

WHITE PAPER

Connected Clients: The New Enterprise Reality

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IDC OPINION

Numerous business trends and IT industry developments are coming together to create a "perfect storm" around client devices in medium-sized and large business environments. The move toward a more global and more "mobile" office is forcing a paradigm shift in how IT departments think about their client devices. In addition, a variety of external factors are forcing companies to consider server-based computing models with connected clients sitting on the edge of their networks. These factors include increasingly powerful server clusters, robust Gigabit networks, wide area wireless networks, software delivery as a service, Web-based applications, increased demands for better manageability, and, most important, a major increase in demand for better security. As a result, we believe simplified, cost-effective client devices that can best leverage these new infrastructures will play a major role in enterprise computing environments over the next several years. IDC defines these "connected clients" as computing devices that leverage high-speed wired and wireless network connections and server-based computing infrastructures. These emerging devices will enable individuals to get access to their data and applications at any place and at any time.

IN THIS WHITE PAPER

IDC examines the market opportunity for simplified client devices that leverage server-based IT infrastructures in medium-sized and large businesses. We discuss the factors that are impacting their growth and provide a forecast for some of the most prominent types of connected clients.

SITUATION OVERVIEW

The world of enterprise IT is typically dominated by discussions of servers, storage, routers, and other infrastructure elements that sit at the heart of these vital systems. However, little time or energy is spent worrying about the client devices that attach to these centralized resources because those clients are almost all Windows-based PCs. Recently, however, IT departments have refocused on the client aspect of these large systems. They're recognizing that the usual clients are increasingly the source of problems — particularly around security and manageability — that are having a dramatic impact on their operations.

Part of the issue is that businesses are changing and their needs are expanding. Today, even relatively small companies need to think globally and consider how to work with branch offices, remote employees, or business partners that may be located nearly anywhere around the world. In addition, end users are increasingly enamored with the freedom that mobile solutions provide, especially given the proliferation of wireless access points and the rapid introduction of wide area wireless services. As a consequence, IT departments are being asked to create solutions that can work effectively for the mobile office — whether that be at a person's home office, on an airplane, or in a remote location. With mobile solutions, IT departments need to consider additional factors, including power-efficient technology for extending battery life and technology for enabling secure remote connections, through a wired or wireless network.

In addition, the world is changing. News stories about lost or stolen laptops with sensitive customer or consumer information are appearing on the pages of newspapers and television screens around the world with increasing frequency. Virus, Trojan horse, and other malware attacks are on the rise, and many corporations face the concern of having their entire IT environments being brought down for hours or even days at a time because of these attacks. The loss of productivity that would result from these potentially catastrophic events is difficult to calculate, but it's unquestionably not something that any IT manager wants to face. Add to this the fact that larger numbers of corporate attacks are actually coming from internal sources (e.g., disgruntled employees), and the need for a comprehensive security/management system for client devices becomes even clearer.

Security issues such as phishing attacks, in which would-be hackers attempt to lure people into providing critical information such as passwords, as well as spyware attacks have become so overwhelming that IDC expects corporations to spend nearly \$3.5 billion on anti-malware applications and another \$2.9 billion on identity and access management software in 2006 alone.

On the technology front, we've also seen a proliferation of new devices and new form factors that are enabling workers to get access to critical data in almost any environment, thanks to power-efficient, cost-effective, high-performance microprocessors, as well as low-cost wireless technologies and high-speed Gigabit Ethernet wired networks. In fact, it's now not difficult to imagine client devices coming in almost any form factor, from nearly invisible wall socket plugs to embedded clients that fit easily into other devices, such as standalone PC monitors. Along with these smaller devices typically comes the added benefit of lower power, and in a battery-powered device, that translates directly into longer useful life — a critical factor for any type of client.

Hardware security technology has also improved thanks to developments like the Trusted Platform Module (TPM) 1.2 chips and VIA's PadLock security features integrated into the CPU die, which provide efficient hardware-level authentication and encryption, enabling the creation of more trusted clients. Microsoft plans to leverage TPMs in the BitLocker feature found in certain versions of Windows Vista. These hardware security developments free the main logic sections of the microprocessor from having to worry about these processing-intensive tasks and allow the CPU to instead focus on application performance. Software technologies, such as VMware's virtualization capabilities, are also bringing new levels of security to client devices by offering the ability to provide separate software partitions for doing protected work.

