



Lowering the Point of Sale System Support Costs with Intel® vPro™ Technology

Written for retail IT organizations managing Point of Sale (POS) systems, this paper shows hard dollar savings that retailers can expect to see by adopting advanced POS systems with Intel® vPro™ technology. The capabilities of POS systems continue to increase as their role in many retailers evolves from simple cash registers to sophisticated customer interaction devices. Advanced Intel processors are widely used in advanced POS systems and benefit from the hardware-assisted security and manageability capabilities of Intel® vPro™ technology, which reduces the total cost of POS ownership by improving the accessibility and serviceability of POS systems.

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EXECUTIVE SUMMARY

Wipro's Product Strategy and Architecture (PSA) team conducted primary market research with 40 North American retailers in order to understand the costs associated with point-of-sale (POS) system management. Wipro PSA analysts then projected the financial benefit of investing in advanced POS systems with Intel® vPro™ technology on POS management practices and processes. POS systems are becoming more sophisticated, and it is now common to find POS systems running multiple applications including timecards, human resources programs, inventory systems, customer relationship management tools, multimedia displays, and up-sell and cross selling tools, as well as cash register functions. Advanced Intel processors such as the Low Voltage Intel® Core™ 2 Duo Mobile with Intel® Advanced Management Technology (Intel® AMT) are used in advanced POS systems. These systems benefit from Intel® vPro™ technology which reduces the total cost of POS ownership by improving the accessibility and serviceability of POS systems.

POS Systems with Intel® vPro™ Technology benefit retailers by:

- Reducing total cost of ownership – Retailers in our survey spent an average of \$1,217 per POS per year in maintenance. One of the major cost drivers is field service visits to fix major software or hardware malfunctions in a POS system. With Intel® vPro™ technology, IT departments save money by fixing more of these issues remotely rather than onsite with a field service visit.
- Reducing power consumption – More than 97% of retailers surveyed had power saving initiatives in place. Switching to POS systems with lower power consumption such as the Low Voltage Intel® Core™ 2 Duo Mobile platform can significantly reduce a retailer's electricity consumption.
- Reducing the cost of complexity – Some retailers in our survey had dozens of models of POS systems from up to five different manufacturers. Such heterogeneity increases POS maintenance costs, a cost which can be reduced by standardizing on Intel® vPro™ technology enabled POS systems. Intel® Active Management Technology (Intel® AMT) is a key technology enabler in this cost reduction by allowing retail IT to a) discover assets even if they are switched off, b) identify the model, type, and status of the POS system, and c) apply the appropriate patch or fix.
- Improving security – By investing in POS systems with Intel® vPro™ technology, retail IT departments can remotely deliver encrypted updates to ensure that security patches are up to date, even if systems are powered off or have hung operating systems. Intel® vPro™ Technology includes Intel® Trusted Execution Technology (Intel® TXT) which offers hardware based security extensions to Intel chipsets and processors, enabling greater levels of protection for information stored, processed and exchanged by the POS system. Intel AMT also includes anti-theft or "poison pill" technology, which may be incorporated into POS systems.

This whitepaper explores these and other benefits in detail, quantifying the financial impact of Intel® vPro™ technology. Wipro PSA built an ROI calculator for IT departments to assess the potential impact of Intel® vPro™ technology on their POS management practices, and the application of that calculator to everyday retailer issues is demonstrated.

INTRODUCTION

Retailers in North America are increasingly building their capabilities to compete on customer intimacy and loyalty. Retailers made great strides with operational excellence in the past decades, but it is harder to gain and sustain a competitive advantage with operational excellence as the technologies, tools, and processes that enable greater efficiency become widely used throughout the industry. The industry-wide mission to squeeze costs and inefficiencies out of retailing is ongoing, and retailers will have to continue these efforts to keep up with the industry leaders. But there are logical and natural limits to reducing costs through operational excellence. Customer intimacy and loyalty, on the other hand, have almost unlimited upside, as loyal customers buy more frequently, spend more money, are cheaper to service, and act as evangelists for the retailer, thereby magnifying their value to the store.

In many segments of retailing, advanced POS systems are the cornerstone of customer-centric sales. For retailers that want to know as much about their customers as they can, the POS system is a powerful tool for capturing information. POS systems are also used in service-oriented selling, allowing the sales associate to suggest complementary goods in order to cross sell and up sell. For example an Office Supply Superstore might offer customers extended warranties on computers, phones, and fax machines at the checkout. The ability to rapidly assess, select, and return the appropriate product or services to cross sell is dependent on POS systems based on PC platforms. Likewise, the ability to offer consumers richer experiences at the point of sale, like showing short videos at gas stations or in a checkout line at the grocery store is dependent on PC platforms. POS systems are mission critical business enablers for retailers, and their importance is increasing as their functions and role in a sale evolve from simple cash registers to robust sales enablers.

Many advanced POS systems are based on Intel processor platforms, such as Low Voltage Intel® Core™ 2 Duo Mobile processors, rather than legacy embedded devices running real time operating systems. While POS sophistication and functionality is increasing, the total cost of ownership is actually lower than traditional systems, as the POS vendors take advantage of Intel vPro technology, which enables remote management. IT organizations within the retail industry are able to maintain, manage, and protect their POS systems using Intel vPro's hardware-assisted security and manageability capabilities, lowering both the IT costs of POS management and the business cost of malfunctioning POS systems. Moreover, the latest POS management consoles from Independent Software Vendors (ISVs) and POS systems vendors offer native Intel vPro technology support, allowing IT to take advantage of enhanced features to manage POS systems – such as discovering and reaching assets even when they are powered off.

Wipro's Product Strategy and Architecture (PSA) team conducted a study of 40 retail organizations in North America to better understand the costs of managing POS systems. Both retail IT executives and practitioners were interviewed to get real world data on POS management processes, common failures, and costs associated with resolving issues. Based on this information and several prior studies into Intel vPro technology, Wipro PSA developed a model to assess the potential cost savings should a retailer invest in POS systems with Intel vPro technology enabled processors.

In this research, we found that by investing in advanced POS systems running Intel processors with Intel vPro technology, retailers can enhance their customer centricity while also reducing the cost of managing and maintaining their POS systems. Retailers are able to simultaneously compete on two dimensions, namely customer intimacy and operational excellence.

HOW INTEL® VPRO™ TECHNOLOGY IS USED IN POS SYSTEMS

Intel vPro technology greatly enhances the ability of retail IT organizations to remotely access and manage their POS systems. With Intel vPro technology enabled POS systems, retailers can protect, maintain, upgrade, and repair POS systems, even if the power is off, the OS is unresponsive, hardware (such as the hard drive) has failed, or software agents are missing. Technicians can reach POS systems to maintain systems, take asset inventories, deploy applications, or diagnose problems – all from a remote command center.

