



## **Thin Clients or Fat Clients?**

***Altiris Has Management Solutions for Both***

**White Paper**

September 5, 2006

## ABOUT ALTIRIS

Altiris, Inc. is a pioneer of IT lifecycle management software that allows IT organizations to easily manage desktops, notebooks, thin clients, handhelds, industry-standard servers, and heterogeneous software including Windows, Linux, and UNIX. Altiris automates and simplifies IT projects throughout the life of an asset to reduce the cost and complexity of management. Altiris client and mobile, server, and asset management solutions natively integrate via a common Web-based console and repository. For more information, visit [www.altiris.com](http://www.altiris.com).

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Altiris, Inc.  
588 West 400 South  
Lindon, UT 84042

Phone: (801) 226-8500  
Fax: (801) 226-8506

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## INTRODUCTION

*Whether it is thin clients or fat clients that match your particular needs, Altiris provides a comprehensive set of tools to make managing your infrastructure easier and more efficient.*

Effectively managing information technology (IT) inevitably entails tradeoffs. For years, full client PCs have been the first choice for deploying a wide array of applications and services. Full client (also known as “fat” client) devices are flexible, computationally capable, and add to the resiliency of distributed systems. However, they have become the target of innumerable viruses, worms, and other malware attacks; the source of information leaks; and require considerable effort and organizational discipline to centrally control and maintain. Many organizations are now considering the benefits of thin client technologies to address some of the challenges they face with full clients.

Thin clients are computers that depend on servers for storage and most services. Thin clients typically do not have disk drives, USB devices, or other persistent storage that could store or introduce malware. Because their operating systems are available from a shared, centrally managed server, there are few pieces of software to manage. These factors reduce security risks and can improve some aspects of manageability. As with any technology, there are drawbacks. Thin clients are highly dependent on network performance and centralized servers that can introduce a potential single point of failure, and thin clients aren’t feasible for some types of workers, such as mobile employees. Thin clients and traditional client computers each have their own strengths and weaknesses for specific applications. Whichever solution matches your particular needs, Altiris provides a comprehensive set of tools to make managing your infrastructure easier and more efficient.

The objective of this white paper is to examine advantages and disadvantages of both full client and thin client architectures and discuss best practices for realizing the benefits of both while minimizing the risks of each. The paper begins with an overview of the motivations for migrating to thin clients. The discussion then turns to best practices for achieving the benefits of thin client architectures in a full client environment. For those who find that the thin client model is a better solution for their particular needs, the final section describes techniques for effectively managing a thin client environment.

## MOTIVATIONS FOR MIGRATING TO THIN CLIENTS

Centralized computing, typified by the thin client model, is a well-established architecture. Early computing was highly centralized with the use of mainframes and dedicated terminals. The advent of mini-computers in the 1970s introduced department-level computing, but it was not until the 1980s when personal computers set the stage for the beginnings of client/server computing.

The ability to share the processing load between specialized servers and general-purpose PCs enabled the development of new types of applications. Servers, for example, could be configured for high-performance database services, while the full client PCs could manage graphics-intensive user interfaces (UIs). This flexibility, however, introduced new demands on the IT professionals responsible for managing assets:

- Operating system and application patch management
- More complex release management
- Additional security vulnerabilities and associated threats
- More difficult resource utilization and optimization

The IT industry responded with two broad solutions to these difficulties: thin client computing and centralized management tools. Both of these addressed several key challenges: security and compliance, application control, operating system control, manageability, and hardware life span.

### Security and Compliance

The goal of information security practices traditionally is to protect the confidentiality, integrity, and availability of data and applications. More recently, it has also taken on important roles in maintaining compliance with government regulations, especially with regard to privacy and business information integrity.

You don't have to look far to find examples of full client devices involved in major security breaches. For example:

- The SQL Slammer worm shut down large segments of the Internet in 2003 and spread rapidly because of a vulnerability in a widely deployed version of Microsoft\* SQL Server and Microsoft Desktop Database Engine (MSDE); many users of the desktop database were unaware they were even running the embedded application.
- A number of high-profile notebook computer thefts have potentially compromised both personal and business data. In one case, a government employee's notebook containing information about 28 million veterans and some spouses was stolen from the employee's home and later recovered.

