



IBM STG Technical Conference

Virtual Clients Solution

and surroundings – Client Consolidation (CCON)

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Before you start

This document is a derivative of a presentation I did for an EMEA technical Symposium. I have removed (i.e. “banned”) some of the charts because, although not strictly IBM confidential, they outline stuff I don’t want to disclose on it20.

I am posting these charts here just so people interested in understanding what “VDI” is ... they can start to have a vague idea.

This presentation was originally in PPT format but I decided to rather post it in PDF format. Most of the animations got lost under way and some charts do not make much sense without those. If interested in the PPT version drop me an e-mail (massimo@it20.info) with your company account (i.e. no yahoo, hotmail etc).

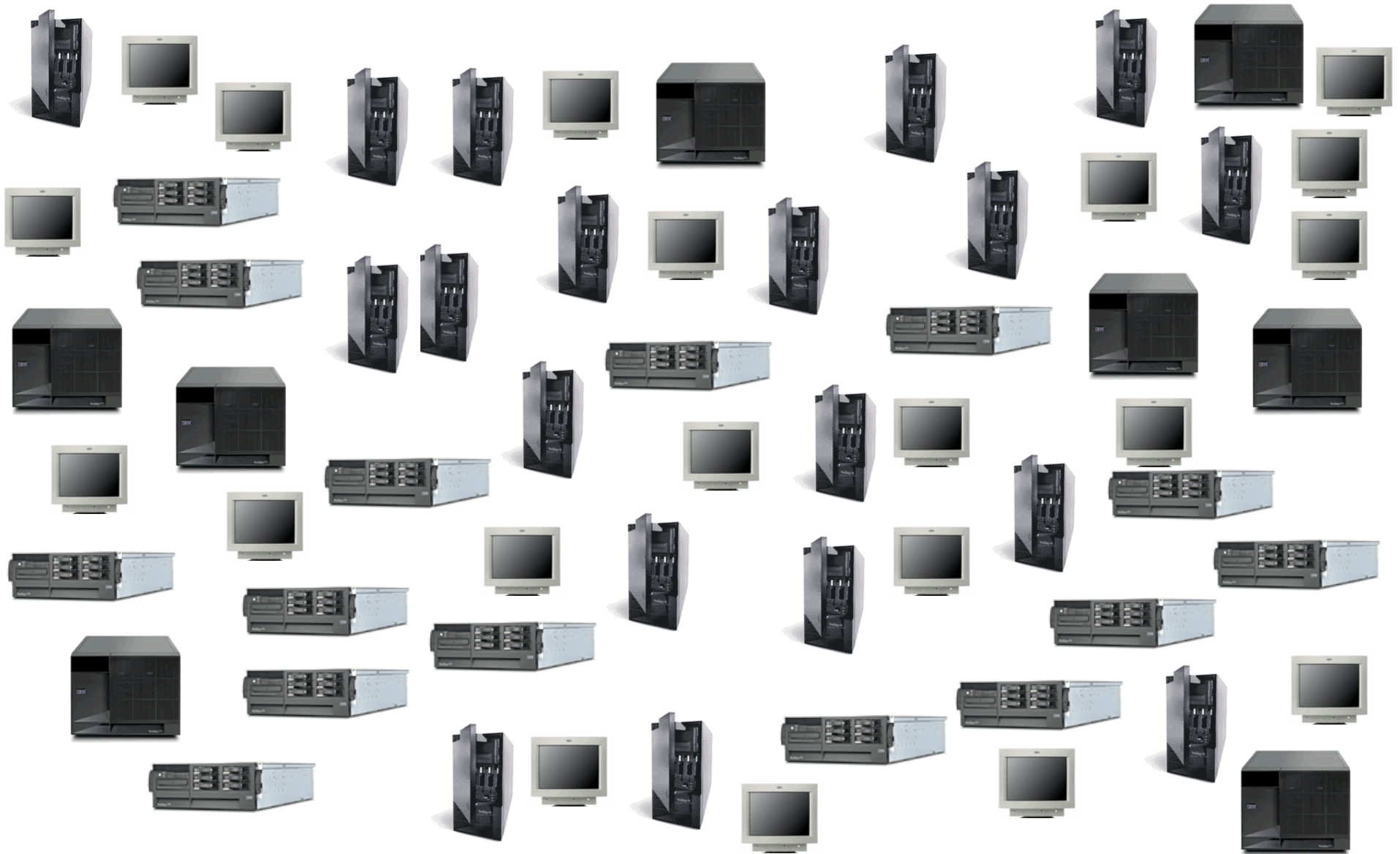
Agenda

- ***Problem statement***
- ***CCON models description***
- ***CCON components***
 - *Client Devices*
 - *Infrastructure Access*
 - *Shared Services*
 - *Virtual Clients*
 - *Workstation Blade*
 - *Client Image(s) repository*
- ***TCO Analysis***
- ***IBM VCS solution***
 - *VCS “off-the-shelf”*
 - *VCS “a la carte”*
 - *Sample Scenarios*
 - *Real life implementations*
- ***Conclusions***

