mobile devices and employee-owned mobile touch points can share printers, thus containing the cost of adding new technology in stores.

For **peripheral providers**, benefits include:

- **Ease of integration:** Provisioning POS peripherals as Web services

simplifies integration with applications and mobile POS solutions.

- **Enterprise management:** POS peripheral services can now be easily controlled from the back office IT infrastructure of the enterprise as well, especially when combined with Service Oriented Device Architecture (SODA).
- **Flexibility:** Web services are inherently platform independent, so integration with a device running a WS-POS stack is more flexible than other choices.

For **ISVs**, benefits include new capabilities for POS peripherals:

- **On-demand discovery and usage:** ISVs have the ability to discover and acquire POS peripherals on demand in a mobile environment, such as an MSR and POS printer from a mobile POS device.
- **Device sharing:** ISVs can access shared remote POS peripherals, such as remote access to a shared receipt printer in a checkout station.
- **Remote access to device data** This permits taking intelligent action based on information transmitted from the peripherals (for example, the purchase of a sensitive item may trigger a check against a government watch list).

## Use case

A customer walks into a store that has implemented WS-POS. The store's network recognizes the customer's WS-POS-compliant mobile phone and logs him in. The POS client software starts on the mobile phone, notifying the store that the customer will be using his mobile phone as a bar code scanner and POS client. While shopping, he finds an item he wants, snaps a picture of the bar code with his cell phone, and places the item in his cart. The picture of the bar code is analyzed, then the UPC is determined by the phone's software and forwarded to the store's server for product lookup and price. The price is then reported to the mobile phone's POS client and displayed on the screen. The customer continues in this fashion for all items he wants to purchase.

When the customer is finished shopping, he presses **Pay Now** on his mobile phone's POS client and requests an MSR from the store's network. He's notified that MSR 6 is the closest available MSR, so he walks over and swipes his debit card. His mobile phone's POS client requests a PIN, which he enters.

The customer starts walking to the exit nearest where he parked. Near the exit, he stops at a bank of three printers. His POS client automatically requests one of them and passes the transaction information to the printer. The POS client notifies him that his receipt will be printed at printer 3. He picks up his receipt and exits the store,

and his POS client software shuts down.

## Discussion

As stated earlier, the benefit of WS-POS is the ability to share detached peripherals as services. Typically, stores have an MSR, a printer, and a bar code scanner for every checkout lane, where the number of checkout lanes is determined by anticipated peak demand.

Item scanning takes the vast majority of the time in a typical transaction. Payment takes significantly less time than scanning, and printing takes less time than payment or scanning. All of these tasks usually happen in a serial fashion (that is, customers pay after they've finished scanning, and the receipt prints after payment is received). This results in a store having many peripherals that sit idle while the other attached peripherals are in use.

With WS-POS, retailers can reduce the number of peripherals their stores support and maintain by planning their peripheral purchases and layouts to maximize usage and customer throughput. In this case, the customer had his own POS client and bar code scanning capability, but needed an MSR and printer to complete his transaction, both of which were scheduled in a just-in-time fashion to maximize availability for other customers.

## Components of WS-POS

To provide coverage for the countless possible use cases, the WS-POS specification needs to address only a few specific areas. The following component areas are seen as a future-proof set of capability areas; not all may be necessary for all versions of WS-POS.

### Messaging base

To interoperate, at a basic level some messaging and transport specifics must be agreed upon. This messaging base is the set of technologies used as a basis for all the other areas and serves as the beginning point for a description of all the messages that are employed.

### Security

Security is a key concern of the entire ARTS distributed peripheral system. In a consumer system like this where private information is being exchanged, such as credit card numbers and purchase details, the trust the users have placed in the system must never be compromised. Security needs to be assured in all the transactions such that devices can be authenticated, authorizations can be assured, transmitted information is always safe from snooping and alteration, and so on.

Transport Layer Security (TLS) is the standard for security at the transport layer, while at the SOAP message level, WS-Security is the specification of choice.

### **Service description**

This area lays out the technique that's used to formally describe the subsequent messages in a recognized, standard way such that all parties can have a known, agreed-upon view of the details of the various messages. Along with a good description base comes the capability to provide tools that assist in the development and verification of conforming products.

### **Service discovery**

The ability to find and pair with devices on the LAN (or non-LAN devices represented by proxies on the LAN) in an ad hoc manner is a key requirement. This is necessary because ease of use is an important requirement for the ultimate users of the devices in the store. Customers may be unwilling to participate in using a complicated distributed POS system. Therefore, as a new device is introduced into the system, it and the collaborating devices must transparently absorb the new device into the system.

### **Events**

This area covers the function needed for devices to share information. The main distinction made in models of interaction is between the pull model and the push model. *Pull* interaction occurs when an information sink inquires about a specific information source the data desired. *Push* interaction is just the opposite; information sources deliver new data to interested parties without those parties needing to poll.

### **Management**

Monitoring and state change of devices and the services they offer, while not within the scope of preliminary WS-POS discussions, will likely be a requirement of future WS-POS specifications.

## **Conclusion**

Retail store owners are demanding more control over their peripheral investments—such as printers, scanners, and card readers—in stores by increasing shareability of these peripherals between multiple POS terminals. This grants remote access from mobile devices and increases control of peripherals from enterprise IT systems. WS-POS addresses these new requirements, allowing point-of-sale peripherals to behave as true services.

Stay tuned for future articles, which will cover the final specification choices for the WS-POS profile and implementation examples.



# Resources

## Learn

- Head to the [NRF-ARTS Web site](#) to grab the WS-POS specification when it becomes available.
- Learn more about [Service Oriented Device Architecture \(SODA\)](#) in this article by Scott de Deugd, Randy Carroll, Kevin E. Kelly, Bill Millett, and Jeffrey Ricker.
- The [SOA and Web services zone](#) on IBM developerWorks hosts hundreds of informative articles and introductory, intermediate, and advanced tutorials on how to develop Web services applications.
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