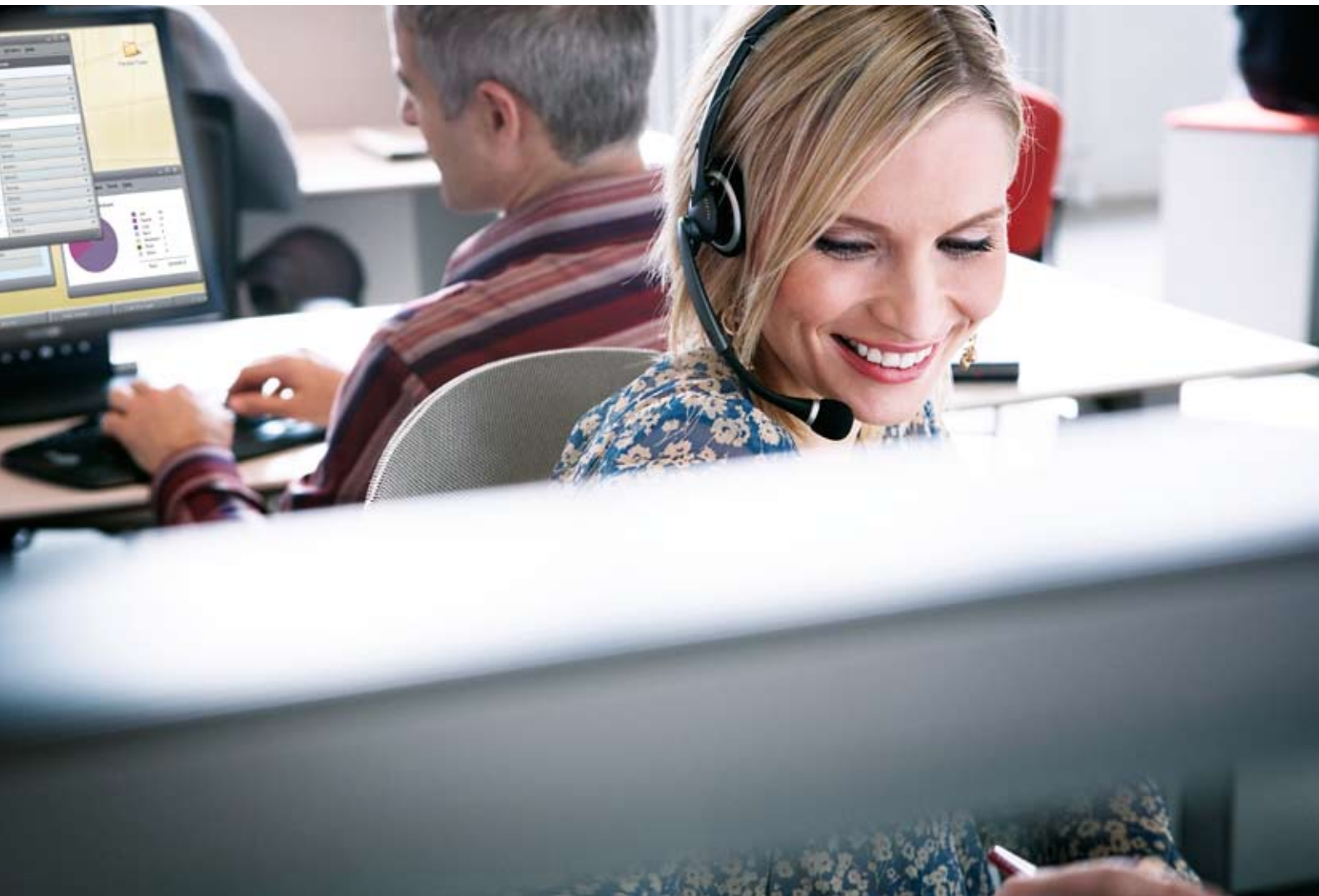




Application Note
Intel® Embedded Station Terminal
Interactive Client

Intel® Embedded Station Terminal Platform

Improving Security and Manageability
without Increasing TCO



Executive Summary

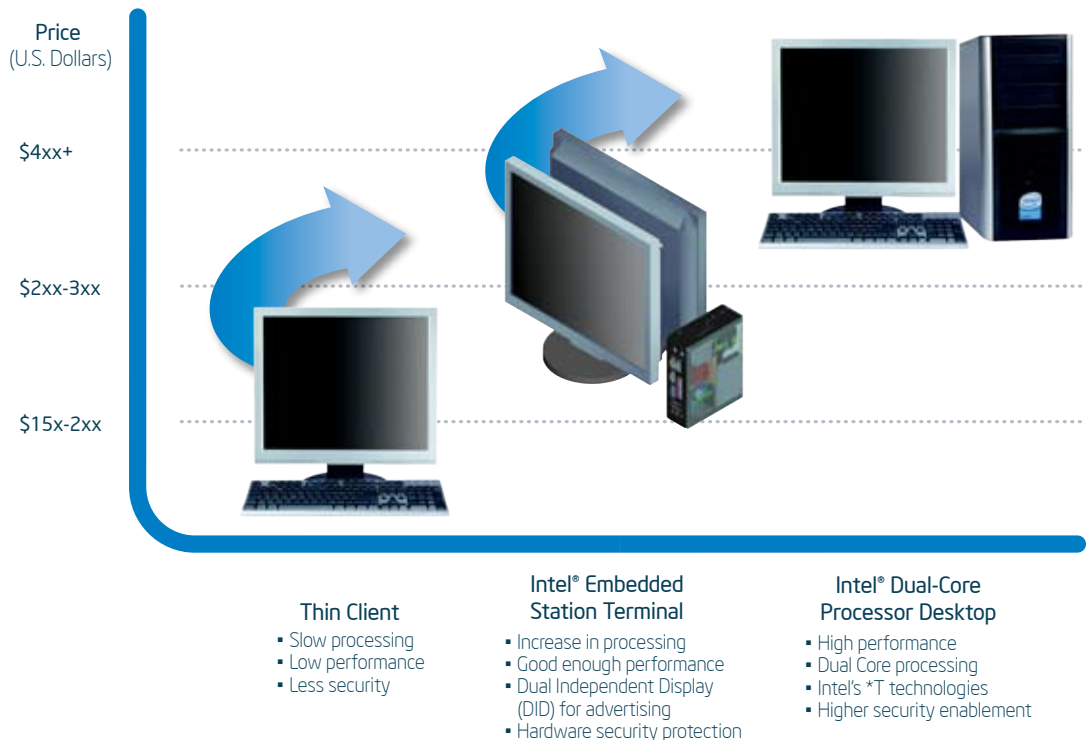
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Interactive terminals based on thin client technology have been an appealing solution to both developers and customers for years, primarily because of their low Total Cost of Ownership (TCO). But the minimalist design of most thin clients leaves some applications wanting: wanting for more robust security features, greater performance, and easier manageability. This is especially true in industries that use interactive terminals to transmit sensitive financial data, such as banking, finance, insurance, and retail.

The new Intel® Embedded Station Terminal platform is designed to meet these needs. Priced comparably to the thin client, the Intel Embedded Station Terminal platform brings hardware-based, robust security and manageability features into a small form factor that also delivers traditional embedded features, like low power consumption for fanless operation and a long life cycle. It's the optimum combination of performance and features in an affordably priced embedded system designed from the ground up specifically for interactive terminals.

Figure 1: New generation client solution—Intel® Embedded Station Terminal



Cost: The Embedded Bottom Line

The marketplace for embedded terminal systems can be quite cost sensitive. A few dollars – or even a few cents – can matter a great deal when the purchase decision involves hundreds or thousands of units.

What this means is that customers are willing to sacrifice performance and features in order to save money. Inexpensive thin clients are popular in the embedded terminal marketplace precisely because they use a minimally enabled platform that promises low overall TCO.

What you won't find in a thin client are the features and performance that enable robust security or manageability. For example, thin clients lack the onboard memory and graphics support that power applications like photo processing or biometric recognition (used for ID verification).

Risky Business

So it's no surprise that interactive terminal systems are not managed in the same way as enterprise PCs. Because IT oversight and security adds to the cost of such systems, many businesses consider them to be disposable devices. Instead of upgrading or repairing a downed terminal, customers opt to replace them entirely, believing that this is the way to keep TCO down.