IT departments are also recognizing the increasingly large role that PC maintenance/support issues continue to play in total cost of ownership analyses. In fact, according to IDC's own research, organizations using thin clients can save 16% on PC support costs versus those companies that only use full-blown traditional PCs.

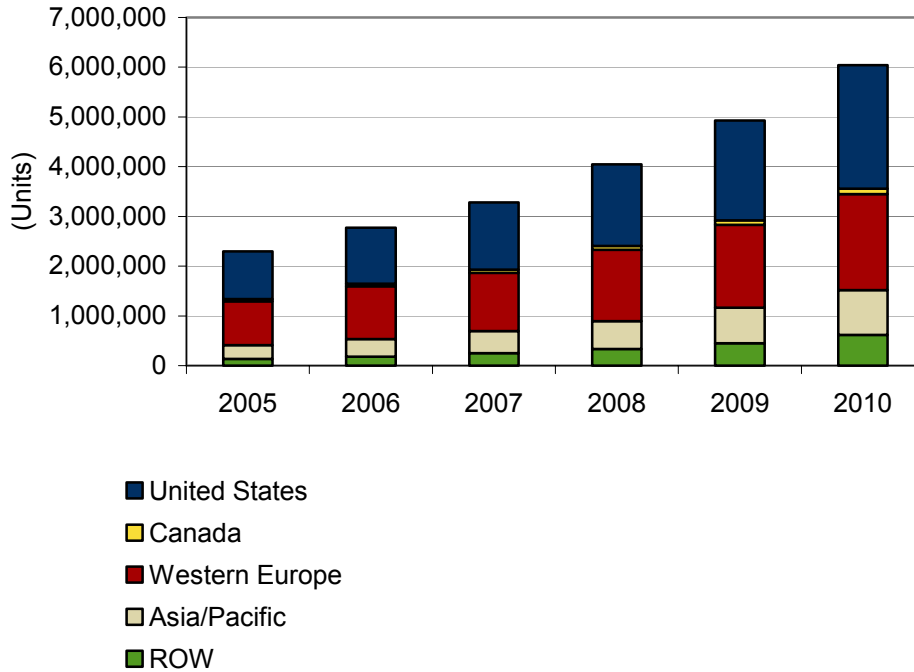
As a result of all these developments, we see a major paradigm shift that's forcing IT departments to rethink their current PC-based fat client strategy. The IT managers and decision makers at forward-looking companies are looking for solutions that can help them create a more secure, more manageable, and, ultimately, more cost-effective environment for the enterprise, while at the same time meeting the performance and compatibility demands of PC users. The solution for many of these environments is connected clients — devices that leverage the robust network computing infrastructure being built by IT departments, but do so in a cost-effective, power-efficient, secure manner. Connected clients move beyond the more restrictive legacy term *thin clients* (though thin clients are a subset of connected clients) because they embrace the developing needs for mobility and increased security.

FUTURE OUTLOOK

Many connected client devices are still only in the early stages of market development, but several subclasses of connected clients are now widely available. The most well-known and most successful to date are enterprise thin clients. Thin clients, which are essentially simplified PCs without hard drives that store and run applications and data on networked servers, have seen tremendous growth since their introduction about a decade ago. In 2005, worldwide thin-client shipments reached more than 2.3 million units, a 42% improvement versus the prior year, and IDC expects thin-client shipments to reach an impressive 6 million units by 2010. Figure 1 shows these forecast numbers graphically.

FIGURE 1

Worldwide Enterprise Thin Client Shipments by Region, 2005-2010



Source: IDC, 2006

The numbers shown in Figure 1 represent a compound annual growth rate (CAGR) of 21.5% from 2005 to 2010, about twice that of the worldwide PC market in the same time period.

Most thin clients come in the form of small, standalone, desktop devices, but there are also thin clients that are integrated into flat-panel monitors and a small but growing number come in mobile, notebook-like form factors. Almost 50% of all thin clients sold in 2005 were powered by VIA processors.

Even more impressive than the growth numbers of thin clients are the current installed base of devices and the number that will be in use by the end of the decade. As Table 1 illustrates, thanks to the roughly five-year (or even longer) lifetimes of thin clients, the worldwide installed base of thin clients will reach over 21 million units by 2010, while the U.S. number will be more than 8.6 million units in the same time frame.