Intel vPro technology includes Intel AMT¹ that allows the IT team to access the POS terminal utilizing hardware based, out-of-band management if the normal communication channel through the operating system is not accessible. The out-of-band communication channel allows the system to be powered up for diagnosis and repair, and the retailer's IT team can access the AMT event logs to view system asset information and status. Even if the system cannot be repaired "down the wire," the retail IT team is equipped with diagnostic information before they embark on a field service visit and can prepare spare parts accordingly.

Previous studies on Intel vPro technology in enterprise IT settings (see Wipro whitepapers *Measuring the Value of Intel® Core™2 Processor with vPro™ Technology in the Enterprise* and *The Benefits of Intel® Centrino Pro Processor Technology in the Enterprise*, available for download on Intel.com/vPro) have shown that Intel vPro technology has a significant impact on the following cost categories:

- Manual Cost of Resolving New Business Application Deployment Failures
- Manual Cost of Resolving Patch Deployment Failures
- Manual Cost of Resolving Audit Failures
- Manual Cost of Resolving Inventory Management Failures
- Manual Cost of Resolving Major Hardware Malfunctions
- Manual Cost of Resolving Major Software Malfunctions
- Manual Cost of Security Incident Management

When applied to retail POS systems, we found that Intel vPro technology impacts those cost categories in the following ways:

Dramatically Improved Management of Major Hardware and Software Malfunctions

Since Intel vPro technology agents are available and operational even when the POS itself will not boot, IT will benefit from the ability to query the deployed hardware and software configuration, remotely boot and test the system from a management console, and then take remedial action without time-consuming field visits. Naturally this also greatly reduces the amount of time the POS system is out of commission.

¹ Intel® Active Management Technology (Intel® AMT) requires the computer system to have an Intel® AMT-enabled chipset, network hardware and software, as well as connection with a power source and a corporate network connection. Setup requires configuration by the purchaser and may require scripting with the management console or further integration into existing security frameworks to enable certain functionality. It may also require modifications of implementation of new business processes. For more information, see www.intel.com/technology/platform-technology/intel-amt/.

Easier and Faster Software Deployment

Intel vPro technology can enable application and patch deployments—including security updates—to occur more rapidly, with dramatically reduced times for recovery from failed deployments. Likely reductions are attributable to simplification of problem diagnosis, elimination of most field visits, and fewer failed deployments due to misidentification of target systems. In addition, by deploying security updates more promptly, retail IT managers can minimize the time it takes to close any windows of vulnerability. Intel vPro technology can be part of a retailers' strategy to maintain or keep ahead of Payment Card Industry (PCI) Data Security Standard (DSS) requirements.

Improved Remote Asset Inventories

Whether or not they are powered on, it is easier to correctly identify POS systems with Intel vPro technology. This can result in a net reduction of inventory failures, audit failures, re-counts, and misidentification of assets. By greatly reducing or eliminating the need for time consuming manual inventory taking and asset tracking, Intel vPro technology positively impacts cost and effort in inventory tracking.

More Efficient and Faster Response to Security Incidents

Often the best response to security incidents such as worms or virus attacks is the swift reconfiguration of ports and network connectivity by management software. Intel vPro technology can make IT personnel more responsive by virtually eliminating the cases where manual effort is required to achieve reconfiguration.

INTEL® VPRO™ TECHNOLOGY AND POS MANAGEMENT TOOLS

Intel vPro technology enhances the capabilities of software-based, in-band POS management consoles from Independent Software Vendors (ISVs), as well as management tools offered by POS systems vendors, by offering native Intel vPro technology support.

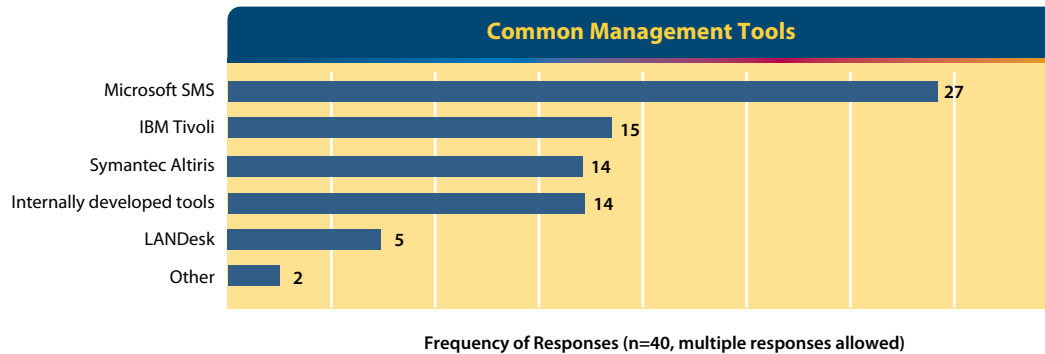


FIGURE 1. Software Management Tools Used for POS Management

Our survey of retail IT organizations showed a diverse mix of software management tools in use. It also revealed that many retailers use multiple tools for POS management. In our sample, Microsoft Systems Management Server (SMS) was the most commonly used, followed by the Altiris® Client Management Suite™ (CMS) from Symantec, IBM Tivoli and internally developed tools. Of these client management suites, Altiris and SMS have been optimized to take advantage of the advanced capabilities of Intel vPro technology, hence retailers do not need to change their management tools to take advantage of the hardware based security and remote management capabilities.

CALCULATING THE FINANCIAL BENEFITS OF DEPLOYING POS SYSTEMS WITH INTEL® VPRO™ TECHNOLOGY

Using data collected from 40 North American retailers, Wipro PSA developed a calculator to quantify the benefit and operational cost savings from deploying Intel vPro technology enabled POS systems. This whitepaper uses the calculator to explore and exemplify ways in which retailers are using Intel vPro technology to increase their ability to compete on two vectors – namely customer intimacy and operational excellence.

In order to illustrate the benefits of Intel vPro technology, Wipro took the average of all survey responses to build the profile of an average retail organization. This Model organization has just under \$3Bn in annual revenue, and has 1,900 POS systems across 589 branches. Its POS systems have a product life of around five years. The model retailer is serviced by three different POS vendors, and typically deploys four POS system models per year.