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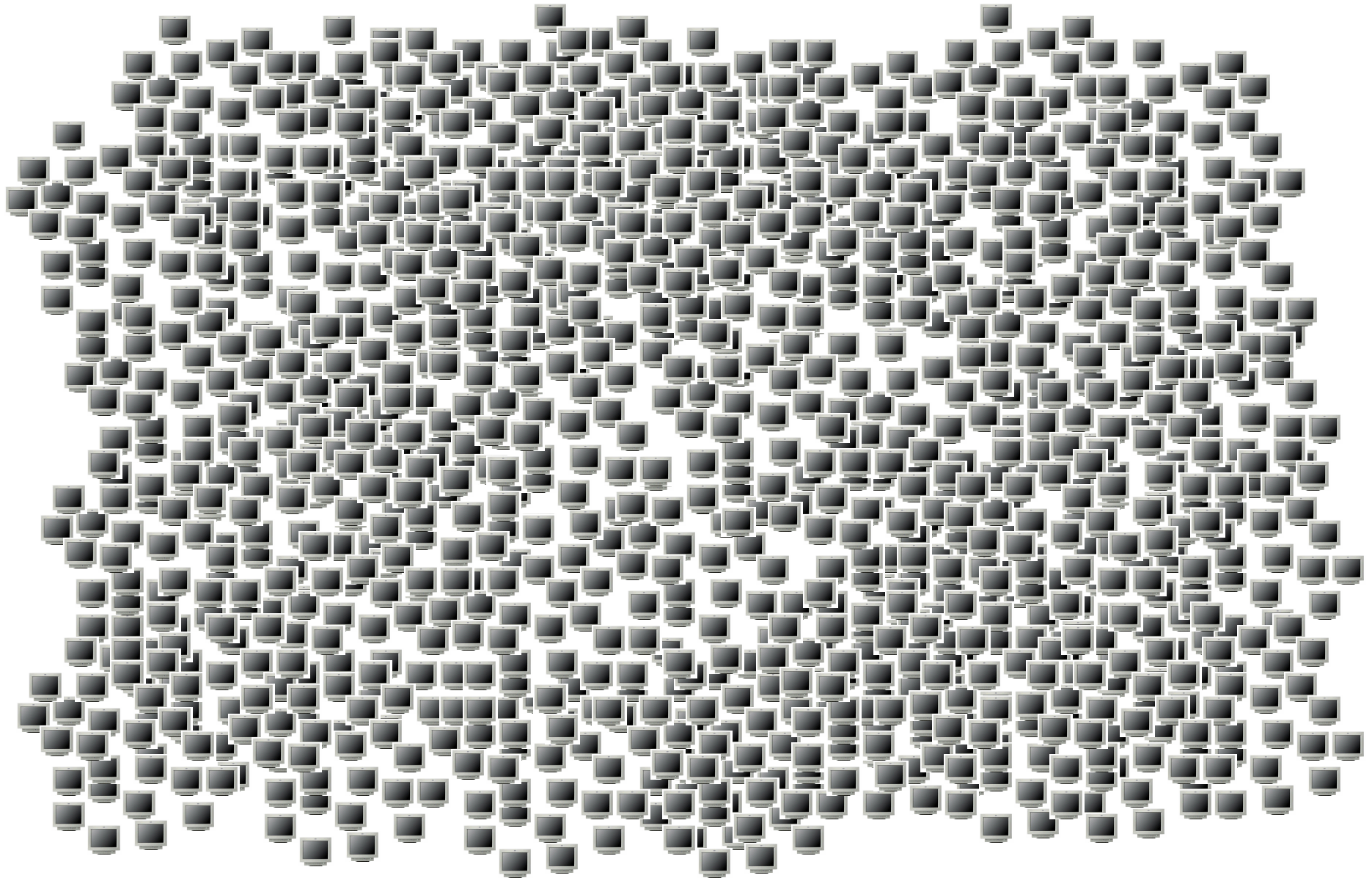
Legacy x86 based server farms



Do you think we have solved all the issues consolidating the servers?



Do you think we have solved all the issues consolidating the servers?