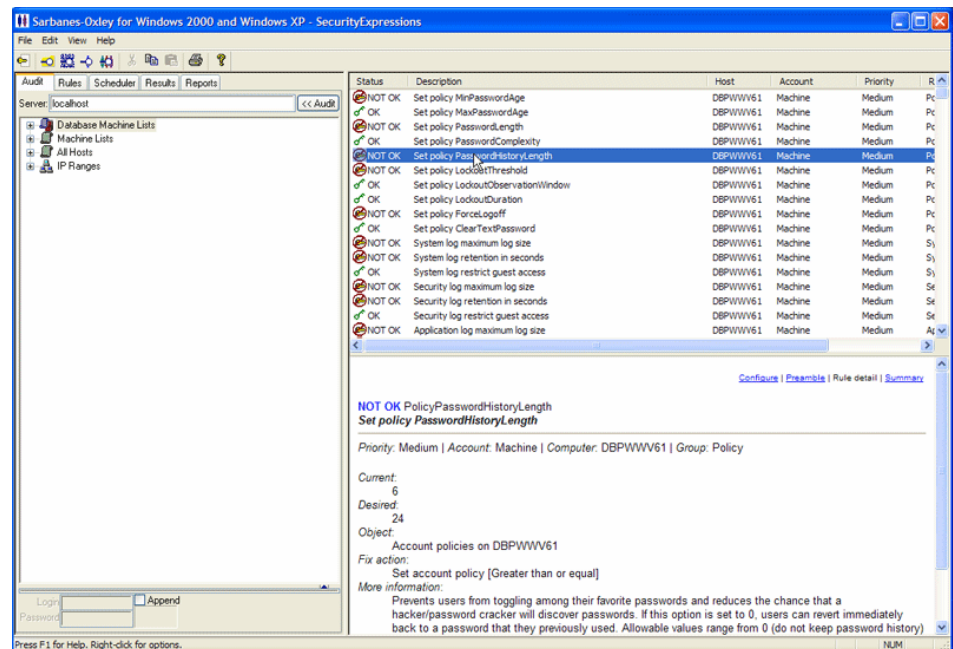
- Spammers are using networks of compromised computers, known as botnets, to send their unwanted e-mails.
- Viruses and worms have exploited vulnerabilities in e-mail clients to disrupt communications.
- Spyware programs, such as keyloggers, exploit the rich functionality of the Windows operating system to intercept sensitive data; for example, usernames and passwords sent to authenticate users to online financial services.

These types of security breaches can be prevented with well-designed and centrally enforced security policies. The vulnerability exploited by the SQL Slammer worm could have been centrally patched and distributed as part of the boot image loaded by a thin client. It could also have been pushed to full clients using client management tool such as Altiris® Client Management Suite™ software.

Another challenge facing IT administrators is ensuring that devices remain in compliance. A centralized, standardized set of executable images, as found in thin client environments, reduces the burden of staying in compliance when compared to typical full client environments. Another alternative is a centralized compliance management system that verifies and enforces policies on full client devices (see Figure 1).

Figure 1

*Altiris® SecurityExpressions™ software supports compliance with vulnerability auditing and support for remediation.*



## **Application Control**

Systems administrators must carefully manage computers to control which applications are installed. Although desktop operating systems certainly make this possible, ensuring that all clients comply with this restriction is difficult unless an automated client management system is used.

Administrators must be particularly careful to evaluate requests for non-standard software. There may be times when users will require specialized software; for example, a marketing analyst may need a statistical analysis package for a short-term project. An administrator may install it, but how will it be updated and patched? Is the licensed owned or leased? If it is leased, what will trigger the removal of the software when the lease expires?

Thin clients can mitigate these types of problems when used with appropriate management regimes. In the case of the thin clients, all applications are centrally managed. Before a specialized application is introduced, it would presumably go through a formal change control process. In the case of a full client environment, even if an application were installed as a “one off” without proper authorization, a software inventory process of an asset management application could detect the existence of the new application and catalog it accordingly.