Model Company	
Total # of Desktop Platform POS systems	1,900
Percentage of POS systems already on vPro	0%
Percentage that will be covered by vPro	100%
Percentage of POS systems covered by management software	75%
Refresh rate (in years) of POS system	5
Number of POS system models deployed per year	4
Number of active hours POS systems are on per day	12
Average Hourly Burden Rate Level 1 (U.S. Dollars)	\$34
Average Hourly Burden Rate Level 2 (U.S. Dollars)	\$42
Average Hourly Burden Rate Level 3 (U.S. Dollars)	\$50
Number of Major Applications Deployed Per Year	5
Number of Inventories Per Year	24
Patches, Audits and Security Incidents Per Year	98
Number of branches	589
Annual Revenue	\$2,926,923,077
Number of POS vendors	3

FIGURE 2. IT and POS make-up of the "Model Company" based on the average values of survey results

The financial benefits of operational excellence are relatively easy to measure. This is because the link between technology tools and business process on the one hand and cost savings from efficiency on the other, can be measured, tracked, and quantified. Measuring the impact of Intel vPro technology on customer intimacy is harder to quantify, as there are more variables to account for, and the impact will vary by individual retailers and their business. We have, therefore, not captured these impacts in our ROI calculator. But, given the importance of customer intimacy initiatives to many retailers, we have identified and documented ways in which Intel vPro technology improves uptime and security at the POS. IT teams can demonstrate their alignment and contribution to corporate customer loyalty initiatives by showing how POS systems and IT infrastructure enable consumers to trust the retailer with their information.

REDUCING OPERATING COSTS WITH INTEL® VPRO™ TECHNOLOGY

While there is variation by scale, size, and type of retailer, our survey showed that on average, retailers expect to spend around \$1,217 per year per lane on POS system maintenance. The greatest cost drivers are field service visits triggered by major software and hardware malfunctions that cannot be fixed remotely, or worse yet, issues which are incorrectly diagnosed as requiring field service visits when in fact they could have been repaired remotely. Labor costs are the largest component in manual fixes, and by reducing the number of times manual intervention is required, the retailer saves on operating expenses.

Level	Description	Rate
1	<ul style="list-style-type: none"> • Help Desk/First user contact • Routine problems • General skills 	\$34 / hour
2	<ul style="list-style-type: none"> • Technicians • Detailed fault isolation • POS installation and reconfiguration • Specialized by technology, hardware system(s), and operating system(s) 	\$42 / hour
3	<ul style="list-style-type: none"> • Analysts/On call • Project research and technical leads for enterprise projects • Handles most complex problems • Performance and design issues • General “master” skills 	\$50 / hour

FIGURE 3. Fully burdened average IT costs in North American Retail IT Organizations in 2008

Whether the retailer uses in-house IT staff, outsources to a depot servicing firm, or outsources to the POS system manufacturer, the basic cost model remains the same – the higher the failure rates and the higher the manual intervention, the higher the operating cost to the retailer. Retailers are addressing this by attacking the cost of labor directly – either by outsourcing field service visits and support to equipment manufacturers and depot servicing firms, or by working with offshore partners that have lower labor costs.

In our survey of 40 retailers, we found that while outsourcing POS management or certain elements of POS management is common, more than 80% of retailers are still involved in field service visits. We also found that centralized management now seems to be an industry best practice, with 70% of retailers in our survey claiming to be managing POS systems centrally. Aside from reducing hourly labor costs by outsourcing, retailers and outsourcers servicing POS systems can reduce the cost of POS management by using Intel vPro technology to handle more of the management with remote management tools.

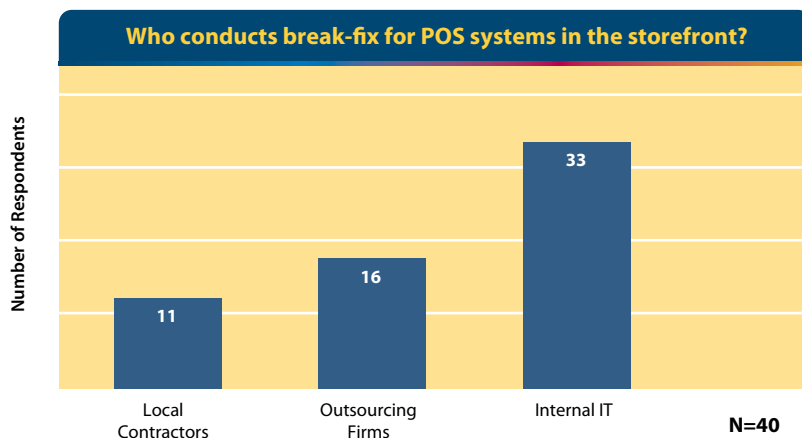


FIGURE 4. The burden for break-fix still falls on internal IT

To illustrate the potential savings of servicing POS systems remotely, consider the model retailer as defined by the survey results. The model retailer has 1,900 POS systems across the company's 589 branches and has annual revenue of just under \$3Bn. The retailer has three POS vendors, possible due to acquisitions made in prior years, and has two to three models of POS systems currently in the field from each vendor. POS systems are refreshed on a five year lifecycle, and the model retailer expects to deploy four POS models during the coming year.

For the Model retailer, replacing their current POS systems with Intel vPro technology-enabled POS systems on their existing refresh cycle of five years results in a net present value of \$831,000. The largest cost saving comes from the reduced costs of resolving major hardware incidents (\$330K) and major software incidents (\$269K). The remaining savings are driven by reduction in manual resolution costs of audit, inventory and new application deployment. All of these savings are driven by Intel vPro technology capability to power up systems remotely even if they are powered down, using the out-of-band communication channel, and then to assess the issue before applying the requisite fix. For retailers with multiple branches such as the Model retailer, this reduces the number of field service visits required, and for those instances where a problem cannot be fixed remotely, IT departments are armed with information on the POS system and its problem before arriving at the site. Investing in Intel vPro technology saves the retailer around \$140 per POS per year over the 5 year roll-out, representing an 11% cost reduction over the current target cost to serve of \$1,218 per year. In year 5, when the fleet is fully switched over the Intel vPro technology enabled POS systems, the model retailer will see savings of \$300 per POS per year.

Case 1: Reducing Operating Costs

National Retailer with 589 stores and 1,900 POS systems

Using POS systems from three vendors – due to acquisitions the store is faced with 2-3 models from each POS vendor.

POS systems are on a 5 year refresh cycle.

Expects to deploy 4 POS models per year going forward

Switching to Intel vPro technology enabled POS systems will save \$300 per POS per year once the fleet is 100% Intel vPro technology enabled; with a 5 year refresh cycle this amounts to an average savings of \$140 per POS per year.

Investment has a Net Present Value of \$831,000 (assuming a 12% discount rate).