The problem

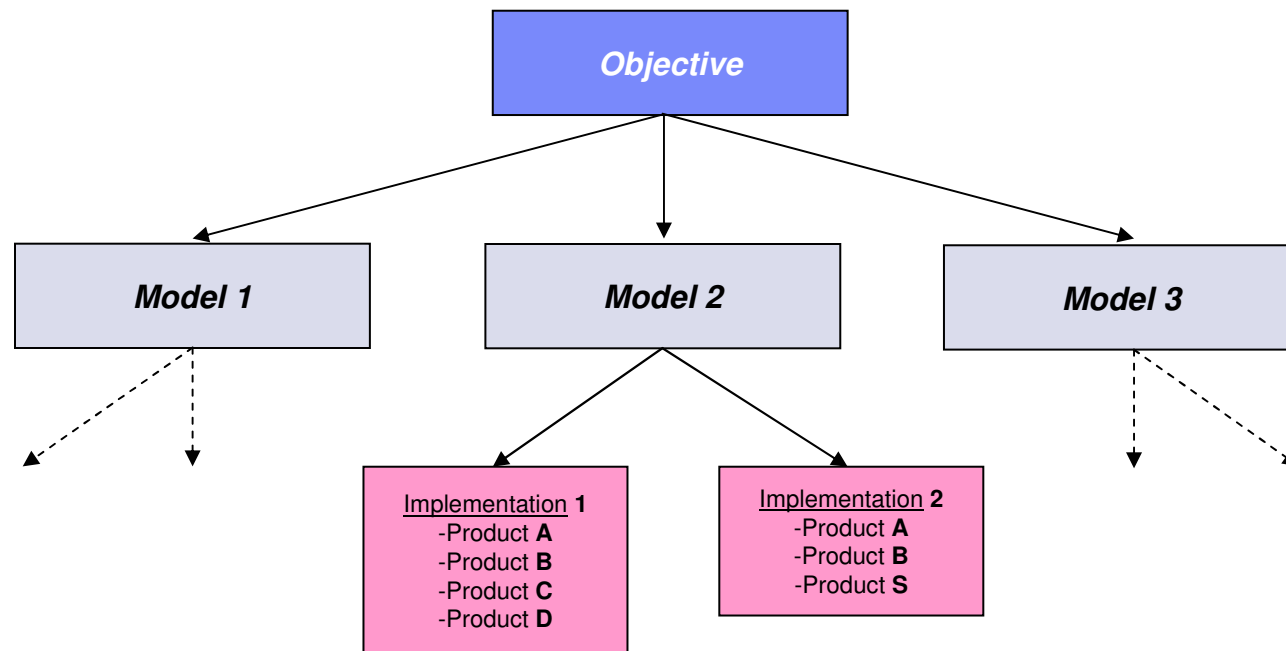
- **Desktop management is a real challenge**
- **“The next release of the systems management” product won’t fix this issue**
- **We have seen these tools evolving over time but the feeling is that the issue is becoming worse than ever**
- **Why? Because you can’t use a tool to fix a wrong architecture/philosophy...**
- **At some point you need to “turn hard”. It’s probably time to do that for a better “desktop” management.**

