

The Future of Community Connect

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Introduction

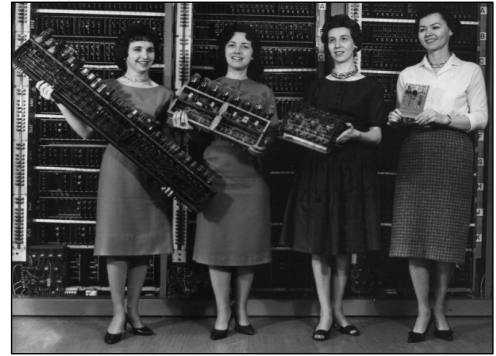
In this session we will be looking into the future to see what the next six to eighteen months have in store. We will be looking at thin clients, what they are and the history behind them.

We will look at the next product to be released for Community Connect – ‘RM Client Connect’. We will also have a sneaky peek in to the future release of ‘Community Connect 4’

Due to the early release of the development roadmap, some of the information and screen shots of the functionality within this document are works in progress. The aim of this session was to say ‘thank you’ for the support and feedback given from Technical Seminar attendees and to give a look and feel of the features that will make up these future releases.

The history of thin client

The first computers were, in essence, automated counting and calculating devices. Series of number patterns were fed into these counting devices by setting the positions of switches or contacts. The sole purpose of the computer was to make calculations according to the set of instructions and data it was given.



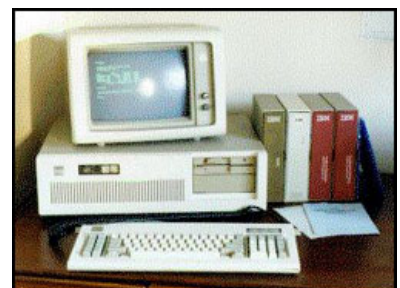
The process of getting information into, and out of, these machines underwent a gradual evolution from switches and contacts, to hole-punched cards, paper tape, magnetic media, and, eventually interactive typewriter style terminals (see diagram below for example).



These early terminals comprised a keyboard for input and a text based CRT display for the computer output. Due the high cost and complexity of early computer hardware, multiple users would share a single computer. When more users needed access to the computer, more terminals, rather than more computers were used to resolve the issue. The power of the computer could be centralized in one place while "dumb" terminals provided a way for multiple users to use the system at the same time. This concept has grown to become what we associate with Mainframe computers today.

A completely different approach was taken with the rise of the personal computer and the low cost of hardware. It soon became practical for an individual to have access to a computer that was used by them alone, and, it could be operated in a standard office or home environment! This being said, these early personal computers were a long cry from what we now understand a personal computer to be.

While having in common the keyboard input device and text output device of the "dumb" terminal, these units had their own local processing power and storage. The availability of dedicated processing power for each computer user allowed new types of applications to be developed, such as spreadsheets, word processors and graphical computer games.



As a result businesses and individuals began adopting personal computers at an amazing rate. With a minimal up-front investment, people could take advantage of the productivity gains offered by these new systems.

The personal computer was a huge hit, and gave many advancements but did lack in areas that the centralised computer did not, such as reliability, low maintenance, security and the ability for everyone to share applications and data easily.

In order to answer these early stumbling blocks the personal computer went through many different incarnations going from operating systems such as MS-DOS to the now super-powerful Microsoft Windows XP. There was one final part of the jigsaw that was additionally needed; the ability for these computers to be able to connect to other computers and the ability to share resources. Thus the 'client-server network' was born.

By the 1990's the PC network was becoming more and more complex requiring specialised devices and layers of software to maintain functionality, so the PC computer was given the name of "Fat Client" due to the complexity. Studies were taken on the virtual cost of PC based computing within a company. The results were very surprising. Companies were spending large amounts of money on never ending software and hardware upgrades. Add to this the large number of related issues with reliability and compatibility, the productivity that the PC had once been well known for started to diminish.