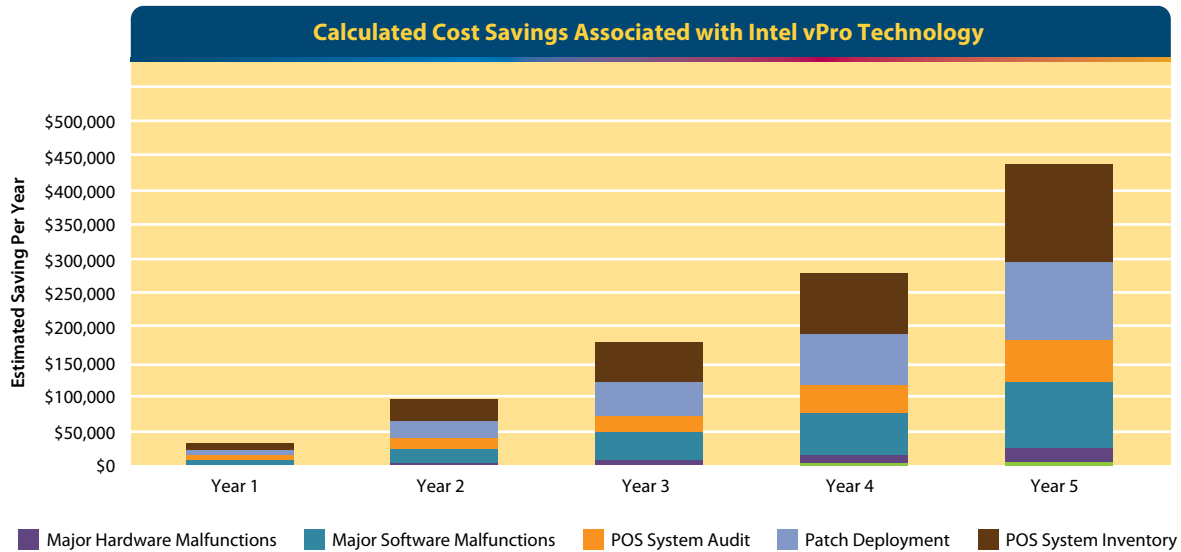


FIGURE 5. Breakdown of savings by year

Breakup of Benefits (Total Savings Over 5 Year Horizon):	
Benefits from POS Systems	\$1,328,382
Resolving POS Deployment Failures	\$1,231
Resolving Software Deployment Failures	\$224,156
Resolving Audit Failures	\$147,198
Resolving Inventory Failures	\$48,783
Resolving Major Hardware Malfunctions	\$330,569
Resolving Major Software Malfunctions	\$268,864
Resolving Security Incidents	\$11,744
Benefits from Intel SIPP	\$387,493
Total costs of implementation	\$91,655

FIGURE 6. The breakdown of total savings for POS systems over 5 years

REDUCING THE COST OF COMPLEXITY WITH INTEL® VPRO™ TECHNOLOGY

Previous research by Wipro and Intel has shown that there is a significant IT cost to managing heterogeneous PC fleets (see Wipro whitepaper, *New Insights in PC Management, Benefits of Controlled PC Hardware Diversity and Recommended Practices: Strategic Management of the PC Installed Base*). As additional POS models are added to the mix of POS systems, hardware related support costs rises across the POS fleet for the retailer, as do software qualification and deployment costs.

The unfortunate reality faced by many retail IT departments is great diversity in POS models caused by acquisitions and the “sweating” of legacy assets. In our survey of 40 retailers, we found that retailers had an average of three POS vendors and had six POS models in deployment. While these were the averages, there were some extreme cases of retailers with up to seven POS vendors and 50 or more POS models deployed.

Intel® AMT², which is one of the elements that make up Intel vPro technology, has built in functionality which allows better discovery and diagnosis of POS systems. IT teams can use a remote management application to query a POS with Intel vPro technology to ascertain its make, model, and configuration information, and then determine the best course of action that is specific to that model. This directly impacts the cost of resolving patch deployment failures, as well as major hardware and software malfunction.

For example, if the Model retailer from our survey data was to double the number of POS systems it deploys each year from its current four POS models per year to eight models per year, the annual cost of failures would increase from \$417K to \$753K. Costs associated with the total number of POS systems, such as the audit and inventory failures, remain the same as the total number of POS systems deployed is constant at 1,900 systems. However, patch deployment costs increase dramatically as systems become misidentified or classified, and incorrect patches are applied. The cost of hardware and software issues also increase as the sheer variety of systems in the field doubles over time.

Intel vPro technology directly impacts these costs by making it easier to identify the model and characteristics of the POS system in question for patching. Similarly vPro lowers the cost of fixing hardware and software malfunctions. Consider the case of the Model company, but with 8 POS systems deployed per year instead of four. Looking at just the three cost drivers impacted by complexity, namely patch deployment failure resolution, hardware failure resolution and software failure resolution, we see a 70% reduction in cost of resolving patching issues, and an 84% reduction in the cost of resolving hardware and software issues.

Case 2: Reducing the Cost of Complexity

Model Retailer with 589 stores and 1,900 POS systems

Deploying 8 POS models per year

POS systems are on a 5 year refresh cycle.

When the refresh is complete, Intel vPro will reduce the annual cost of hardware, software and patch resolution issues by \$501K, or 76%.

In the Intel ROI Calculator for retailers, these savings are captured in the overall Intel vPro savings results.

Cost Element	Before vPro	After vPro	Savings
Manual Cost of Resolving Patch Deployment Failures	\$379,521	\$113,856	\$265,665
Manual Cost of Resolving Major Hardware Malfunctions	\$154,877	\$24,780	\$130,097
Manual Cost of Resolving Major Software Malfunctions	\$125,967	\$20,155	\$105,812
Total	\$660,365	\$158,791	\$501,574

FIGURE 7. Impact of Intel vPro technology on reducing costs associated with complexity

SAVING POWER WITH INTEL® VPRO™ TECHNOLOGY

From corporate sponsored environmental initiatives to basic cost reduction pressures, retail IT departments are under pressure to reduce power consumption in their stores. In our survey, 97% of firms had some sort of power saving initiative underway. We believe this trend will continue, as environmental awareness increases, energy costs rise, and the quantity of electronic equipment in the store, from POS systems to kiosks and digital signage, continues to increase. Intel vPro technology contributes to power savings in two ways, explored in detail below. While these savings will not usually benefit the IT budget, it allows IT to make a positive environmental impact and saves the retailer money.