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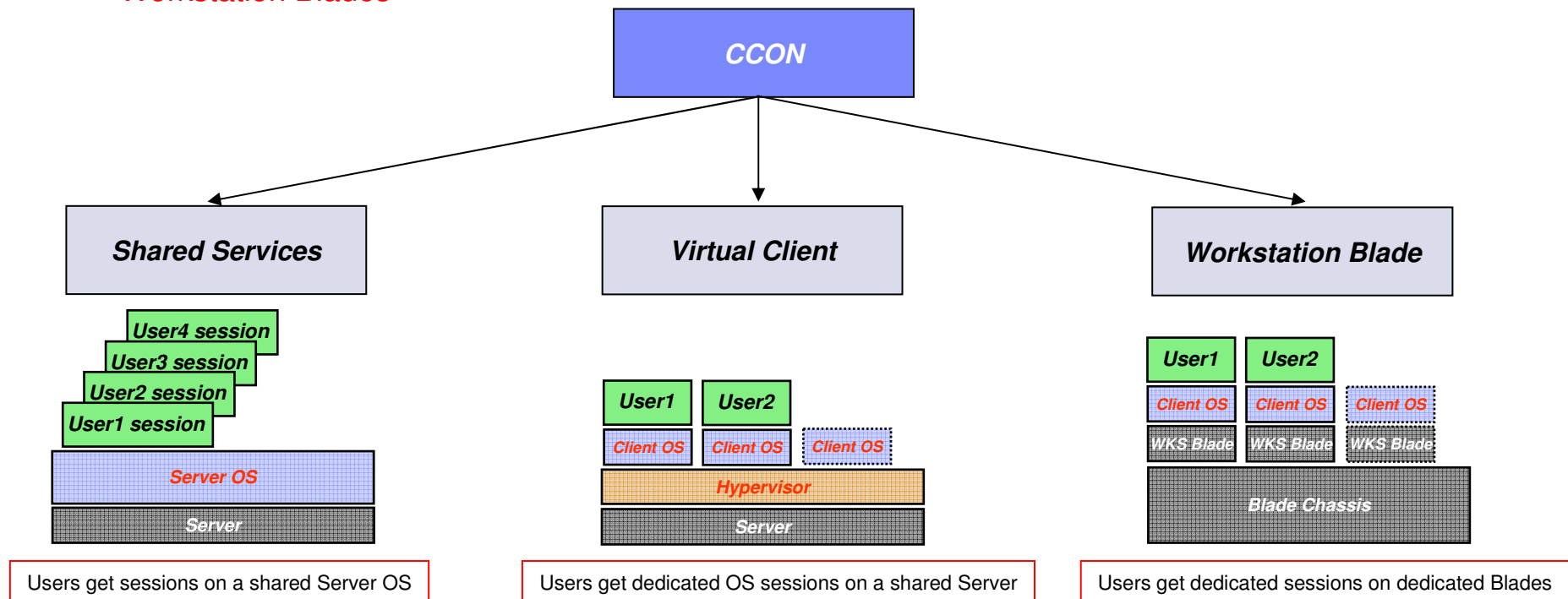
Definition

- A model is the IT architecture/philosophy being used to solve a particular issue
- Each model will have at least one or (usually) more possible implementations
- Example: To optimize a datacenter you can use different models (i.e. **Blades**, **Virtualization** etc). To implement **Virtualization** you can use different products/solutions (VMware ESX, MS Virtual Server, Xen, IBM micropartitioning etc etc)



CCON (Client Consolidation)

- Strategy is to simplify the supportability of end-user environments
- The main objective is to centralize end-user services as aggressively as possible
- Back to dumb terminals on the user's desk
- IBM is focusing on 3 main models associated to "Client Consolidation":
 - Shared Services
 - Virtual Clients
 - Workstation Blades



Shared Services drill-down

- **Background**

- Historically been used for Server Based Computing
- Typically based on Windows Terminal Services core functionalities
- Still a valid model in many circumstances

- **Implementations/Products**

- Windows Terminal Services (WTS)
- Citrix “Metaframe” & “Presentation Server” (builds on top of WTS)
- others ?

Most of the time can only deliver “applications” and not the whole desktop environment

Shared Services drill-down (cont'ed)

Windows XP Professional + SP2

Adobe Reader 7.0
Altova XMLSpy 2005 Home Edition
Apache Tomcat 5.5
Bloodshed Dev-C++
EasyPHP
Eclipse + UML
Ghostview 4.7
GIMPshop
Internet Explorer 6.09
InterVideo WinDVD
Jext
LCC – Win32
Macromedia
- Dreamweaver MX 2004
- Fireworks MX 2004
- Flash MX 2004
Microsoft Office
- Access 2003
- Excel 2003
- Infopath 2003
- Outlook 2003
- Powerpoint 2003
- Publisher 2003
- Word 2003
Mozilla Firefox
MySQL Server 5.0
NetBeans 5.0
Pcspim
Putty
Opera
QuickTime
QuickZip4
RealPlayer
scilab-3.1.1
SoundMAX
WinSCP3

Real Customer example

- Often the PC software stack becomes quite complex
- Core applications but many small packages too
- Some of these components work in a shared services model
- Others just don't
- Result: most of the time you have to leave the PC on the desk and distribute centrally only the core applications
- This doesn't solve the "Windows desktop issue"

Workstation Blades drill-down

■ Background

- For those that requires ultimate video performance&flexibility and maximum horse power
- A single Workstation blade is only used for a single user session at any given point in time
- There is a market for this model too
- A very viable alternative solution for high-end workstations
- Don't confuse the standard “server blades” with the “Workstation blade” concept
 - Server blades are replacements for standard rack optimize servers
 - Workstation blades are replacements for end-users' workstations (i.e. Intellistation-like)

■ Implementations/Products

- various OEM's have offerings in this space.....
- Most of these offerings are “PC Blades” (i.e. they make no business sense since a PC can be more effectively replaced by a hosted desktop vm rather than a dedicated blade)

Virtual Clients drill-down

- **Background**

- New model
- potentially a game changer
- It has most of the advantages of the shared services model as well as those of the PC Blades
- without (most of) the disadvantages