But this strategy is increasingly risky and potentially a lot more expensive. A growing percentage of embedded devices are connected through the Internet to enterprise networks, exposing the entire business to hackers, viruses, worms, spyware, and other threats. And it can take a lot more effort—and cost—to fix problems once they get into the network.

In an effort to address the security threat, many customers deploy firewalls and anti-virus software. But such solutions designed for traditional enterprise networks are not always suitable for embedded systems. For example, embedded system hardware—especially thin client technology—may not have enough head room to run complex security

applications. Thin clients often have to use software-only security solutions, which may not be sufficient to thwart today's more aggressive attacks.

For these reasons, transaction-based industries need interactive terminals with more performance, security and manageability built in. IT managers need the ability to exert some level of control and management over their embedded terminal systems, if simply to ensure the integrity and protection of the network and the sensitive financial data that runs through it.

The Balancing Act

Developers recognize the need for more robust, feature-rich embedded platforms. But they must balance the need for performance and features against price, and must consider everything from design to component pricing to deliver as much performance as possible at the lowest possible cost.

The ideal solution is a platform that allows for easy manageability and robust security in a form factor designed for embedded applications. The price sensitivity of the embedded terminal marketplace demands that such a solution be priced comparably to the thin client. The trick is how to achieve such performance gains without driving up cost.

Intel Succeeds

The Intel® Embedded Station Terminal achieves this balance perfectly. With strong performance and built-in manageability and security features, the Intel Embedded Station Terminal platform allows transaction-based industries to better protect and manage their interactive terminal networks. And it offers a way for developers to deliver more robust embedded solutions at a price comparable to today's thin clients.

The Intel Embedded Station Terminal platform can be used in a wide variety of devices, like teller workstations, payment processing machines, currency exchange displays, remote teller machines, trade transaction terminals, kiosks, customer service desks and more. Because one platform has so many potential applications, development work and support costs are minimized.

Intel® Embedded Station Terminal Platform

Figure 2: Fanless, small form factor and double-security protection

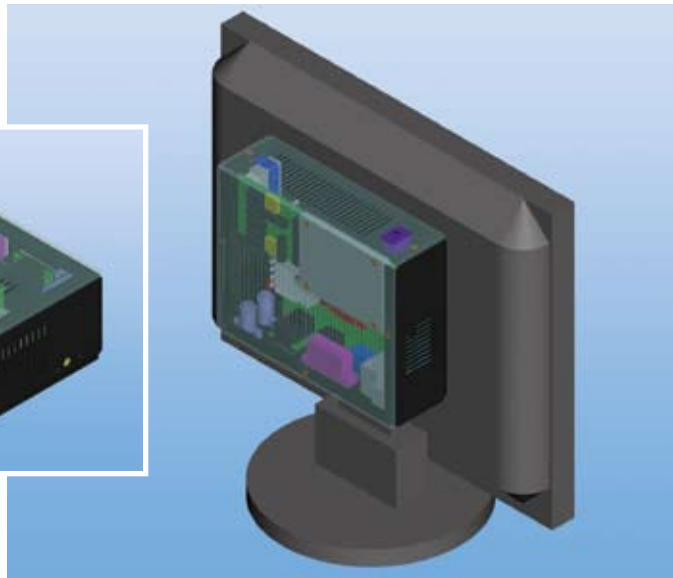
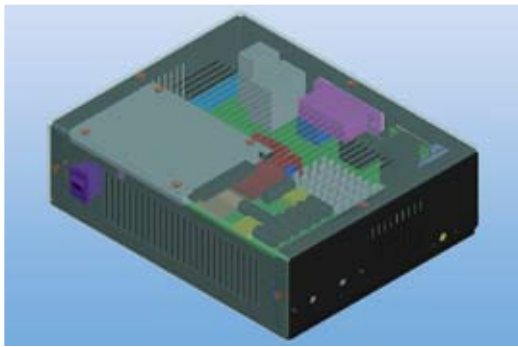


Figure 3: Affordable Intel® Embedded Station Terminal for client solution

The Intel Embedded Station Terminal platform comes in a compact form factor that runs reliably in a completely fanless enclosure. Other features that make it suitable for embedded terminal applications include: up to 4 serial ports, 4 USB ports, and dual independent display. These features will allow terminals to readily add peripheral devices like RFID tag readers, card readers, barcode scanners, bank check readers, pin number pads, keyboards with card reader, account book printers, and other tools for processing financial transactions.