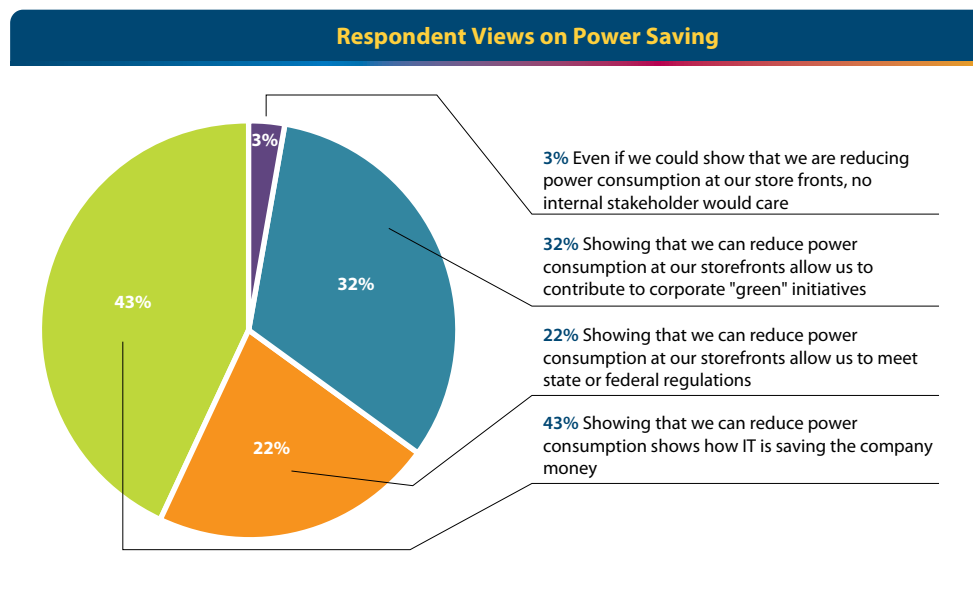


FIGURE 8. Retailers' views of key motivations for reducing power consumption

Save Power by Moving to Low Power Intel Processor Platforms

One way to lower power consumption is to switch to POS systems using energy efficient mobile processor platforms such as the Low Voltage Intel® Core™ 2 Duo Mobile. The advantage of the mobile processor platforms is greater power efficiency with equal performance to desktop processor platforms. While the power used by individual processors may seem trivial, in mid to large size retailers with a lot of POS systems, this can add up to significant savings over the course of a year.

To illustrate this point with the ROI calculator for Intel vPro technology, take the example of the Model company with its 1,900 desktop processor based POS systems distributed across 589 stores. While some of this retailer's branches are open 24 hours a day, others have more limited opening hours, so in this calculation we assume that the POS systems are running on average, 18 hours per day. While currently the Model retailer is using 100% desktop processor based platforms, if they switch to 100% mobile platforms they would see savings of \$88,000³ a year once they had fully switched over to mobile platform based POS systems.

Case 3: Saving Power Costs with Low Power Platforms

Model retailer has 1,900 desktop processor based POS systems across 589 branches

Stores are open 18-24 hours a day depending on location, and POS systems are left on for 18 hours per day on average

Retailer is interested in saving power, both from a financial and green initiative perspective.

Current desktop processor based POS systems are 110 watts (85 watts for processor and 25 watts for chipset) but will be replaced by 39.5 watt mobile processor platforms (25 watts for processor and 14.5 watts for chipset). It is assumed that POS peripherals consume 175W.

Switching to 100% Mobile processor platforms from Intel would save this retailer \$88K per year, or \$46 per POS per year.

³The savings estimates used in this paper are based on power consumption data provided by Intel as well as hardware profile inputs by the end-user and represents the potential savings for a year if all of the desktop processors found in POS systems were replaced with mobile processors. Calculations use the following formula: [(Power consumption of desktop processor in KW)-(power consumption of mobile processor in kw)] x (# of desktop processor based POS systems) x (days of operation in a year) x (# of active hours per day per POS system) x (cost of KW Hour of electricity). The ROI calculator uses default values for the cost of electricity which users can override with more accurate information if available.

An Intel commissioned study showed a further potential power saving of \$108 per POS per year attributable to a reduction in terminal cooling cost. The assumption is that a POS system with a mobile processor platform requires 70% less cooling and this contributes to a reduction in store-front air-conditioning requirements. The retailer's overall power bill will therefore be reduced. These savings are not captured in the TCO calculator but may be added to the results as appropriate. The full study, *Advanced CPUs & New Store Technology: Positive TCO Impacts vs. Legacy POS Platforms* may be downloaded here: http://download.intel.com/design/intarch/platforms/iaclient/Intel_TCO_Executive_Brief_Final.pdf.

Save Power by Using Intel® vPro™ Technology to Remotely Power Down POS Systems

Single POS systems do not consume much power, even if they are left on over night, but for retailers with thousands or tens of thousands of systems, the power of keeping them running when not in use can add up to significant sums. For years, retailers instituted a policy of leaving POS systems on overnight in order to enable patching and maintenance, but with the Intel vPro technology, this policy is outdated. Making use of Intel AMT, a component of Intel vPro technology, retailers can instruct their staff to turn POS systems off at night, secure in the knowledge that the IT team can remotely power up the POS for patching, auditing and maintenance.

To exemplify this saving, take the case of the Model company with 1,900 POS systems. Currently all the systems are left on overnight, when the store is closed. Assuming that the POS system at idle consumes 35 Watts and the cost of power is \$0.1 per KWH, using Intel vPro technology to power systems down at night saves the company \$29K per year, or just over \$15 per POS system. If the system is left fully powered up in its active mode, and the peripherals such as the monitors and scanners are also left on, the savings will be as high as \$237K, or \$125 per POS system per year. This assumes that the peripherals draw 175W and the processor and chipset on desktop platforms draw 110W while processor and chipsets on mobile platforms draw 39.5W.

Case 4: Saving Power with Remote Power Management

Model retailer has 1,900 desktop processor based POS systems across 589 branches

POS systems are currently left on when not in use to allow IT to patch and manage systems, meaning that they are on for 12 hours a day when not in use.

The current POS fleet is replaced by Intel vPro technology enabled POS systems.

If systems are left on in standby mode, the company will save \$29,000 per year with Intel vPro technology, or \$15 per POS per year. If systems are left on in active mode, the company will save \$237K or \$125 per POS system per year, assuming that the peripherals such as scanners and monitors draw 175W.

OTHER BENEFITS OF INTEL® VPRO™ TECHNOLOGY FOR RETAILERS

As seen from the cases and examples above, Intel vPro technology can improve the financial performance of a retailer by directly reducing the operating costs of IT. Aside from the immediate financial benefit however, Intel vPro technology enabled POS systems can also improve POS security, helping to minimize risk to a retailers brand and reputation, and enable IT organizations to meet their performance goals. These non-financial benefits for retailers are explored in the following sections.

MEETING IT PERFORMANCE METRICS WITH INTEL® VPRO™ TECHNOLOGY

In our survey of North American retail organizations, we found that uptime and customer satisfaction were most commonly cited as being the most important measures of IT metrics within the Retail industry, with 35% and 28% of respondents respectively. 38% of respondents cited customer satisfaction as the second most important metric for performance, with a combined 65% of respondents citing this metric as ranking in its top two performance metrics.