- **Implementations/Products**

- VMware has a value proposition (VDI)
- Lots of innovations in this space as the solution becomes more widely accepted

- **Possible game changer technology**

- Shared Services has (almost) hit the top of their market potential
- Customers looking with interest into this new model as an escape to the “desktop issue”
- This is <the> HOT model today

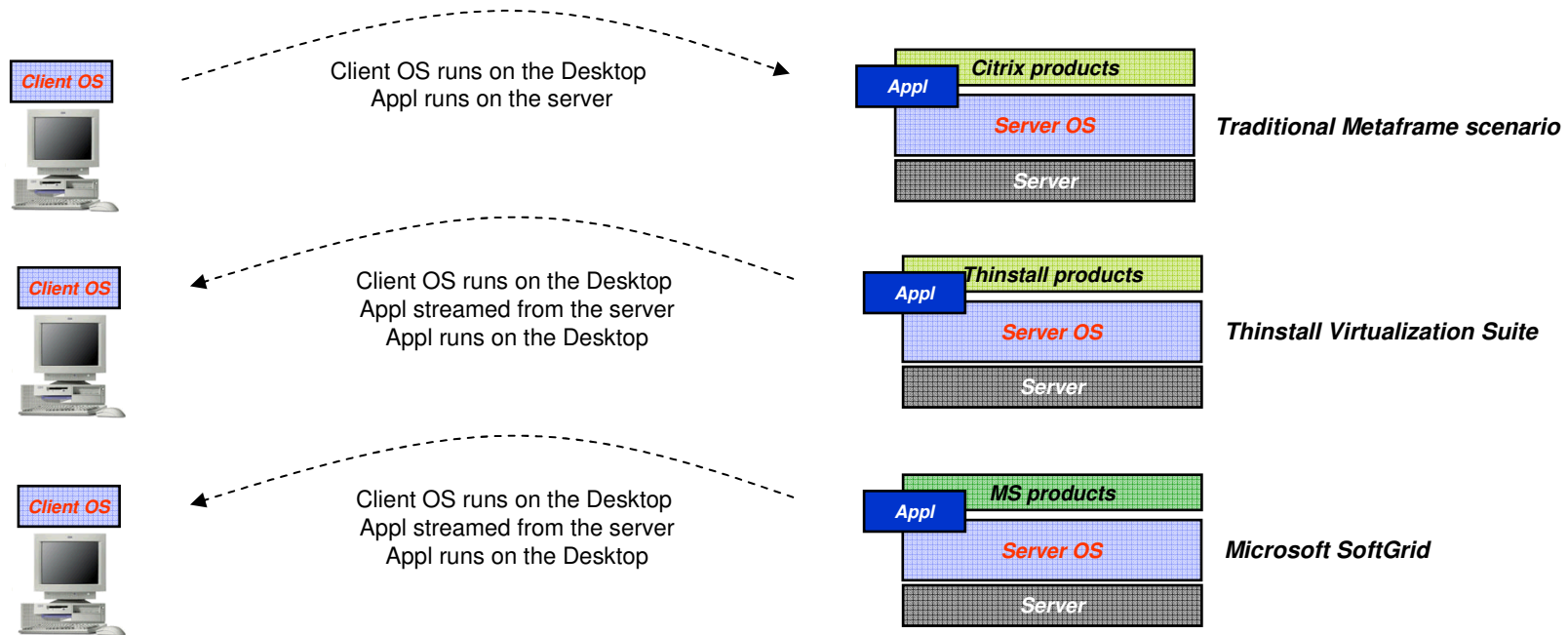
CCON model characteristic comparisons

	<i>Shared Services</i>	<i>Virtual Clients</i>	<i>WKS Blades</i>
<i>User supported x 2-way</i>	70+ (?)	15+ (?)	1
<i>User Experience</i>	Win 2003 Gui	XP Gui	XP Gui
<i>fault isolation</i>	Some	Optimal	Optimal
<i>Performance Isolation</i>	Some	Optimal	Optimal
<i>Application compatibility</i>	Depends on the appl	Optimal	Optimal
<i>Remote KVM protocol</i>	ICA (optimal) / RDP	RDP (good)	RDP / Native hw
<i>Dedicated client environments for selected users</i>	Not Supported (only shared sessions)	Supported (through dedicated XP vm's)	Supported (through dedicated XP vm's)
<i>Shared pools of resources</i>	Supported by design (through multi-sessions)	Supported (through XP vm pools)	Supported (through XP blade pools)