“We have developed the Intel® Embedded Station Terminal platform specifically to address the needs of transaction-based industries, like banking and finance, where features such as cost-effective IT system manageability, small form factor, hardware-based security validation, dual independent display, and computing performance are required,” explains Eric Chan, Intel Processor Division (IPD) Asia Director. “The platform empowers our customer to offer banking services without being limited by computing performance – service levels previously not attainable from today’s thin client solutions.”

The Intel Embedded Station Terminal platform roadmap begins with the ultra-low voltage Intel® Celeron® M processor at 800 MHz and the Intel® 852GM/ICH4 chipset. “Scalability of the Intel® Embedded Station Terminal platform is also planned, demonstrating our commitment to supporting increasingly sophisticated banking and transaction services,” says Chan. “For example, we have already defined the future Intel® Embedded Station Terminal platform roadmap using the Intel® 945GM/945G chipsets. We have also committed to validating Intel® Active Management Technology on the Intel 945G chipset-based platform.”

Other future versions of the Intel Embedded Station Terminal platform will include integrated RAID and Intel® Virtualization Technology. Even Intel® Core™ Duo processors will be adapted for the embedded market segment and will be used to deliver even greater performance and security on the Intel Embedded Station Terminal platform.

Engineering Success

Engineering, design and development of the Intel Embedded Station Terminal platform board is a cooperative effort between Intel and ICP Electronics Inc. "It was designed to achieve the lowest possible power consumption while offering extra features such as dual display interface, compact flash socket, 4 USB 2.0 ports, and embedded Trusted Platform Module (TPM) security," says Wesley Chang, EMS Business Division Director, ICP Electronics. "Intel and ICP Electronics believe these are the most important features needed in interactive terminal platforms used by the banking/finance and other transaction-based industries."

But there were development challenges to putting so many features on a small form factor. For example, thermal engineering proved difficult with high density circuitry required to enable inclusion of the TPM chip and onboard cache. BIOS engineering was also complex, requiring some adjustment in code for the BIOS vendors in order to fit the Embedded Station Terminal platform. To meet the low-cost threshold demanded from customers, ICP Electronics engineers needed to find cost-effective design solutions for VRM circuitry, PCB layers and third-party board components.

"Because ICP Electronics has been active in the interactive client marketplace for many years, we had a lot of experience to draw upon," explains Chang. "Our customers include POS, kiosk, gaming and the medical industry, where interactive terminals are already used heavily. The banking and finance industries provide a natural extension for our expertise, and the Intel Embedded Station Terminal platform is the ideal solution."

Enabling Manageability

At least three new hardware-based Intel® technologies have been developed specifically to promote better management and lead to lower TCO for both enterprise and embedded computing devices. All three technologies exist today and will become available in new generations of Intel processors and

chipsets during the next few years. What's more, all three technologies will be included in future versions of the Intel Embedded Station Terminal platform.

Intel® Active Management Technology (AMT):

Hardware-based technology that allows for out-of-band (OOB) system management, remote troubleshooting and recovery, proactive alerting, and remote hardware and software asset tracking can decrease downtime, reduce the need for on-site support, and enable businesses to discover, heal and protect their entire network. "OOB system management is especially exciting for the Intel® Embedded Station Terminal platform, because it is the first time that remote management is possible without relying on support from the operating system," says Chan.

Intel® Storage Matrix Technology:

This is Intel's RAID system for Serial ATA disk arrays, which are most common in PCs and other low-cost systems, like embedded terminals. It takes advantage of two or more ordinary hard disks to create a RAID storage system for superior data protection, performance, fault tolerance and ease of use.

Intel® Virtualization Technology:

IT managers can use Intel Virtualization Technology to actively manage multiple applications and hardware and operating systems as if they were one. Dynamic system crash management and modular performance enhancement are enabled through hands-on management of an entire set of interactive devices through a single console – even if they are distinctly different.

