Sun Ray and Secure Global Desktop: environmental benefits – a background paper

September 2008

Summary
Traditional forms of desktop computing are energy-intensive and not environmentally friendly. PCs have limited useful lifespans, are hard to dispose of and do not make efficient use of power. Most organisations have configured their PCs according to working practices which assume that staff will be physically present, reinforcing needs for commuting to and from offices.

Approaches exist which can provide dramatic improvements on waste, power consumption and staff travelling but are not yet in widespread use. This is expected to change over the next few years as alternative technologies and working practices become more widely adopted.

Cutter project has first-hand experience of installing and configuring substantial deployments of long-lived low-energy systems that also provide full facilities to staff working from home, providing a very different approach compared to typical office configurations.

Our strategy is to combine "thin client" desktop computers with powerful server computers and secure remote access to achieve these goals.

Background
A "thin client" is different from a typical desktop or laptop PC. Thin clients are designed to be simple, have no moving parts and do not themselves run the users' programs. Instead the thin client is simply a device which provides a display, sound, mouse, keyboard and USB connectors. It uses a network connection to a remote, more powerful server computer which runs the user's software. Thin clients are intended to be cheap, long life, low power and easily replaceable.

The user software is centralised on remote servers where it can be more easily controlled: a single server (itself similar in power and cost to a traditional desktop computer) proves to be capable of supporting dozens of thin client displays thus greatly reducing the power consumption per user.

Thin client devices are inherently networked – all they do is act as screens for the application software – so if suitable equipment and systems design is used, they can be located anywhere in the world that has a network connection to the servers.

Installing thin clients represents a departure from typical configurations and can be daunting without specialist knowledge or expertise and is likely to be seen as introducing risk. Selection of a skilled supplier with a track record of satisfied customers should reduce or eliminate this entirely.
The experience discussed below is directly based on Cutter Project's existing customer base using

Sun Ray thin clients and associated software and servers. We are happy to arrange for those with an interest in finding out more to meet customers and see live systems in use.

Experience

The combination of thin clients and centralised servers typically results in

- Reduced hardware replacement costs. Server computers are designed for longer life than desktops and thin clients are designed to last a minimum of 7-10 years. This translates into less call on disposal and landfill.
- Reduced power consumption. Typical desktops use in the region of 100 watts whilst thin clients use 5-7 watts. The reduction in power consumption and heat often means no need for air-conditioning in offices – a substantial further energy saving.
- Low-noise environment. The thin clients are silent and the reduction in air conditioning noise provides a greatly improved office or classroom noise level.
- Enhanced classroom discipline in schools. Thin clients provide near-instantaneous boot times and students do not have to wait for computers to start (thus giving opportunities for unruliness to develop). Similar benefits are found where staff need rapid access to computer facilities away from their usual desk – user switching can be very fast.
- Greater flexibility. Well-designed thin client systems are independent of the software that is being used. Where alternative software systems such as, say, Unix or Linux are or may be needed the thin clients don't care; all that is needed is to configure some of the centralised servers appropriately. Users can be allocated to specific servers or mix-and-match depending on how management controls are set up.
- Improved availability. Thin clients rarely fail. If they do, or are damaged, no technical knowledge is needed to replace them and no installation or configuration is needed when they are replaced. The low cost of thin clients allows higher levels of spares to be kept, including the possibility of live spares if space permits.
- Lower downtime. Centralised servers are easier to monitor and manage than distributed desktop PCs. Systems designed by Cutter include 24x7 monitoring and allow for remote management, remote reconfiguration and remote re-installation. Some of the systems we manage are 6,000 miles from us.
- Remote access. Thin client systems are based around the concept of networking. A thin-client installation opens the opportunity for the servers to be made available to people working from home or branch offices. It's common to use software thin clients: the users' desktops are accessed through software running on a standard PC, laptop or in a web browser all via secure networking.
- Reduced staffing levels. Organisations using substantial numbers of thin clients in place of traditional desktops report a considerable reduction in the need for network technician time, reducing employment and hiring costs.
- Access controls. Sun Ray thin clients can be equipped with smart card readers. Using these, secure access can be provided on a per-user or per-group basis to entirely separate sets of services: this proves to be valuable in schools to separate staff and pupil access or businesses where different staff need different levels of authorisation but may have to be mobile.

Drawbacks, disadvantages and issues

Naturally nothing in life is perfect; thin client systems are no exception. We rarely recommend the wholesale replacement of traditional desktop or laptop systems (“fat clients”) in an entire

organisation for some of the following reasons. Thin clients are inappropriate for heavy multimedia use (they are usually fine for light use) and we would not recommend them where extensive video editing, animation or sound processing is being performed. This is particularly so where restricted networking capabilities are available.

Some specialised desktop PCs are used for the control of automated equipment or data logging and thin clients are rarely suitable for that kind of use.

Some software written for Microsoft's Windows operating system does not work well on centralised servers. Cutter Project now has considerable experience of installing (and in some cases cajoling) ill-behaved software on centralised servers and can provide advice on alternatives or assistance in determining which packages have problems.

At present the capital costs of installing a thin client system are broadly comparable with the traditional approach. A strong financial case can only be made over the longer term when replacement and running costs are taken into account or when environmental concerns are important.