Sadly, it was not possible at this point to go back to the days of centralized computers and dumb terminals. People were getting tangible benefits from the wide range of powerful applications that had developed only on personal computers. These applications simply were not available in the old format, that is, until thin client/server-based computing came along.

In simplest terms, the phrase 'thin client/server-based computing' describes a shift back toward centralised computing while maintaining the benefits offered by the personal computer revolution. This step was an easy one for the business world to consider and implement but it was not right for education and the needs of the classroom, well at least not for a while.

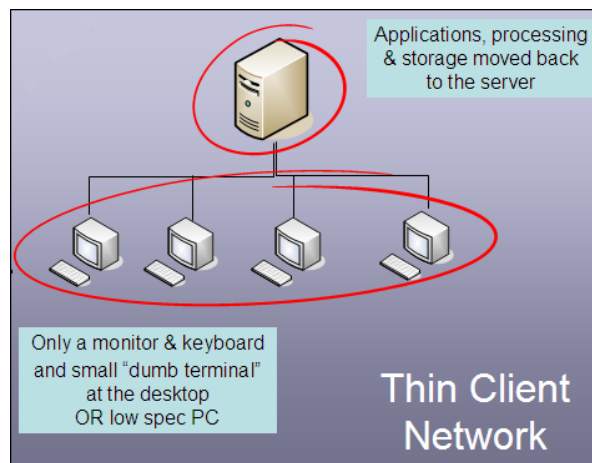
What is thin client?

Thin client deployments move the processing power away from the workstation or client onto a remote computer - typically a central server. The remote computer is connected using a special protocol that basically allows the transmission of audio and video data from the server to the client and the secure transmission of keyboard and mouse input from the client back to the server. The connection could be over a local area network, or across the Internet.

Users connected to the remote computer have to establish a logon session on that computer in exactly the same way as though they were logging on to it locally. Once logged on they have the same desktop settings that they would have if they logged on anywhere else on the network, and the same restrictions and permissions apply to them. Multiple remote users can be logged onto the same server simultaneously, each of them working in their own session oblivious to each other.



Because the client itself has little to do but display information and accept user input, the processing power it requires is minimal - hence the term 'thin' client. This makes it ideal for re-purposing low-specification hardware.



What do you need?

A thin client network typically includes:

- One or more servers to provide the processing for the thin clients.
- An operating system that supports thin client networking, e.g. Microsoft® Windows® Server 2003.
- Software to control the client and the server.

What software options are available?

The two most common platforms for thin client are Microsoft Windows Terminal Services and Citrix Presentation Server™ (formerly Citrix® MetaFrame®). Microsoft Windows Terminal Services is a component included with Microsoft Windows Server 2003 and is also available to download for other operating systems including Windows 2000 Server. At the client, Microsoft provides Microsoft Remote Desktop Connection (formerly called Terminal Services Client), with the Windows XP operating system, to connect to the server.

Citrix Presentation Server is used to provide the Microsoft Windows Terminal Server product with additional functionality by allowing multiple client operating systems to connect to a Windows Terminal Server and run a Windows application through their browser. When Citrix resides on a Windows server, the server needs to be licensed for Windows Terminal Server and Citrix.

Thin client – the return

So why the return of thin client? It's not a new technology as such and has been around for quite a while. The answer to this is the changes in required hardware costs and also the speed of access that is now available to the Internet.

The cost of computer hardware has been on the decrease as new and more powerful versions are released. It is this fact that is helping to bring down the overall cost of implementing a terminal server on network, making it a cost-effective and viable solution. At the same time we also need to consider that the new, more powerful hardware will allow the terminal server to have more concurrent connections, in other words more users logged on via thin client.

The Internet and bandwidth improvements have also had their parts to play in allowing thin client users to connect to the terminal servers whilst being in a separate location. We will look at this functionality later in this session when we look at the future of thin clients.

Advantages & disadvantages of thin client

As with everything else, the use of the thin client solution offers great advantages and equally some drawbacks for schools. The thin client solution is not right for all networks, so I have laid out below a list of the advantages and disadvantages that are most commonly listed about thin client solutions.

