

A Quick Guide to Thin Client Computing

What is it?

The difference between 'thin' and 'fat' clients is the location that all the processing goes on. In a fat-client network, each PC performs all its own processing but it sits idle most of the time as users type away on their multi-gigahertz machines. In contrast, a thin-client environment uses a number of central servers that share the processing for clients. The clients need only be very basic machines capable of sending and receiving keystrokes and screen refreshes. Meanwhile, the powerful servers are working most of the time.

What is the advantage?

If a computer is sitting idle most of the time, it clearly makes sense to share the processing power with others. By doing this you can have a small number of powerful machines and many less powerful machines instead of a lot of powerful machines.

By adopting this model of computer, cost savings can be made in a number of ways:

- Client computers can be kept for longer than the normal 3-year replacement cycle
- Clients can be replaced by inexpensive, solid-state devices with 10+ year lifespans that consume less power
- Clients can be of any architecture (assuming client software is available) – e.g. Windows, Linux, Mac and many more – and the user experience will be the same
- There is no sensitive information held locally on the computers (e.g. cached passwords, student information, etc.)
- Bandwidth requirements are low (this not only saves costs upgrading the network backbone but means that more clients can connect to wireless access points than normal)
- The management of resources can be performed easily from a central location

A knock-on advantage of thin client computing is the leveraging of licenses outside of normal school hours. Using a remote connection, access can be given to the terminal servers so that users may work as if in school – with access to curriculum software and resources that would not normally be available at home.

What is the disadvantage?

So far, thin-client computing sounds like the answer to all your problems but it does have drawbacks. The biggest of these drawbacks is that it is not possible to run resource-hungry multimedia applications (e.g. music production, video editing, etc.) on thin clients. However, I would argue that computers used for these specialist purposes should be specified especially anyway and it is unlikely that you would have more than a couple of small suites for this purpose anyway.

The next biggest drawback to thin client computing is the initial cost. If you run a Windows-based system you will probably want a Windows-based thin client solution to run alongside. As with all things Microsoft, there is a cost involved for every desired connection. This is on top of the cost of the powerful terminal server hardware and any other software licenses for programs such as Microsoft Office. There is also an additional cost if you require all the 'bells and whistles' that Citrix brings.

Should I use Citrix?

Firstly, a quick explanation of what Citrix (or Citrix Presentation Server to give it its proper name) is. Basically, Citrix is a software layer that sits on top of your terminal server's OS to add some advanced management features. There are a number of versions with the optimal one being 'Enterprise Edition' which brings features such as load balancing, a 'magical' software installation tool, SNMP, application publishing and much more.

If you are just beginning to dabble in thin client computing to see if it will suit your situation, it is un-necessary to use Citrix as you only need to publish a desktop and you will probably be using some old hardware as your sole server (so no load balancing required). You can even add Citrix later if you decide that you need its features.

What are the options?

Server-side

Linux

This is the cheapest way to go. There are lots of open source projects based on LTSP (Linux Terminal Server Project) to choose from with good community-based support. These projects vary in features and will probably only have crude load balancing abilities (although Citrix can be installed on top of some distributions). Edubuntu is a distribution incorporating LTSP and is designed for education.

If you do go down the Linux route and your existing systems are Windows-based, you will not be able to run the majority of your software – although hybrid solutions and emulators, etc. are available.

Windows Terminal Server

Windows Server comes with the ability to run as a terminal server – this feature can be trialed for 90 days before licenses must be purchased.

The biggest problem with this Windows solution is the lack of load balancing. The only way to spread users across servers would be to use a crude 'round-robin-DNS' system of load balancing.

Windows Terminal Server with Citrix

This solution gives all the added features mentioned earlier but is the most expensive. Ideally, you should also have a SQL server to hold the datastore (this can be located on the same SQL server as another app as it is relatively small).

The most sought-after function is the advanced load-balancing ability. Users can be directed towards the relevant server based upon which server has the lowest usercount, lowest CPU-utilisation, most available RAM and more besides (including combinations). These complex load-balancing abilities mean that the servers in your 'farm' do not need to be of the same specification.

Client-side

Old Hardware

The cheapest way to get started is to convert your aging PCs into thin clients. There are a few Linux-based projects available that are relatively easy to configure. One of the simplest and more feature-rich is Thinstation (see www.thinstation.org).

Not all the benefits of thin client computing will be gained from using old hardware but it means that these machines could be run into the ground rather than replaced with expensive new PCs.

'Fatish'-clients

It is also possible to simply access the terminal servers from within Windows/OS X. Computers that are used for multimedia editing often require regular rebuilds and elevated privileges. By giving access to the networked applications via a terminal server, security concerns can be eased and it becomes less time consuming to re-build PCs.

Dedicated Hardware

Dedicated thin client devices can be bought relatively cheaply and have an embedded OS on flash memory. The OS will generally be a custom Linux distro, WinCE or Windows XPe. The majority of these clients also come with software to centrally manage the configurations.

From experience, I have found that the HP Linux-based terminals (t5125) are the cheapest branded terminal and they are also the easiest to set up, using the included Altiris Deployment Solution to deploy the configuration files.

The advantage of these solid-state devices is the low power consumption (approx. 20W when on and approx. 2W when 'off') and the extended lifespan of 10+ years as opposed to the usual 3 years.

FAQ

Is there an easy guide to setting up a thin client solution so that I can see if it is right for me? Yes! *There is an excellent guide at http://edugeekconference.net/index.php?option=com_content&task=view&id=33&Itemid=59 from the 2006 EduGeek North Conference. I am of course a little biased.*

Can I use virtual machines as my terminal servers? *Definitely not! You need all the resources of the server to do the job justice. There is also no point in having more than 2 processors per server as they will not be used.*

What spec of server do I need? *A dual-processor 2-3GHz Opteron/Xeon with 4GB of RAM should be ample to support 30 concurrent users. Fast hard disks also help performance although RAM is the main consideration. It is also worth remembering that not all your thin clients are likely to be in use all of the times so you could probably have 3 of these servers for 100 thin clients and never reach capacity.*

How much are licenses? *This obviously depends upon the number of licenses being bought and the licensing model used. Assuming Select licensing, you will need Windows Server 2003 Standard for each terminal server (approx. £60), Terminal Server Device*

CALs (approx. £11 each – one for EVERY thin client) and possibly Citrix licenses (approx. £125 each for Enterprise Edition – concurrent licenses so you will likely need only 2/3 of the number of thin client devices).

How much are these thin client devices? The HP t5125 is approx. £130 complete with keyboard, mouse and Altiris Deployment Solution license. As mentioned above, there is little need to go for WinCE or XPe unless you need to in order to attach a specific piece of hardware.

Where can I buy Citrix licenses and HP terminals? Two of the best suppliers that I have found (who happen to have both supported EduGeek) are EuroLaser– speak to Mandy on 01753 680400 – and Oliis Solutions – speak to Bobby on 0845 456 8556. 1st Technologies are also able to source second user terminals – speak to Stuart on 01254 878800.

How do I lock down the desktops? The terminal server desktops are locked down in the normal way and your existing GPOs will more than likely need no adjustment.