The savings of a thin client system become most evident when a substantial deployment is undertaken. Small-scale systems deployments such as trial systems are likely to be less cost-effective.

We believe that there is a compelling argument for most organisations to take a hard look at whether or not a thin-client system can provide benefits to them. In general a strong financial case can be made based simply on replacement and management costs without having to try to attach figures to less quantifiable but also valuable benefits such as increased system availability, remote accessibility and quieter working environments.

Remote access using Secure Global Desktop

The infrastructure that supports thin clients on users' desktops isn't limited to servicing thin-client equipment within your premises. With suitable security put in place it can be made accessible via internet connections to anyone you choose to permit. The thin clients themselves can be installed in your users' homes or remote places of work or, alternatively (and most often) users will make use of software thin clients instead.

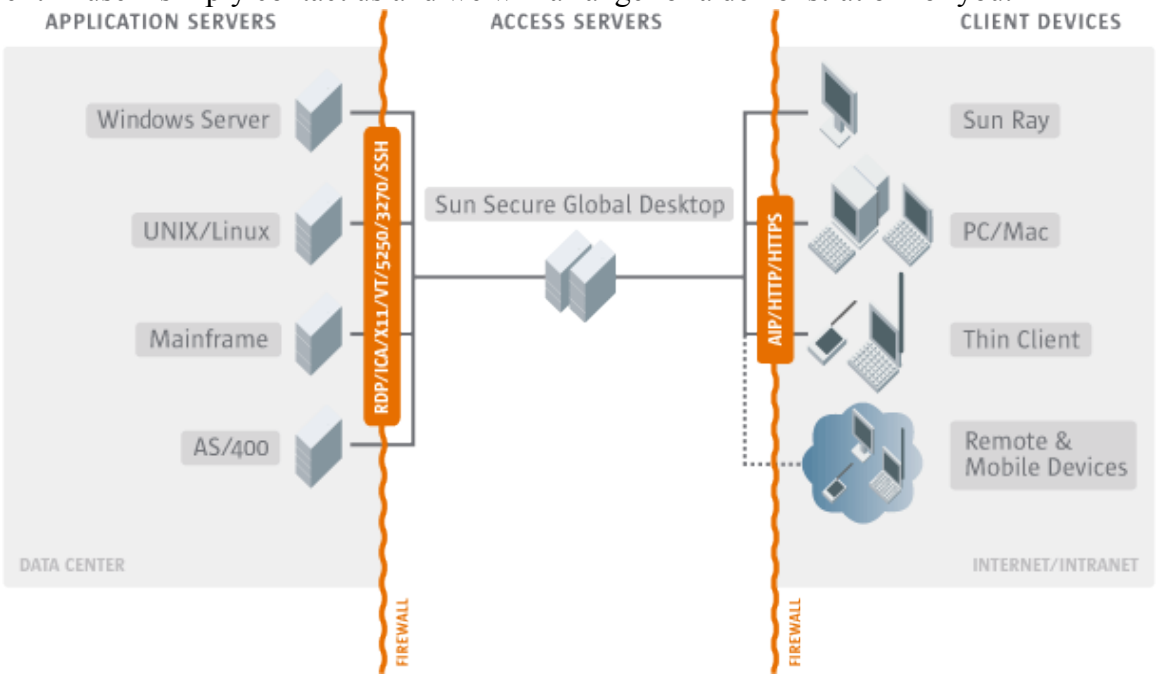
Cutter Project uses Sun's Secure Global Desktop for this kind of off-site access. It provides security, access controls and integrates with a wide range of software thin clients. A popular way of getting access is simply to open a particular link in a web browser and run the client that way.

Whilst simple to describe, this remote access has transformed the way some of our clients work. In schools staff are able to work on marking, curriculum development, timetabling and a host of other activities from anywhere with a network connection. Staff who have young children are able to go home early, tend to the needs of their youngsters and then carry on working where they left off later in the evening, time shifting their day to suit their needs. The benefits of home working are of course widely known, with many staff arguing that not only are they more productive that way, they aren't clogging up the roads either.

By spreading the hours that staff work, fewer servers (and hence less power) will be needed. However, the servers are likely to be running 24x7 rather than switched on and off on demand so careful calculation may be required to obtain realistic power saving figures.

Those clients who have implemented remote access via Secure Global Desktop have made comments to us such as “It's the single best thing we have done in years” and “If we lost access to this my staff would lynch me”.

Because Global Desktop can easily be run in a web browser it's easy to demonstrate if you want to see it in use – simply contact us and we will arrange for a demonstration for you.



Recommendations

We would encourage anyone responsible for the procurement or specification of desktop computer systems to investigate what is possible through the use of thin clients. We are well aware that claims from suppliers are likely to be viewed with considerable scepticism and we are happy to set up meetings and open days on our existing customer sites so you can determine for yourself whether thin clients may work for you.

Because we specialise in this area we think we do it better than many others. We have honed our configuration and delivery procedures so that it's possible for us to deploy a 400 desktop system in less than a day on your site and to be able to remotely maintain and administer it if you wish. Frankly, we think that's pretty good.

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