Hardware-Based Security

Another important feature of the Intel Embedded Station Terminal platform is the onboard Trusted Platform Module (TPM) chip, version 1.2. TPM is a Trusted Computing Group (TCG) standard used to establish the root trust framework for a computing platform. ICP Electronics works closely with TPM chip manufacturer Sinosun to develop the TPM firmware and complete the hardware and software solution for the Intel Embedded Station Terminal platform.

Intel® Embedded Station Terminal Platform

“The TPM will be used to measure the integrity of all components of the platform – both hardware and software,” says Stephen Yang, Technical Marketing Manager at Sinosun, one of the few companies now building TPM security chips for the embedded segment. ICP’s Mr. Chang adds: “The greatest advantage of the TPM is to use hardware encryption to protect personal drive, data, E-mail, and digital signatures on the platform.”

Sinosun’s Mr. Yang describes the potential benefits to the banking industry this way: “With the Intel Embedded Station Terminal platform that includes a TPM 1.2 chip, important personal and financial data will be protected from unauthorized access and transfers. Because every banking transaction submitted by a terminal is made using a TPM signature, the server will not only verify the identity of the bank’s teller, but will also validate the terminal equipment.”

More information on TPM is available from www.trustedcomputinggroup.org

Adding Up the Benefits

The Intel Embedded Station Terminal platform is one of many new industry-specific platforms being developed by Intel in cooperation with leading third-party developers. It is part of Intel’s platform initiative designed to strengthen the solutions offered by manufacturers without increasing costs.

When compared to thin clients, the Intel Embedded Station Terminal platform offers the performance and features needed by the banking and finance industries. For example:

Dual Independent Display: Banks, retailers and others can use the dual independent display features of the Intel Embedded Station Terminal platform to do interactive advertising and promotions, allowing for add-on sales that generate additional revenue. Thin clients cannot support this service today.

Better Graphic Performance:

Photo processing: The Intel Embedded Station Terminal platform is equipped with better graphic performance than traditional thin clients, allowing

Figure 4: Dual independent display for product advertising



banks and other financial institutions to more quickly process data imaging—like photo identification and credit card signatures—to prevent fraud. Thin clients can provide this service, but lack the CPU power to do so quickly, slowing customer service.

Biometric Recognition: Biometric verification has become more and more important to link banks to government databases, such as identity cards, passports, criminal records, and terrorism watch lists. A banking terminal requires a more powerful CPU to process images and perform the biometric algorithm computation in parallel. Today, thin clients might have problems performing such functions, and processing time will be quite slow.

Hardware Security: Thin clients primarily depend on software based security, which can be unreliable in protecting against hackers, spyware, and other threats. The Intel Embedded Station Terminal platform is comprised of both hardware and software security. The onboard TPM chip allows financial institutions to encrypt and decrypt confidential files or email to ensure data integrity and better protect sensitive records.

Fanless Enclosure: Most of the thin clients in the marketplace still depend on the fan to dissipate heat, which requires electricity. The Intel Embedded Station Terminal platform provides a completely fanless solution which will save on power costs, leading to lower TCO.

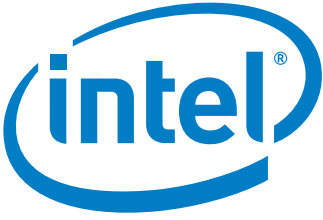
Conclusion

Considering that the Intel Embedded Station Terminal platform is available at a price comparable to today's thin clients, the added performance and manageability features make it easy for the banking and finance industry to choose this solution for interactive terminal applications. In fact, these benefits add up for all of the different customers in the development and sales chain:

Developers: With a system-ready platform that delivers strong performance and hardware-based security and management features, developers can build more powerful interactive transaction terminals at a cost similar to today's thin clients. With more features, developers can better meet the needs of their transaction-based customers.

Banking, Retail and Other Transaction-Based Industries: Platforms enriched with greater security and enhanced manageability will improve customer service and reduce transaction costs. TCO will also be reduced through lower support costs enabled by remote management, built-in scalability for a longer life cycle, and protection against data loss and unplanned downtime.

Consumers: With greater performance, interactive terminals process consumer transactions quickly and easily, even offering up a richer menu of services from a user-friendly GUI. Security will also be improved, protecting consumers against theft and loss of sensitive data.



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