- *Shared Services: scales very well but it's not very "transparent" as far as application compatibility / user experience*
- *Virtual Clients: Transparence and optimization at the same time but not as scalable as the Shared Services model*
- *WKS Blades: 100% transparent and ultimate performance but fails to scale / optimize (1 session = 1 blade)*

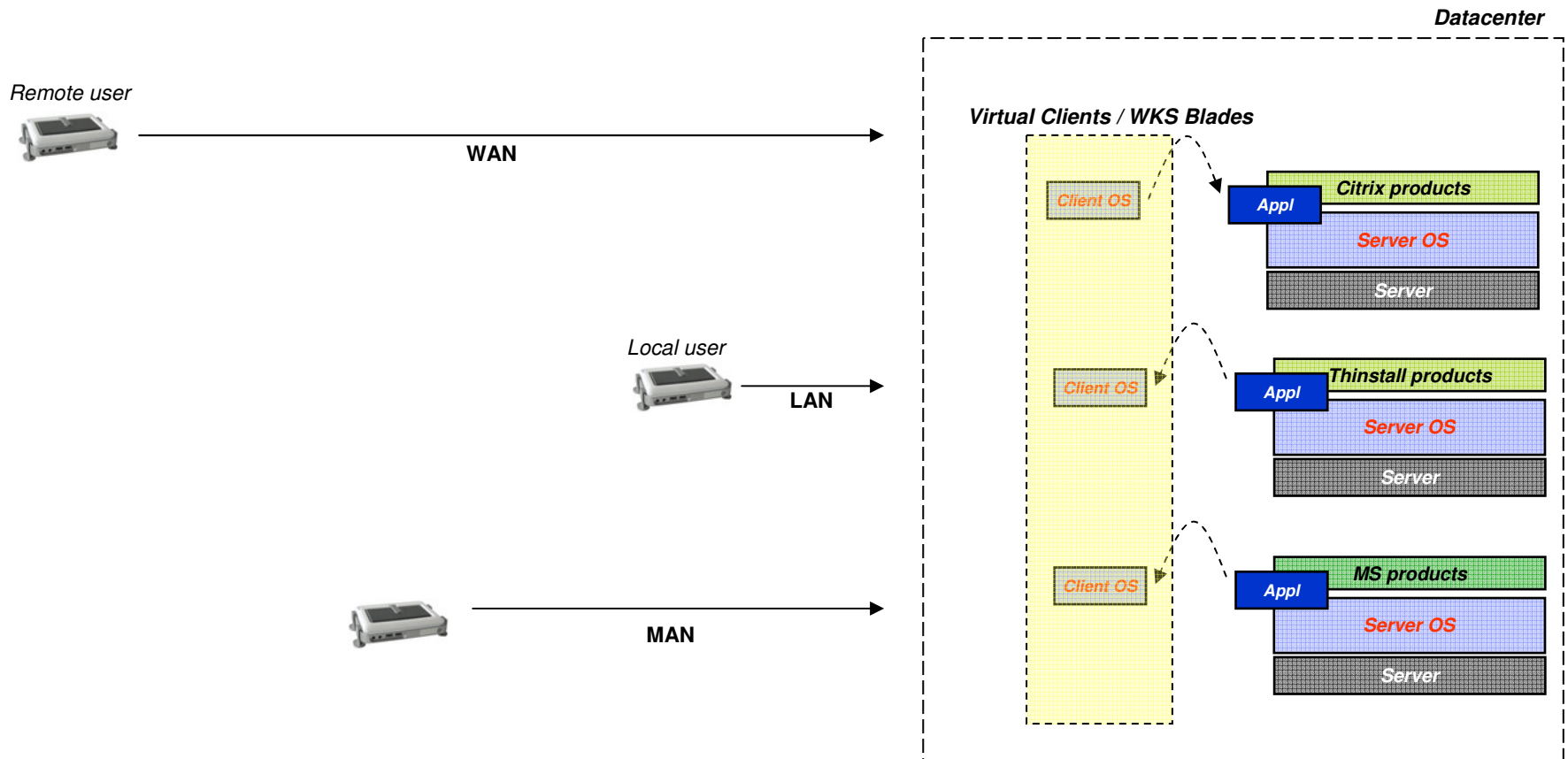
“Deviations” from the 3 models described

- There are a number of deviations from the 3 architectural models we have described
- Typically this involves managing centrally only the “applications” rather than the whole “client device”
- Examples are:
 - Citrix Presentation Server when it’s being used to publish applications and not the whole desktop (this can be considered a sort of “shared services model where only the application is provided to the user, not the client OS)
 - Thinstall / Microsoft Softgrid and other similar technologies where applications are streamed on-demand onto a fat client