Performance Metrics	Ranked 1st	Ranked 2nd	Total % of Respondents Voting As A Key Performance Metric for IT Performance
Time to Resolution	18%	15%	33%
Number of Incidents Resolved	13%	18%	30%
Uptime	35%	23%	58%
Customer Satisfaction	28%	38%	65%
Service Level Agreements	8%	8%	15%

FIGURE 9. Key Performance Metrics for Retail IT

Intel vPro technology directly impacts many of these measures. Uptime is increased as more incidents can be resolved remotely, and a greater number of security patches, application deployments, audits, and inventory taking can be completed remotely at the first attempt. One of the greatest frustrations to IT is that systems which were supposed to be turned on for patching are turned off and inaccessible. With Intel vPro technology enabled POS systems, IT can remotely power up a system, work on it, and power it off, without the help of local staff onsite.

Time to resolution is improved in two ways. Firstly, a larger amount of work can be conducted remotely, allowing IT to deal with a problem as it occurs rather than scheduling field service visits or waiting for multiple events to justify a field visit. Secondly, even if a field service visit is required, IT can prepare for that visit by accessing the Intel AMT event logs to view system information and status, increasing the probability that the issue can be fixed in a single visit and shortest amount of time.

Intel vPro technology's AMT components allow retail IT organizations to conduct significant preventative care of POS systems using tools such as proactive alerts, which identify issues before they become problems or require costly repairs. These include alerts about missing or disabled software, memory usage, hard drive health, fans, and power supplies. By allowing POS management to occur in the background with minimal input from store managers, retail IT departments may increase the overall satisfaction amongst their stakeholders.

IMPROVING SECURITY WITH INTEL® VPRO™

According to the National Retail Federation survey in 2007, US retail shrinkage amounted to \$41.6Bn in 2007, representing 1.65% of total retail sales.* Point of sale systems are no longer simply targets for thieves who want to grab some cash and run, but are magnets for more sophisticated scams targeting customer data or store goods. As POS systems evolve from cash registers to sophisticated customer interaction systems, the type and quantity of data stored on the systems is increasing and will continue to increase, making the POS an ever more attractive target for tampering. By investing in POS systems with Intel vPro technology, retail IT departments can remotely deliver encrypted updates to ensure that security patches are up to date, even if systems are powered off or have a hung OS.

Aside from the simple cost of goods lost, however, security breaches have a potentially larger reputation cost, as consumers lose confidence in stores that lose consumer data or compromise customers' credit cards. This is particularly critical for retailers that compete on customer intimacy; customers are only prepared to share information on their preferences and shopping habits if the retailer has a demonstrated ability to secure and protect that data. This trust is hard to gain and easy to lose.

Intel vPro technology can contribute to data security in a variety of ways. The multi-level operation capabilities provided by Intel TXT and the virtualization capabilities of Intel® Virtualization Technology® (Intel® VT) allow for the separation and strict communication management between applications and data sources. The compartmentalization of various applications allows for any security incidents that may be occurring in one application from corrupting the execution of other programs, thereby securing the data more effectively. Again, when POS systems with Intel TXT are powered on, the configuration in which they are launched is tracked and can be verified from a remote management console, ensuring that there has been no tampering of the POS system. Finally, the "poison pill" capabilities in Intel AMT can be used either to remotely disable a system if it is physically stolen, or to disable a system on a policy if some aspect of the POS is compromised or tampered with.

One final direct cost of weak security is the transaction costs charged by credit card vendors. In our survey of 40 US retailers, 53% reported that IT and security performance metrics have a direct impact on the transaction fee charged by credit card companies. Metrics tracked include extent of a retailer's compliance with the Payment Card Industry Data Security Standards (PCI DSS), a standard which includes network and client management which is enhanced by Intel vPro technology.

Do the credit card transaction fees charged by Visa, MasterCard etc, to your company vary by security breaches or other IT security or compliance metrics?

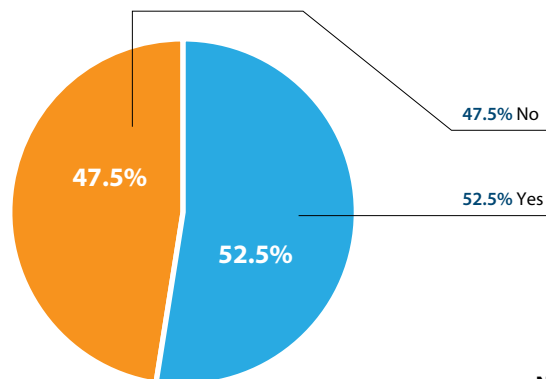


FIGURE 10. Direct financial impact of IT performance on credit card transaction fees

*Report available from the National Retail Federation Website at www.nrf.com.

† See <http://www.intel.com/technology/virtualization/> for more detail

IMPROVING BRAND PERCEPTION WITH INTEL® VPRO™

80% of survey respondents claimed that they either measure the impact on customer perception of a broken or out of order POS system, or they are concerned about the impact that a broken POS system may have on their brand. In an age when retailers are competing on customer loyalty, brand perception is top of mind for many retailers. While the financial impact of negative customer perceptions will vary from retailer to retailer, the upshot is the same – customers will take their business elsewhere, and the number of brand advocates a retailer has will decline.

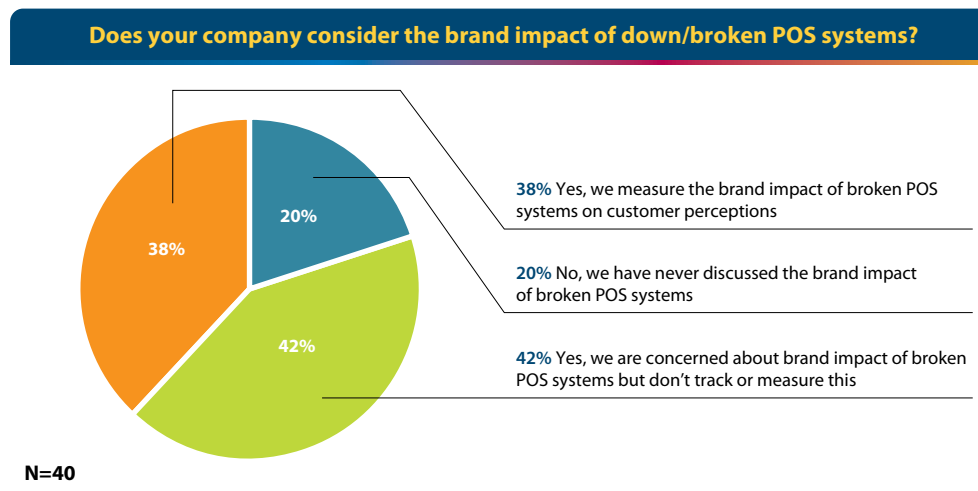


FIGURE 11. Retailers are concerned about the brand impact of broken POS systems

Like all machines, POS systems will break down from time to time, but Intel vPro technology enabled systems can be diagnosed rapidly and often fixed remotely, rather than waiting for the branch manager to contact IT with a report, and then for IT to dispatch a technician for a field service visit. While POS system downtime varies on the nature of the incident, previous studies by Wipro and Intel have shown that POS systems with Intel vPro technology can reduce the downtime of a POS system by 60-90%,⁶ as many required fixes can be made remotely rather than scheduling a field service visit.

