

Desktop Virtualisation Case Study

John Masefield High School, Ledbury, Herefordshire



Background

John Masefield High School (JMHS) is a medium sized (850 pupils, 120 staff) Secondary Academy in a rural location. It is a good school where IT is valued by senior management. There is one IT Manager and an IT Technician supporting 450 Windows desktops and 48 Windows laptops (classroom use only). The network was a RM CC3 network with Windows XP clients that was reliable, relatively easy to manage and was well regarded in general.

Key drivers for change

Microsoft was withdrawing support for Win XP, and RM CC3 did not fully support Win 7, requiring an upgrade to RM CC4.

The RM servers were reaching end of life and RM were to withdraw support for them, leaving us in the position of either having new servers or having no manufacturer support.

SIMS also was going to withdraw support for Win XP and older versions of Office, requiring us to upgrade.

The project process

A number of options were explored:

1. Upgrading to RM CC4 on new server hardware and replacing some older desktops that were not going to run Win 7 satisfactorily.
2. Upgrading to vanilla Windows Server 2008/2010 on new server hardware and replacing some older desktops that were not going to run Win 7 satisfactorily. Servers to be virtualised on new hardware. Clients to remain fat clients, running Windows 7.
3. Virtualising both server and desktops, reusing existing desktops as thin client devices and replacing desktops with thin client devices when desktops reached end of life.

An extensive evaluation was conducted and costs calculated over various periods extending to 10 years. Primarily due to the fact that a desktop virtualisation option required replacement of desktop clients every 8 – 10 years at costs of £150/unit, compared with full fat desktops replaced every 5 years at £300, the long term costs of option 3 were the lowest, although the upfront cost was high.

Additional benefits of desktop virtualisation were access to full school desktop from anywhere on any device; reduced energy costs over long term when desktops were replaced by thin clients; reutilisation of aging desktop hardware that now “ran” as fast as the more recent kit; increased ease of deployment of applications; increased ease of deployment of desktop clients.

A detailed functional specification for the project was prepared and put to open tender.

From the seven responses, three were shortlisted based on a scored match with the functional specifications vs. cost. The cheapest was a thin-client only solution but detailed application testing showed that this would not be able to run all the software required by JMHS, with several key applications not running under Remote Desktop Services (RDS)¹. The other contender was a Hyper-v/Quest Workspace solution that was very attractive. However the Citrix based solution proposed by Precedence Technology of Cambridge offered both XenApp (RDS type service) and XenDesktop (Virtual Desktop (VDI)) options and a massive amount of hardware for the price, making the decision the most risk free. They also could demonstrate their solution working in other schools and worked hard to tailor the solution to our requirements and budget. Together with their experience of the educational environment and their obvious technical skills, the decision in the end was not hard to make

Implementation.

The project was approved by Governors and contract signed in November 2012. Unfortunately the building housing the server room was scheduled to have a new roof installed over the winter of 2012/13, so all the existing servers had to be moved out to temporary accommodation, together with the new servers and storage. Go live was scheduled for Easter holidays , April 2013, as the RM support for the old server hardware was ceasing then. Server installation and configuring was done over the spring 2013, but performance testing was not really possible in advance. Over the nine days of the Easter holidays, all workstations were rebuild as thin client devices, key systems such as SIMS, Exchange and SharePoint were migrated to the new servers; all user accounts and data were migrated and the network switched over to connect to the new servers. Volunteer VI Form students assisted in this and the thin client used was a Linux-based client from Precedence that essentially required each PC to be configured to PXE boot from the network and given a name and so this was a very quick process. The changeover was successfully completed in the nine days and staff and students came back after the break to a working system.

Teacher workstations that connected to Promethean interactive whiteboards (ActivBoards) were configured as Provisioned PCs (where the PCs booted from a virtual disk image on the network, but run locally as a full Windows 7 desktop) so that The ActivBoards and other USB devices (visualisers, cameras, etc.) work satisfactorily. A music suite was also provisioned so that music keyboards would not suffer lag, as well as a photo editing suite, as XenApp did not support the high resolutions required. Student and Support Staff workstations were configured as thin client XenApp devices running sessions from a bank of application servers. Windows 7 Virtual PCs were also available to run those applications, such as SuccessMaker that would not run under XenApp. These Win7 VDI sessions were made available in the XenApp sessions.