## **Operating System Control**

Keeping operating systems properly configured and patched can be a challenge. Unless users are completely locked out of configuration programs, operating systems might drift from standard configurations. A user might change display settings in one case, or modify a network configuration setting to work around a temporary problem in another case. A bigger problem is ensuring that operating systems are adequately patched, as noted earlier. Again, as with application management, a centralized control mechanism, either in the form of thin clients or client management application, can reduce the risks of these potential problems.

## **Manageability**

Thin clients bring the promise of easier manageability for a number of reasons. Firstly, thin clients reload operating systems code and applications on power up. There is no need to schedule software distributions to update individual machines; changing a single executable image on the thin client’s server may be all that is required.

Secondly, thin clients use essentially the same hardware. There is no variation in disk size, no peripherals, and no USB devices to manage.

Thin clients provide a close approximation to a truly commodity computing device.

Thirdly, a thin client environment can promote a shift in software development toward Web-based applications. The result is that over time, thin client executable images are reduced to a minimal number of applications in addition to the operating systems, browser, and basic office productivity suites. In addition, in a thin client environment, all work-related data is stored on central servers. Backup and recovery is centralized.

Finally, single centrally controlled environments make it much easier for administrators to test software upgrades and new deployments. This in turn can result in higher levels of confidence that the release will not encounter an unanticipated configuration that disrupts the deployment.

### **Hardware Life**

Thin clients have fewer moving parts than their full client counterparts, so there are fewer points of failure. There is a belief among some proponents of thin client technology that thin client hardware is more reliable. This may certainly be the case, but it is difficult to make broad generalizations about any information technology; it is best to compare device-specific measures on mean times between failures (MTBF) than rely on the “conventional wisdom” about an evolving technology.

In addition, a single upgrade to a centralized server can improve the performance of all users, effectively decoupling the performance of the application from the client. The several motivations for migrating to thin client architectures are felt by just about anyone in the IT industry. We must all address security, compliance, application and operating system control, manageability, and hardware life spans. There are, however, a number of challenges presented by thin client architectures that prevent them from being the right solution for everyone.

## CHALLENGES OF THIN CLIENT ENVIRONMENTS

As with any technology, there are benefits and drawbacks that must be weighed when considering adopting a new system. Among those you should examine with regard to thin clients are:

- The introduction of a new platform to manage
- Limited functionality
- Less flexibility
- In some cases, non-commodity hardware
- Management issues

The relative importance of each of these factors will vary between organizations, and some will have a greater impact than others.

### **New Platforms**

It is an exciting time for some IT professionals when new technology is introduced. There are new systems to learn and the potential to change the way things are done and to solve long-lingering problems. For others, new technologies mean new processes and procedures to develop, test, revise, and implement. It means training staff on the new systems, working through the inevitable kinks in the process, and, if you are fortunate, retiring the old system (the unfortunate ones must maintain the old as well as the new systems). There might be integration and migration issues. In short, introducing a new technology can require a substantial commitment of time and resources, well beyond the cost of acquiring the system.

Thin clients are different from full client PCs. Even thin clients that use the same hardware found in typical Windows PCs are configured differently. Unless every application and user can move to a thin client, IT will be supporting two fundamentally different platforms. Standardizing on a single platform is a recommended practice but can be difficult to implement.

### **Limited Functionality and Flexibility**

Depending on your perspective, limited functionality can be a disadvantage or an advantage. Administrators may like the idea because it helps to minimize problems introduced by users as well as the potential for unauthorized use. Users, however, may feel constrained by the number and types of applications available, the inability to use USB devices—especially flash drives—and other constraints associated with thin client technology.

A related problem is that thin clients are less flexible than full clients. Full clients can easily be repurposed and reconfigured if necessary. For example, a high-end workstation purchased a few years ago is no longer

cutting edge for compute-intensive tasks, but it might easily meet the needs of an average power user or could be upgraded with larger drives, more memory, and special purpose hardware. Thin clients, as a rule, are not as easily customized to changing hardware configuration needs.

### **Non-Commodity Hardware**

One of the advantages of full clients is that they are easily built and maintained using readily available parts. The de facto of Microsoft Windows on Intel hardware has developed into a mature market with multiple suppliers, competitive markets and plenty of options for buyers. In some cases, thin clients use non-commodity hardware in addition to non-commodity operating systems.