Advantages

- **Longevity of hardware**

One of the issues highlighted with the personal computer or thick client was the need to continuously to upgrade the hardware for the new programs or operating systems to run smoothly. In a thin client solution, as the terminal server completes all of the work, the hardware in a thin client does not need to be upgraded. Remember there is no hard drive for storage. Therefore new operating systems may come and go but the hardware in the thin client will not need to change.

- **'Stateless'**

The thin client does not remember any settings from the last user session as no changes were made to local files. Any thin client computer can therefore be used by any user around the network without the need to alter any settings in advance.

- **Low attraction value for thieves**

One of the advantages of thin clients is that they can be added to locations where previously it could have been easy to steal from. Once a thin client device is removed from the network it is useless and will not connect to anything.

- **Easier to maintain**

Due to the lack of moving parts, such as the hard drive, thin client computers are very easy to maintain. An example would be hard drive stops working, simply replace the hard drive. The same diagnostics applies with the keyboard and the monitor.

- **Client hardware cost**

After a cursory look over the Internet, thin client machines can cost as little as £156, when compared to the cost of a personal computer that can range from £400 onwards. The saving can clearly be seen, but it is also important to factor in the cost of the terminal servers at the same time.

- **Lower energy consumption**

Certainly in these green aware times, reduced energy consumption can help the world but also help the purse strings when we think about the escalating cost of the power to run machines and networks. Specialised thin client devices can make large savings in this area, but there are two more areas to consider. The required terminal server can be rather energy-hungry whilst power saving PCs such as the RM ecoquiet can help make savings with a thick-client network.

Disadvantages

- **Reliance on the server**

The main disadvantage if we think of thin client solutions is the sole reliance on the terminal servers. If the server is down or unavailable for any reason then the thin clients will simply not work.

- **Infrastructure usage**

Thin clients as we have seen above, are reliant on the terminal servers in order to be able to run. With this in mind infrastructure is equally important and can be seen as another disadvantage.

- **Available applications**

When we were looking through the history of thin client, we discussed the change from central processing to the personal computer. With this change more processor and memory intensive applications could be designed and delivered. A lack of suitable software applications available for thin clients has been a big downfall in the thin client network.

- **Software updates / plug-ins**

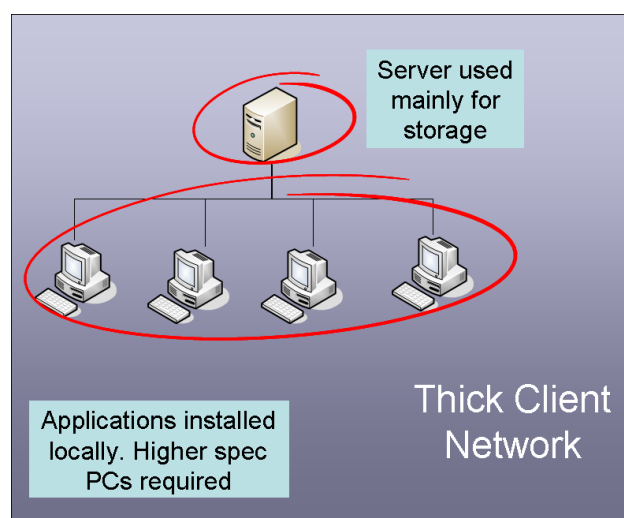
Taking into account that the server itself completes all of the work on a thin client network, any updates needed for software or plug-ins will need to be added at the Terminal server. Due to security and to enable a stable platform, these updates can only be carried out by the administration team and not the normal thin client user.

- **Utilising peripherals**

One of the main disadvantages of a thin client network would be the lack of ability to add peripherals to a thin client station. Examples would be musical keyboards, microscopes and USB Christmas trees.

What is a thick client?

Thick clients, also called heavy clients, are full-featured computers that are connected to a network. Unlike thin clients, which lack hard drives and other features, thick clients are functional whether they are connected to a network or not.