TABLE 1

US and Worldwide Installed Base of Enterprise Thin Clients, 2005-2010

	2005	2006	2007	2008	2009	2010
United States	3,694,102	4,213,695	4,852,205	5,785,495	7,078,095	8,603,679
% Growth	8.9%	14.1%	15.2%	19.2%	22.3%	21.6%
Worldwide	7,787,119	9,461,484	11,439,244	14,015,468	17,320,851	21,067,386
% Growth	21.8%	21.5%	20.9%	22.5%	23.6%	21.6%

Source: IDC, 2006

In addition to thin clients, companies are beginning to consider several other types of connected client devices, including ultra-small-form-factor PCs; ultra-mobile PCs (UMPCs); blade PCs; "diskless" PCs, which differ from thin clients in that they typically have desktop PC processors and chipsets; and mobile client devices, such as the NEC TCM160 or Hitachi's Flora SE210, which use notebook form factors. In addition, there are several types of software-based client solutions, including "virtual PCs," disk image management tools, and even flash-based mobile storage devices.

Blade PCs are a good example of how connected clients can provide a relatively familiar experience for end users and IT support staff, but start to flip the idea of a traditional client on its head. Blade PCs provide the full computing power and compatibility of a traditional desktop PC but are housed in a rackmount form that can be physically housed inside a corporate datacenter. With the appropriate software tools, blade PCs can be provisioned on an as-needed basis, enabling companies to share their client computing resources on a more effective basis.

The common thread running through all these connected clients is that they can leverage the enterprise infrastructure while at the same time reducing the security risk and manageability concerns associated with traditional PCs. All these devices use a server-based computing model in which applications are stored and typically run on centralized servers and the visual results are presented on a desktop monitor. The computing power that's now available via multicore, multiprocessor servers lends itself ideally to these new types of environments.

To end users, the experience is intended to be either identical to or extremely similar to what they would do with a desktop (or notebook) PC attached to the monitor. They continue to use a regular keyboard and mouse and interact with applications and their data through a familiar Windows interface. The critical difference is that the applications, data, and network connections are centralized, allowing them to be more easily and tightly managed than hundreds or thousands of individual PCs.

These devices also remove an individual's dependence on any single client computing device and open up the opportunity to create an anytime, any-device computing environment. In other words, the focus moves away from a user's PC and toward the user's own digital identity — the applications, data, and settings that are uniquely his or her own. In these more flexible, connected client computing environments, individuals can move from client device to client device and still have access to their applications and their data and have the environment customized to their own preferences and settings, just as if they were sitting in front of their own PC. The proliferation of wireless networks as well as fast Gigabit Ethernet wired networks is helping drive this development as well. In some cases, biometric tools such as fingerprint readers can be used to call up these settings, while in others, a simple username and password log-in will suffice. Regardless, an environment like this gives individuals and companies the flexibility to place workers wherever they need (or want) to be, while giving them complete access to their work materials and tools.

As alluded to earlier, the connected client markets are growing in both size and awareness for many reasons, but most notably because of increased concerns about the security and manageability of enterprise IT resources. In fact, the security concerns are now so important that many companies that had previously written off alternative client devices are now reconsidering them, recognizing the inherent security benefits that a centralized server-based computing model can provide.

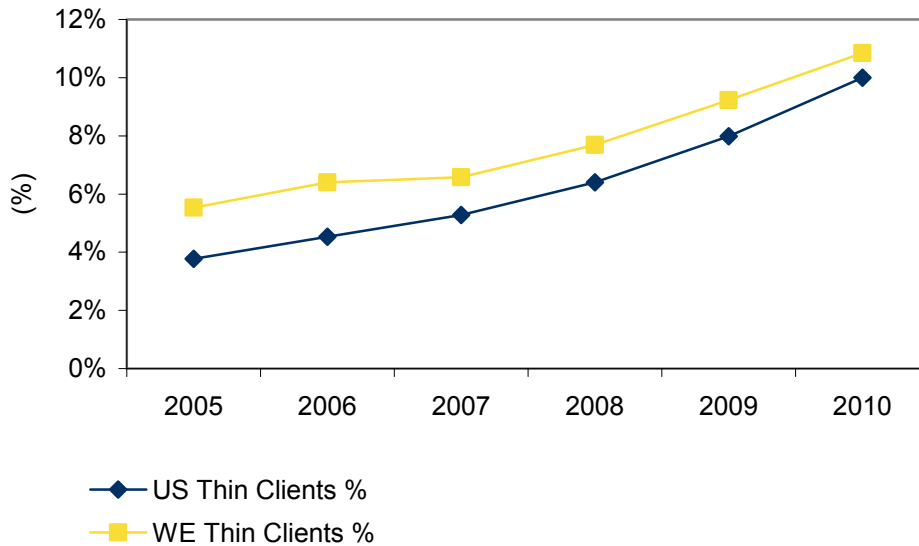
In addition, the growth of various software-as-a-service models is driving new interest in these connected client categories. While specifics vary, with many software-as-a-service models, the applications live, run, and are managed on external servers and provide true desktop application-like performance feature sets but require only a Web browser to access. The entrance of Microsoft into this market, with its Office Live! and Windows Live! offerings, has only added even more credibility to the movement.