Although non-commodity components are not a technical problem themselves, they do lose the cost advantages of commodity parts. In addition, you lose the confidence of knowing the levels of quality and reliability associated with the broad use of commodity components over an extended period of time.

### **Management Issues**

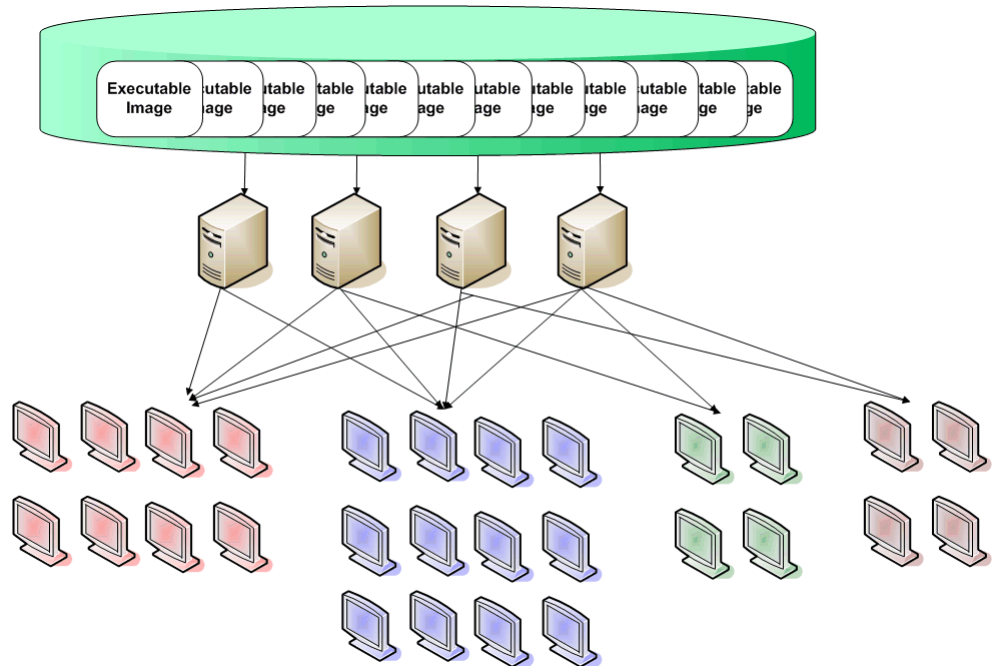
Adopting thin client technology is an effective way to address some management issues, such as controlling security vulnerabilities, but it can also introduce others. For example, an application that runs flawlessly on a standard Windows XP client may exhibit problems on thin client device operating systems such as Windows CE or Windows XP Embedded. Applications must be tested and verified on both platforms. Custom development may become more difficult if both full client and thin client versions of a client must be developed and maintained. Of course, sound software engineering practices, such as version control and software configuration management, can be used, but these cannot eliminate the complexities of developing and maintaining multiple versions of an application, especially over several upgrades.

There are also management issues with the thin client systems themselves. Different departments, and even small groups of users, may need specialized versions of boot images, each configured with a distinct set of applications. These images are subject to change control procedures, as is the repository that stores them and the servers that deploy them. Thin clients are dependent on centralized servers, so those servers should be clustered and configured for failover recovery. In addition, the added network traffic introduced by thin clients may require upgrades or reconfiguration of the corporate network.

It is important to note that thin client technologies address some management issues but also introduce their own set of configuration and maintenance tasks.

**Figure 2**

*In thin client environments, issues such as multiple image management, server failover, load balancing, and network performance arise.*



Thin and full client technologies both have advantages and disadvantages and both require comprehensive management regimens. Regardless of which technology is better for your organization, there are tools available to ensure it is effectively managed.