While a thick client is fully functional without a network connection, it is only a "client" when it is connected to a server. The server may provide the thick client with programs and files that are not stored on the local machine's hard drive. It is not common for schools to provide thick clients to their students. This enables them to access files on a local server or use the computers offline. When a thick client is disconnected from the network, it is often referred to as a workstation.

Advantages & disadvantages of thick clients

As we have looked at some of the popular pros and cons of the thin client environment, it is equally important to look at the advantages and disadvantages of the thick client network.

- **Work without the server**
With thick clients, there is the ability to work "offline". By this users can continue to work on a thick client PC without the need of the server to keep the functionality.
- **Applications aplenty**
As the title here indicates, the sheer volume of packages designed for the thick client far exceeds the amount designed for thin clients.
- **Local storage**
With thick clients the hard drive is back, allowing for files to be stored locally rather than on the terminal server. This can be seen as a down-side if the data is not backed up as this creates a single point of failure.
- **Mobility**
With thick clients, such as notebooks, they have the ability to be placed in a car, driven 30 miles up the road and switched on and used. This is not possible with thin clients.
- **Ability to use peripherals**
With thick client computers the ability to add and use peripherals is available.
- **Higher specification clients**
With thick client computers, it is necessary to upgrade and refresh the personal computers as new applications and operating systems require more and more memory and power.
- **Lots of 'moving parts'**
With the addition of hard drives and memory the thick clients have lots of moving parts. The moving parts can be seen as a disadvantage as they can be more fragile than the thin client model.
- **Heat generation**
Heat generation is an issue with thick clients, and can make them difficult to use in certain areas of the school.

What is a Community Connect 3 client?

Now that we have looked what a thin client and thick client machine is in general, let's compare what we know to a Community Connect 3 workstation. What is it?

I had mentioned earlier in this session that thin client technology is not new. In fact RM had looked at this before but had decided that it was not a viable solution in the education market. But at that point it did not stop RM cherry-picking some of the ideas behind it. I would call a Community Connect 3 workstation a "medium client" solution. By this, I mean some of the characteristics of both thin client and thick client stations can be found on a Community Connect 3 workstation. If we look at the ability to log on to any workstation and to have the same desktop on any machine, and add to that the fact that the users N:\ drive or home area are stored on the server for backup we have examples of thin client technology. If we look at the privilege user functionality via the RM Management Console this offers thick client functionality.

RM Client Connect

RM Client Connect is the latest product available for Community Connect 3. This new upgrade offers a hybrid environment where thin client and Community Connect 3 can run on the same network. It also offers functionality on the ability to SmartClient a Windows Vista workstation on the Community Connect 3 network.

RM Client Connect and thin client

When utilising thin client via Client Connect, a terminal server is added to the Community Connect 3 network as a member server. In order to keep the same management functionality available to control the look and feel of a workstation, RM AppAgent is added to the terminal server. This allows the thin client user sessions to be governed via the Management Console. Through the Management Console it is possible to control the drive mappings for the thin client, printers available and packages that are allocated to the terminal server. This allows the ICT teams and network managers to use the same method of control over the whole network. A new Group Policy object is created which gives the ability to control the logon look and feel and other workstation settings.

One of the advantages of adding thin client functionality to the Community Connect network is the ability to re-use workstations that otherwise would need to be refreshed due to their speed and hardware specification. These workstations can be used to become thin clients. The workstations will only need to boot into the Windows XP operating system and then once the thin client session was started via remote desktop, then the terminal server would do the rest of the operating work. This way the older computers can be stripped down to the bare bones and still offer functionality on the network. However it is worth pointing out, that not all the advantages of a thin client will apply to these re-used stations (e.g. heat generation).

The future of thin client

As the session title entails we will look forward to functionality that RM is working on with thin client in later releases.

Remote access to Community Connect via the Internet

With learning platforms on the horizon, one of the areas of difficulty highlighted has been the ability for students to be able to use the Internet at home and the ability to use a parent's computer. By using the Internet and remote desktop on home computers this acts as a solution to some of the fears raised when thinking of students working from home. The thin client access will control the student's access to the Internet and programs as if the student was on the school network. This way parents can be confident that their son or daughters access is controlled.