All main applications, including support systems, such as PaperCut, Impero, SysAid, PRTG and antivirus were configured and tested.

¹ Key applications were RM SuccessMaker, Global Earth and Promethean ActiveInspire, where writing on the board was not smooth in RDS.

Initial issues.

The nine days install was not sufficient to test fully and there were a number of relatively minor issues that needed resolving that would have been sorted if we could have installed over the summer.

The main issues we had were:

1. The Linux thin client did not handle multi-media, especially Flash content well, with sound being distorted. We had to replace the client with a Windows 8/ThinKiosk solution, which was done piecemeal once the system was live. However a number of our workstations are too old to run Win 8 and have to be the Linux client.
2. Promethean ActivBoards when connected via a serial/USB converted required reconnecting every time the workstation was restarted. This was solved by replacing the serial/USB cable with long USB cables, the ActivBoards having both interfaces built in.
3. Printers were initially problematic, with service being interrupted regularly. This was eventually isolated to a faulty print driver, which when replaced restored stability. In XenApp, the Citrix Universal print driver doesn't provide full functionality so there are still issues with tray selection for students.
4. SuccessMaker runs as a Windows 7 VM, published to the XenApp desktop for students to use. This has taken some tweaking to get working satisfactorily, but then again it didn't work particularly well on the RM CC3 network.
5. DVD drive mapping for the provisioned workstations required some tweaking so that the drive appeared as the same letter for all workstations. This was required as other drive letters are not accessible for security reasons.
6. Outlook profiles don't work well in a XenApp environment and so we use the Outlook Web Access (OWA) interface instead. This is not as feature rich as the desktop client and is not liked as much by the majority of staff.
7. Serif MoviePlus exhibits strange behaviour and does not work well under XenApp, although I have seen it work well in other schools. We have worked round this by providing provisioned machines for MoviePlus use.

All of these issues have either been worked around or resolved and the network is now performing well.

Advantages

The most liked feature is being able to access the school desktop from anywhere on any device. From home, staff can access SIMS, students have access to all their applications. Files get saved straight to the network, so no requirement for USB sticks or emailing work. Performance over broadband is as good as being in school.

Software deployment is easier, with no need to package software.

The flexibility of the Citrix solution means that there will be a way to deliver any application, either through a provisioned desktop, VDI or XenApp.

Hardware deployment of thin clients is very easy. We recently added 15 NComputing clients to a room, which involved screwing a mounting plate to the back of each monitor, attaching the thin client, plugging it in and starting them up. They picked up their configuration and were ready to go immediately.

Over time, as the existing PCs get replaced by thin clients, we expect to see significant decreases in energy costs.

Reutilising old desktops as thin clients to run up to date OS and applications has saved significant sums and purchasing thin client devices will continue to save money in the future.

Conclusion

A mixed environment with full desktop clients (provisioned in our case), VDI for troublesome applications and thin clients for the majority is required for most schools in my opinion. The flexibility offered by such an arrangement enables any application to be delivered and for the complex variety of IT use in a school to be catered for.

The performance of the system is heavily dependent on the network and switches, so you do need to ensure your network is up to it. 100Mb to each XenAp desktop and 1GB for provisioned machines is recommended.

Printing need careful planning and supporting many different models of varying ages can be problematic.

The support and expertise of Precedence Technology was invaluable in getting this project implemented and they still provide essential support and assistance. Having their product knowledge and technical skills on tap is a huge asset to us. However, as they are educational specialists and a small company, support can be stretched at the start of the school year, so we now plan activities accordingly.

The end –user experience is good, with multi-media application performing adequately, but generally not as well as on a full client. Other applications in general perform much better than they did on our old desktop hardware.

Desktop virtualisation provides many real advantages, but requires a complete set of tools to deliver a cost-effective solution. VDI is expensive and RDS doesn't deliver on all applications. A detailed Proof of Concept to test all your applications is vital.

JMHS considers the project a success and looks forward to reaping the cost savings in future years in addition to the improvement in application delivery we have now.

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