## ACHIEVING THE ADVANTAGES OF THE THIN CLIENT IN A FULL CLIENT ENVIRONMENT

When the cost and disadvantages of moving to thin clients outweigh the advantages, organizations can still realize some of the benefits of thin clients through the use of centralized management tools. Altiris offers a full range of capabilities for managing key aspects of full clients, including:

- Endpoint security (wireless and data lockdown)
- Operating system lockdown
- Compliance verification
- Software virtualization
- Application usage monitoring
- Remote management
- Hardware management

These capabilities do not duplicate the functions of thin clients but provide comparable benefits. For example, notebook computers are not protected by perimeter defenses and other network countermeasures when used outside the corporate network. Endpoint security solutions can adapt to the particular needs of mobile users and protect them from malware, data theft, insecure wireless usage, port scans, and protocol-based attacks. With centralized management, endpoint security continues to be manageable as the number of mobile devices grows. Of course, centralized management is available to all clients, not just mobile devices.

Altiris Client Management Suite provides operating system deployment and upgrades, hardware and software inventory, policy enforcement, blocking of unauthorized applications, and patch management. In addition, applications can now be deployed in such a way as to minimize the risk of disrupting other applications.

Altiris Software Virtualization Solution™ places applications and data into individual, isolated units called Virtual Software Packages. This allows administrators to instantly activate, deactivate or reset applications without altering the base operating system or running the risk of conflicting dynamic link libraries (DLLs). In essence, each application is turned into a self-contained unit that does not impact the operating system or other applications. Administrators no longer must contend with the ripple effects of application changes that extend well beyond the scope of that application. When problems occur, the Virtual Software Package can be quickly reconfigured and redeployed, again without disrupting the operations of other applications. In worst-case scenarios, malfunctioning software packages can be turned off in a matter of seconds. Through centralized management of full clients and

servers, coupled with software virtualization, the advantages of thin client technologies can be achieved in a full client environment.

Another advantage of thin client environments is the relative ease of usage monitoring. This too can be achieved in a rich client environment using tools such as Altiris Application Metering Solution™ software. This tool allows administrators to reclaim and redistribute unused licenses, eliminate used licenses, and more accurately plan for future requirements.

For some, thin client technology is an appropriate choice. Altiris again has the management tools to address the challenges of managing this type of environment.

## MANAGING A THIN CLIENT ENVIRONMENT

Software deployment in a thin client environment poses its own set of challenges. Altiris Deployment Solution™ addresses the needs of provisioning and managing full client, notebooks, servers, handheld devices, and thin clients. It can, for example, automatically deploy operating systems and applications along with upgrades and configuration settings across local area or wide area networks for enterprise management. In today's dynamic IT environments, flexibility in deployment and consistency in management are essential to cost-effective management. Relevant features of Altiris Deployment Solution include:

- The ability to quickly re-provision thin clients
- A thin client agent for executing scripts and tasks against thin clients and easing ongoing management and troubleshooting
- Predefined jobs for the most common thin client architectures as well as capabilities to create custom scripts
- Role-and-scope-based security, ensuring only authorized administrators have access to the thin client infrastructure

While thin client architectures may lessen the need for management of clients, it also introduces a new and critical server infrastructure that requires management. Altiris Server Management Suite™ software is designed for centralized management of a wide range of geographically distributed servers. If thin client servers must be placed in multiple offices and remote branches to overcome network performance issues, it is not a problem—they can still be managed from a single point.

Business continuity is an essential function of systems management, and the Altiris Server Management Suite includes monitoring and backup capabilities. If a disruption were to occur, administrators could be notified and failed servers could be rapidly replaced by re-imaging the server on other hardware.

No two IT environments are the same; many will include both thin and rich clients as well as a variety of servers running a wide range of applications. Altiris' flexible management infrastructure allows administrators to manage all these devices from a single console. Regardless of which technology, or combination of technologies, is right for your organization, Altiris has the management tools needed to get the most from your investment.

## SUMMARY

Thin client environments are an evolutionary change within IT. They address real challenges faced with full client environments, but there are three key points to consider when assessing the technology:

- Some of the advantages of thin clients can be achieved in full client environments through the use of Altiris management tools.
- Thin client environments still require well-defined management process and supporting tools.
- Altiris fully supports thin client environments with specialized manageability solutions.

As IT changes, the number of options increases but the fundamental principals of IT management remain constant. It is those principals that allow Altiris management tools to deliver compelling value across technology platforms.

For more information about Altiris and its affordable lifecycle management solutions, visit [www.altiris.com](http://www.altiris.com).