Non Windows devices

Although at the time of the session non-Windows® devices acting as Client connect stations was a look into the future. This functionality is now available with Client Connect. An example would be Apple® Mac® computers. These computers can be very helpful with multimedia and podcasting. But adding this type of computer can be at the cost of one less Community Connect station. Via a remote desktop protocol the non windows device can be turned in to a thin client machine on the Community Connect network, offering the best of both worlds.

Vista and Community Connect 3

RM Client Connect for the Community Connect 3 network will allow for Windows Vista™ workstations to be added to the network via the SmartClient process. By this we mean the ability to take a Windows Vista workstation and then add the RM components on to the workstation. Smart client does not offer the rebuild functionality that is available for the Windows XP clients, but the ability to add Vista workstations does offer some advantages. ICT teams and network managers can plan and prepare the integration of the new operating system. Considerations such as to which applications will work on the new system and also the ability to look at the new functionality and decide which options will be locked down via the Group Policy Settings are possible. It will also allow for early training in which users of the network can look and use the new operating system with help before use in normal lesson. This way the new operating system will not be a surprise to the network users and help to ensure a smooth transition in the classroom.

Community Connect 4 development process

Community Connect 4 has been several years in the making. Through ongoing feedback from network managers, ICT teams and teachers we have learned what works and what does not work on an education network.

Feedback has been given in many ways, from customer panels, seminar questionnaires and from information passed on to RM engineers. With theses valuable insights we have been able to advance the management and delivery toolset. It is a direct result of this help that we were able to show an early view of the Community Connect 4 development roadmap. The aim of this presentation is to pass on an idea of some of the features and concepts that will make up the finalised product.

Evolution not revolution

Community Connect 4 is evolution not revolution, we have not ripped up Community Connect 3 and started with a fresh canvas. It has been important to take on the good functionality, build on these features and add functionality. It is important to note that Community Connect 4 will be a software upgrade that can be added to existing 2003 Domain Controllers. It has been very important to RM to have a smooth upgrade process.

Smart lists and filter lists

One of the areas of comment was the amount of information held on objects such as users and computers. There is a need to have more details information such as service packs for computers and disk quota usage for users. In answer to this, the new RM Management Console will hold lots more information on these objects and a new way to compare this information. When you think of 'smart lists' think of questions on the network; For example "I would like to view my new Windows Vista Business PCs and the amount of memory contained in them". This question can be answered using the filter lists to let me see only computers which have the windows Vista Business operating system. I can then filter further by the location of the PCs. Thus, quickly and easily seeing the information to my question.

Let's take this one step further, if this is a question that I am likely to ask on a regular basis, let's take user home areas over 90% full, I can then save this question like a favorite in Internet Explorer®, that way when I click on this question, the Management Console will dynamically go out and find the answer to that question and then display the results in the console. The aim of these tools is to allow the ICT teams to quickly and easily find and compare granular pieces of information or settings.

Improved application management

Another area of feedback was in regard to package management. On education networks there are many software titles on the network managers desk and of course on the network itself. We received feedback on the need to help with a way of quickly and easily seeing where software is allocated, if it is installed correctly and how many times has it been allocated. The solution is a package matrix! Imagine a spread sheet that shows all of the software titles listed with icons for package status and the ability to quickly see how many times the software is installed.

Internet Access Manager

The Internet could be considered to be one of the most powerful tools on a network, so it is no wonder that it is used regularly in lessons. There are occasions when a user needs to be banned from accessing the Internet and this can impact on a lesson. We also received feedback for the need to control Internet usage for all PCs in a classroom. The solution is Internet Access Manager. With this tool it is possible to control the Internet for users, groups of users, computers and groups of computers. These objects can be set different access permissions at different times of the day; this can be narrowed down to five minutes periods at any given point in the day via access controls. These controls have the default settings of:

- Full access
- Internet and Intranet
- Intranet only

It is possible to make custom Internet access by only allowing certain web sites to be viewed or alternately allowing all web sites except the ones listed.