CONCLUSIONS AND RECOMMENDATIONS

As POS systems are becoming more powerful and central to retailers, they are increasingly moving on to PC platforms powered by processors such as Intel® Core 2 Duo and Low Voltage Intel® Core 2 Duo Mobile platforms. One benefit of this transition is that POS manufacturers are taking advantage of advanced management capabilities enabled by Intel vPro technology.

Intel vPro technology lowers the total cost of ownership by:

- Reducing the cost to manage and maintain the POS system. A larger proportion of fixes and upgrades can be conducted remotely, reducing costly field service visits
- Reducing the complexity in POS fleets. Processors with Intel vPro technology can take advantage of the asset discovery and diagnosis capabilities of Intel AMT, reducing the cost of managing heterogeneous POS systems.
Moreover, standardizing on Intel vPro technology enabled POS systems will reduce complexity over time, lowering the cost to serve the entire fleet.
- Reducing power consumption. Significant savings can be derived from moving to POS systems with low power mobile platform based processors, such as Low Voltage Intel® Core™ 2 Duo Mobile, as these processors consume less than half of the energy used by less efficient desktop processor platforms, while offering comparable performance. Power savings are also derived from the ability to remotely power systems off when they are not in use.

Additional benefits of Intel vPro technology enabled POS systems include:

- Improved security. Intel vPro technology improves the accessibility and visibility of POS systems, ensures more complete security patching, and increases the success rates for audits. This has a direct financial implication for retailers as credit card vendors can raise or lower their fees on a retailer's security standards compliance such as PCIDSS. It also has an indirect financial impact as security

Savings for the Model Retailer

Using the Retail POS ROI calculator, a retailer can calculate expected savings for their organization. Savings for a Model retailer with 1900 POS systems in 589 branches is shown below:

Once the POS systems are fully refreshed to Intel vPro technology systems, the retailer will see \$300 in savings per POS systems in maintenance costs, representing a 25% reduction from their current costs. The ROI calculator assumes a rolling refresh of POS systems based on a retailers current refresh rate, hence the savings for our Model company will increase from year one to year five as more of the fleet is refreshed. The average saving over the five year period is \$140 per POS per year.

If the Model retailer switches over to low power mobile processor platforms, they will see an additional \$46 per POS per year in power savings.

The model retailer will see \$15 per POS per year in power savings generated by Intel vPro technology's capability to switch systems off remotely. If the model company currently leaves POS peripherals on overnight in active mode, the company will save up to \$125 per POS system per year.

Total savings once the Model retailer has switched to 100% Intel vPro technology enabled POS systems can range from \$360-\$470 per POS per year.

Retailers may save an additional \$108 per POS per year from a reduction in terminal cooling cost.

breaches and mishaps can have a tremendous reputation cost and a resulting decline in business.

- Improved ability to meet IT metrics. Intel vPro technology increases uptime with greater preventative care, reduces downtime by allowing more issues to be fixed 'down the wire', and can improve customer satisfaction by making POS management less of an issue for store and line of business managers.
- Improved brand perception. Retailers who want to compete on customer loyalty and customer intimacy need to be concerned about the brand impact of broken POS systems, slow or unresponsive POS systems, or security incidents in the press. Retailers are asking for customers to trust them with more personal information in order to tailor personalized services to them, and this trust needs to be earned. Intel vPro technology can be one of the enabling technologies to make POS systems central to better customer experiences, turning customers into advocates for a retailer.

Breakdown of Projected Saving from Intel vPro Technology for Model Retailer Once POS Fleet is 100% vPro

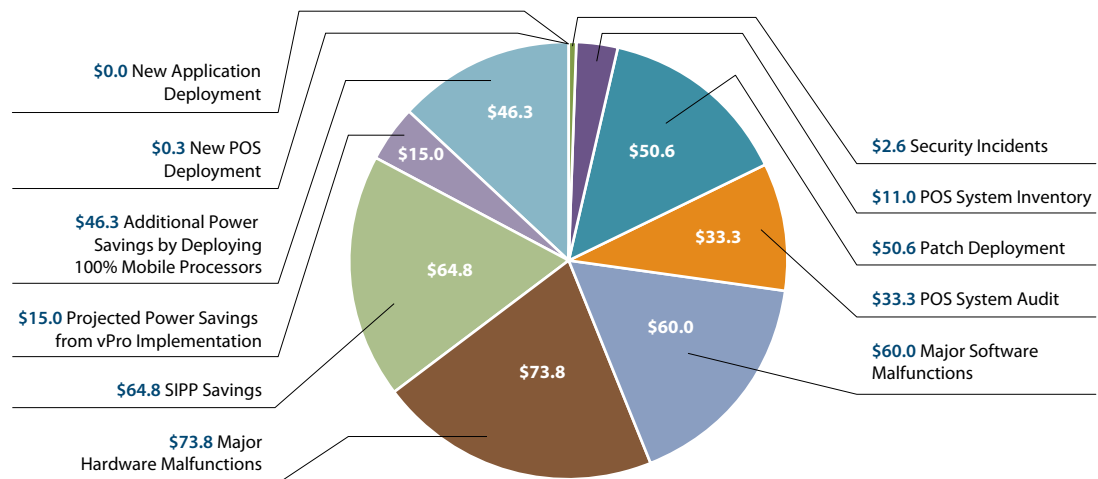


FIGURE 12. Total Estimated Savings Per POS system Per year for Model Retailer with Intel® vPro™ Technology once the POS fleet is fully switched over to Intel vPro systems

APPENDIX

Methodology

This study builds on previous work conducted by Wipro PSA consultants to assess the financial and business impacts of Intel vPro technology.

In 2006 and 2007, Wipro PSA consultants and technical architects interviewed CIOs, IT directors, and senior IT managers at 160 companies in North America, Europe and Asia. Wipro PSA selected companies to represent a full spectrum of industries, management practices and user distributions, and a good mix of desktop and notebook systems. Based on the aggregate findings, Wipro PSA created the algorithms for an ROI model (available at <http://www.intel.com/business/business-pc/roi/demo.htm>).