- Viable alternatives but they fail to solve the holistic distributed issue as they still leverage “the PC on every desk”
- These technologies could be used complementary to the CCON models

“Deviations” from the 3 models described (cont’ed)

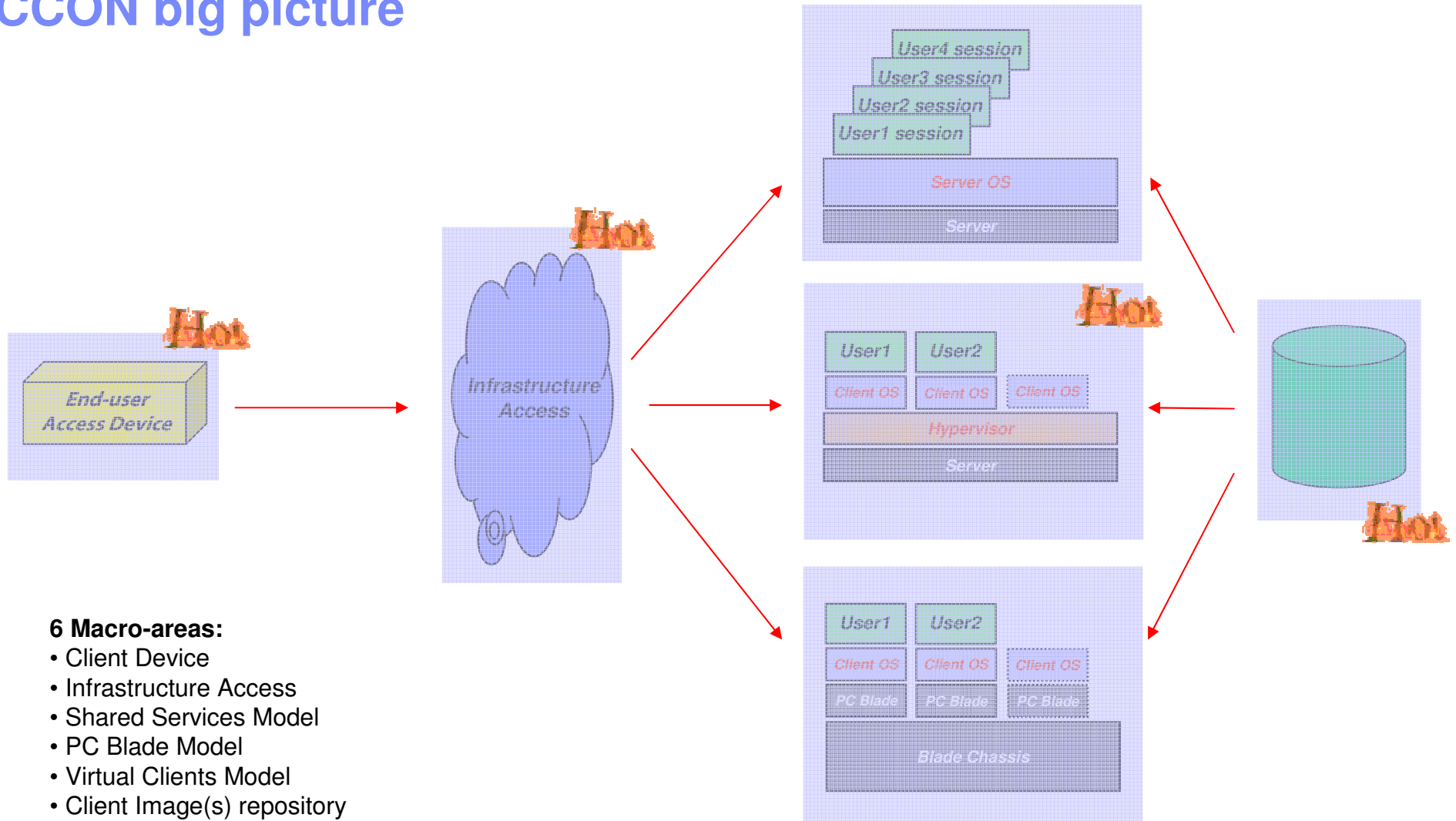


- Allows to keep the same software stack architecture but with the advantages of centralization
- These “deviations” as complementary technologies to the 3 CCON models (especially virtual clients and WKS blades)
- As an example 80% of Citrix “shared services” deployments are used to publish applications only. This means that 80% of Citrix customers might be willing to look into the Virtual Clients / WKS Blades models to complement their setup (unless they are already publishing applications directly to thin clients)