Hardware configuration

More granular pieces of information were highlighted as an area that needed to be looked at. Within the Management Console it is possible to pick a computer and view all of the components in the computer. Examples of information would be:

- Workstation serial number
- Video card make and driver
- RAM
- Hard drive size
- Free hard drive space
- MAC address
- Network card type

As you like it!

With the new Management Console, it will now be possible to tailor the view to how you as an individual would like to see it. We all work differently and in some cases complete very different tasks on the network. With this in mind the Management Console remembers each users settings so that it is that much quicker for each user to find the information and settings quickly and easily.

Notes on computers or users

From an ICT team's point of view it is necessary to keep notes on users and computers. Community Connect 4 will provide an area to explain the reasons for a user setting being enabled or disabled, notes on computers on what is to be completed.

Automated downloads and updates

Keeping the network patched and up to date can be a very time consuming task. It is important to check RM Support Online to see if there are any updates for the operating systems from Microsoft or updates to the Community Connect components. Then the updates have to be downloaded and finally a time to apply these updates to the network must be found. The solution is to provide automated downloads, but still keeping the ICT team in control. With Community Connect 4 we configure the network to check with the RM update area once a week, on a day and time specified by you. Once the updates are found, they are automatically downloaded to the servers and this is when a choice is given. Would you like the updates to be downloaded and automatically added to all machines? Alternatively you can specify 3 or 4 test PCs that will have the updates automatically allocated. If, after a few days the computers are running smoothly then the rest of the computers can have the updates allocated.

Network Recycle Bin

This has to be one of my favorite features available for Community Connect 4. I am sure we are all aware of the queue of network users outside the ICT door every morning who have accidentally deleted files! On standalone PC computers we have the recycle bin. That way if we delete a file, we can go to the recycle bin and then restore the file. On a network this feature is not possible, so we have to rely on the network backup tape.

What happens if I create a new file in the morning, and later that day in the afternoon I delete the file? Well it will not appear on the nightly backup tape as the backup process

has not yet run, so it is impossible to restore the file. Now, with the network recycle bin, each user can recover from those 'butter finger' moments.

My Connect

My Connect is the replacement for the RM Status Reporter. This offers more user and computer information. One of the advancements that caught my eye was the ability for each user to have a picture loaded on the network which shows on the My Connect screen (a bit like an avatar). Does the picture on the screen match the face that is sat in the chair? Another advancement from the 'My Connect' tool is the extra ability for teacher users to reset student passwords, printer credits and disk quota space. This feature, added after user feedback, is available as an extra user interface to My Connect, rather than having teacher users to be delegated responsibility to the Management Console.

Acceptable Usage Policy

Certainly a common form used with networks in education, an AUP is a way of expressing the rules for users of the network, and encouraging good network practice. The difficulty comes with dealing with the administration of the paper forms and how many times a user will be reminded of the rules. Within the Management Console it is now possible to create a separate AUP for more than one type of user. Students, teachers, network managers, head teachers and in some cases evening class users will receive the policy and rules that are relevant to them. It is also possible to control the frequency of the Acceptable Usage Policy being shown.

New station build

Community Connect 4 will have a brand new builds process, but I do want to keep something back for the next time we update you on the development roadmap. Here are three headlines for you:

- You will no longer have to use floppy disk disks to build computers.
- Hardware Support Packs will be a thing of the past.
- There will no longer be Windows 98 in the top left of your screen.

Conclusion

In conclusion, in this session we have looked at the next Community Connect 3 product – 'Client Connect', which offers the ability to have a hybrid network with thin clients, thick clients and of course medium clients. You will also be able to add Microsoft Vista clients to the network.

We have had a sneaky peak at the development roadmap for Community Connect 4. A big THANK YOU for all of your feedback on what works and what does not in the educational work place. Please keep the information coming, by telling us what works for you!