In 2008 Wipro PSA consultants interviewed IT decision makers and practitioners in 40 retail IT organizations to understand how costs and activities of managing retail POS environments differ from that of enterprise IT departments, and then adapted the impact of deploying Intel vPro technology accordingly. While retail POS systems are often based on mobile or desktop PC platforms, the environment they operate in, their security requirements, the applications they run, and the use they are put to differs significantly. This whitepaper and the ROI model for retail is therefore targeted specifically to calculate the ROI of investing in Intel vPro technology enabled POS systems, and the costs and benefits are specific to various retail segments.

Retail is a broad segment encompassing a variety of IT environments, hence Wipro tried to capture a variety of common scenarios and use cases across retail sub-segments to test the applicability of the cost savings from Intel vPro technology. Sub-segments included:

- Department Stores
- Drug Stores
- Entertainment Retailers
- Home Improvement stores
- Supermarkets
- Restaurants (including quick service restaurants)
- Office Supply Superstores
- Large – Format retailers
- Non-store Retail
- Small format retail

ROI Calculator Assumptions and Algorithms

Savings Generated by Intel® vPro™ Technology

In this study, Wipro analysts compared the standard set of support capabilities and related IT activities against the capabilities and activities associated with POS systems with Intel vPro technology. Based on this comparison, researchers concluded that Intel vPro technology can mitigate the cost and labor requirements required to investigate and resolve:

- POS deployment failures
- Application deployment failures
- Patch management failures
- Audit failures
- Inventory failures
- Major hardware malfunctions
- Major software malfunctions
- Security incidents

Effort and costs are reduced by:

- Eliminating and minimizing manual tasks, such as storefront visits.
- Reducing indirect IT support costs due to the lowering of overall POS complexity, realized by migrating to Intel SIPP-compliant, Intel vPro processor technology-enabled POS systems. We have found that there are two complexity factors which are taken into account by the ROI calculator
 - o REFRESH FACTOR - In the ROI model, we account for the refresh cycle impact on failure rates. Longer refresh cycles mean markedly higher failure rates for both major and minor application deployments. POS systems which are kept for more than five years are subject to higher maintenance costs as software and hardware failure rates increase, and compatibility with newer applications decreases
 - o HARDWARE CONFIGURATION FACTOR – Previous Wipro/Intel research has shown that there is a correlation between IT costs, and the number of hardware configurations being managed. Simply put, there is a price to be paid in support costs for having multiple POS systems from multiple vendors, and an efficiency saving to be gained from reducing the number of hardware configurations.
- Increasing the capabilities provided by automated desktop management and security software.

The projected net benefits of deploying POS systems with Intel vPro technology was obtained by balancing the one-time and per-POS system implementation costs against yearly savings. We model POS upgrades on a standard refresh cycle rather than a forklift upgrade at one time, hence the yearly savings increase as the refresh cycle proceeds.

Implementation Costs

Both one-time and per-POS implementation costs have been included in our analysis:

One time implementation costs are incurred during the first year of a retailer moving to Intel vPro technology enabled POS systems and include

- the cost of training IT staff to take advantage of vPro including staff and trainer costs
- the cost of staff and consultants associated with re-engineering IT installation and support processes with Intel vPro technology specific activities
- engineering costs to integrate Intel vPro technology features and capabilities with existing POS management tools

Per-POS system implementation costs are incurred as the POS systems are deployed and include:
OEM Intel vPro technology charge – additional premium charged by OEMs for Intel vPro technology-based POS systems.
Configuration cost – additional cost of configuring POS systems with Intel vPro technology.

It is assumed that there is no additional license charge by Independent Software Vendors for POS system management/security software to support POS systems with Intel vPro technology, as this support will be included in their normal release updates, although if such costs are incurred the ROI calculator can capture those costs and include them in the analysis.

Power Savings Calculations

Intel's mobile processor technology allows for the delivery of desktop processing performance with the benefit of much lower power consumption. By moving toward POS systems based on these power-sipping processors, retail organizations can save on their electric utility expenses. The savings estimates used in this paper are based on power consumption data provided by Intel as well as hardware profile inputs by the end-user and represents the potential savings for a year if all of the desktop processors found in POS systems were replaced with mobile processors.

Calculations use the following formula: $[(\text{Power consumption of desktop processor under load in KW}) - (\text{power consumption of mobile processor under load in kw})] \times (\# \text{ of desktop processor based POS systems}) \times (\text{days of operation in a year}) \times (\# \text{ of active hours per day per POS system}) \times (\text{cost of KW Hour of electricity})$. The ROI calculator uses default values for the cost of electricity which users can override with more accurate information if available.

GLOSSARY OF TERMS

Term	Definition
Point of Sales (POS) Systems	Technology that is used mainly for managing the sales of retail goods, keeping track of inventory and purchase details. The most basic example would be an electronic cash register at the checkout point for a grocery store.
POS Systems on Mobile Platforms	For the purposes of this study, POS systems on mobile platforms are wired, powered down and connected through an Ethernet but based on Intel's Mobile processor platforms such as the Low Voltage Intel® Core 2 Duo Mobile.
Wireless/Handheld Systems	In retail, these systems are typically small handheld computers or PDAs. For example, waiters use these devices to take customers' food orders and complete transactions. Retail stores use these devices for swiping credit cards and/or taking inventory and looking up the availability of goods.
Provisioning	To set up or prepare technology (i.e., POS systems) for immediate use by end users.
Service Level Agreements (SLAs)	A formally negotiated agreement between two parties. It is a contract that exists between customers and their service provider, or between service providers. It records the common understanding about services, priorities, responsibilities, guarantee, and such — collectively, the level of service.
New application deployment	The installation of new software onto devices or machines.
Patch Deployment	A program that is released to fix bugs in programs, address security problems or to enhance functionality.
Audit	The task of evaluating the overall or component- specific performance (there are all types of audits from the device level to everything in the technical environment) of tools and/or systems.
Inventory Management	The task of accounting for hardware, software, and firmware throughout the system lifecycle.
Major Hardware Malfunction	For the purposes of this study, hardware would include POS devices. A major malfunction is one where any part of the POS hardware components are not working at all.
Major Software Malfunction	For the purposes of this study, software would include all software/applications that are deployed and in use on the POS devices. A major malfunction is one where the application/software is completely broken and cannot start up or work properly.

Security Incidents	Technology related security incidents are virus/worm attacks, actual or suspected loss or disclosure of company and/or confidential information, etc.
Push(ed) Down the Wire	Ability of IT staff to remotely access and alter PCs. Often used to describe the ability of IT to deliver updates to images and other software to remote machines.