Connected client devices are ideally suited for server-based applications because they provide enough computing horsepower to provide a quality experience while at the same time offering a simple, easily manageable footprint. Connected client devices can also be equally effective with some of the new application and image streaming software services that are becoming available from companies such as Microsoft, Wyse, Neoware, and others.

In fact, we believe that all the benefits of thin-client devices, which include affordability and reduced power consumption as well as good-enough processing, ease of management, and enhanced security, will help them take a major role in enterprise environments. In mature IT markets, such as the United States and Western Europe, thin clients will represent over 7% of desktop computing devices starting in 2009 and grow to nearly 11% in 2010. Figure 2 shows thin clients as a percentage of desktop computer shipments in enterprises over the five-year forecast period.

FIGURE 2

Thin Client Percentage of Enterprise Desktop PCs



Source: IDC, 2006

CHALLENGES/OPPORTUNITIES

As attractive as connected clients may be from a security and management perspective, integrating them into existing PC environments can be a challenge for IT departments. Technically, the changes required to existing servers and IT infrastructure aren't terribly difficult and could be very minimal. However, philosophically, the change is a significant leap in behavior because it entails a new way of thinking about client devices and applications. In some instances, there can be costs involved with purchasing additional servers and software licenses to enable the new model, and IT personnel often need to be redeployed. Client support issues typically fall dramatically with connected client implementations — thanks to the simplicity of the clients and their stateless nature — but server issues typically require more attention — hence the need to realign IT help departments around the new models. Depending on how the IT departments are structured, in some cases, this can even lead to political infighting that slows down the transition process. Even without political issues, transitions often run six to nine months to move from PCs to connected clients.

In addition to IT, users are sometimes reticent to move to connected clients because of the feeling that it's a kind of technical demotion from a full PC. Having a PC taken from your desk and replaced with what, at first glance, often appears to be a less powerful device is not an easy experience for any end user to endure. The issues are not technical, but more psychological, reflecting how attached to and dependent on their computing devices people become. However, given the reduction in support problems,

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the speed and compatibility of the devices, and the increasing number of options to fulfill different user needs, these issues are becoming less of a concern over time.

Finally, awareness of alternative clients remains low. Many IT managers are very content with the status quo of full PC clients and are unwilling to consider other options. However, we've seen a number of developments from major industry players, suggesting that the whole category of thin/connected clients is gaining respect and momentum in the marketplace. For example, Microsoft's recent introduction of its Windows Fundamentals for Legacy PCs application — which turns older PCs into thin client-like devices — will raise the awareness and respectability of the new alternative solutions.

CONCLUSION

Connected client devices, including thin clients, blade PCs, and other alternatives, have an important new role to play in the enterprise. While full Windows PCs will continue to be the predominant client devices, the opportunity for new types of client devices is growing at a fast pace. New software architectures, new licensing mechanisms, and new computing models are all coming together along with cost-effective, high-quality computing devices. These new devices enable the kind of application speed and compatibility that traditional desktop PCs have offered, with all the security and management benefits of a server-based computing architecture.

The rapid development of inexpensive microprocessors that offer performance good enough for mainstream applications is helping drive this dynamic paradigm shift and helping enable the creation of these new devices. This new computing paradigm will coexist with traditional PC clients for quite some time. Still, we believe that connected client devices will become a major alternative in about a five-year time frame.

Looking further out, we believe users will become increasingly comfortable with the idea of a virtual data identity and will gladly migrate to a computing model where they can have anytime, anywhere access to their applications and data from virtually any computing device. This kind of utopian computing model offers the kind of flexibility, security, redundancy, and management control that many IT managers can only dream about. But with the capabilities that simplified connected client devices can offer, we believe that dream is much closer to reality than most people suspect.

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