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CCON big picture



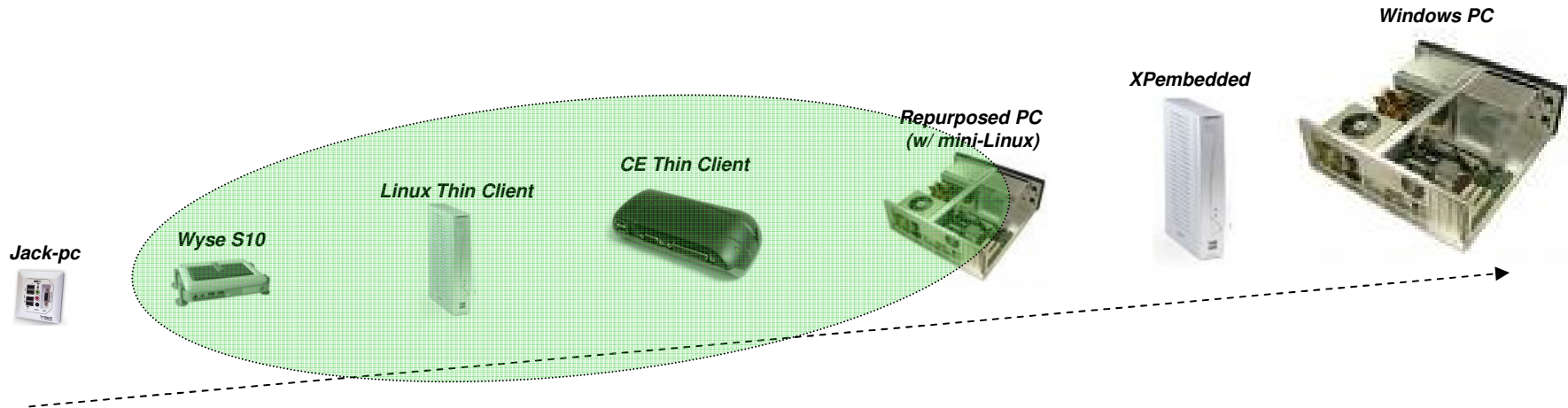
6 Macro-areas:

- Client Device
- Infrastructure Access
- Shared Services Model
- PC Blade Model
- Virtual Clients Model
- Client Image(s) repository

Since this is a VCS focused presentation will focus now (primarily) on the 4 hot areas above

What can I use as a client device ?

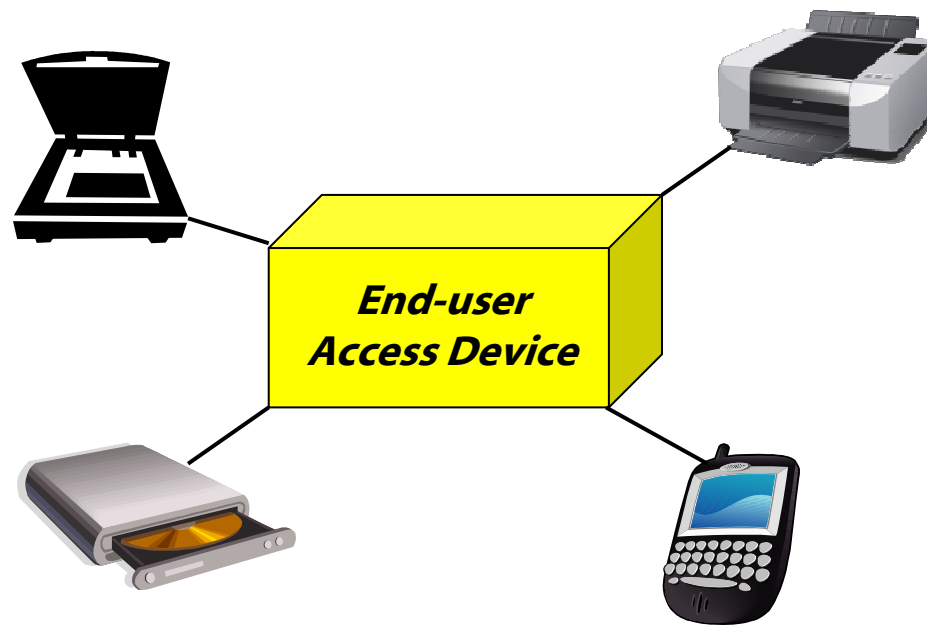
- Short answer: (usually) any device that can initiate an RDP session



- As you move up the chain (from left to right)
 - The cost of ownership increases (you might want to stay on the left)
 - The flexibility increases (so you might want to stay on the right for this)
 - You need to find the right balance between a very low TCO client that yet could provide what you need
- Based on the experience the best trade-offs are those at the center-left

What peripherals can I attach to a client device ?

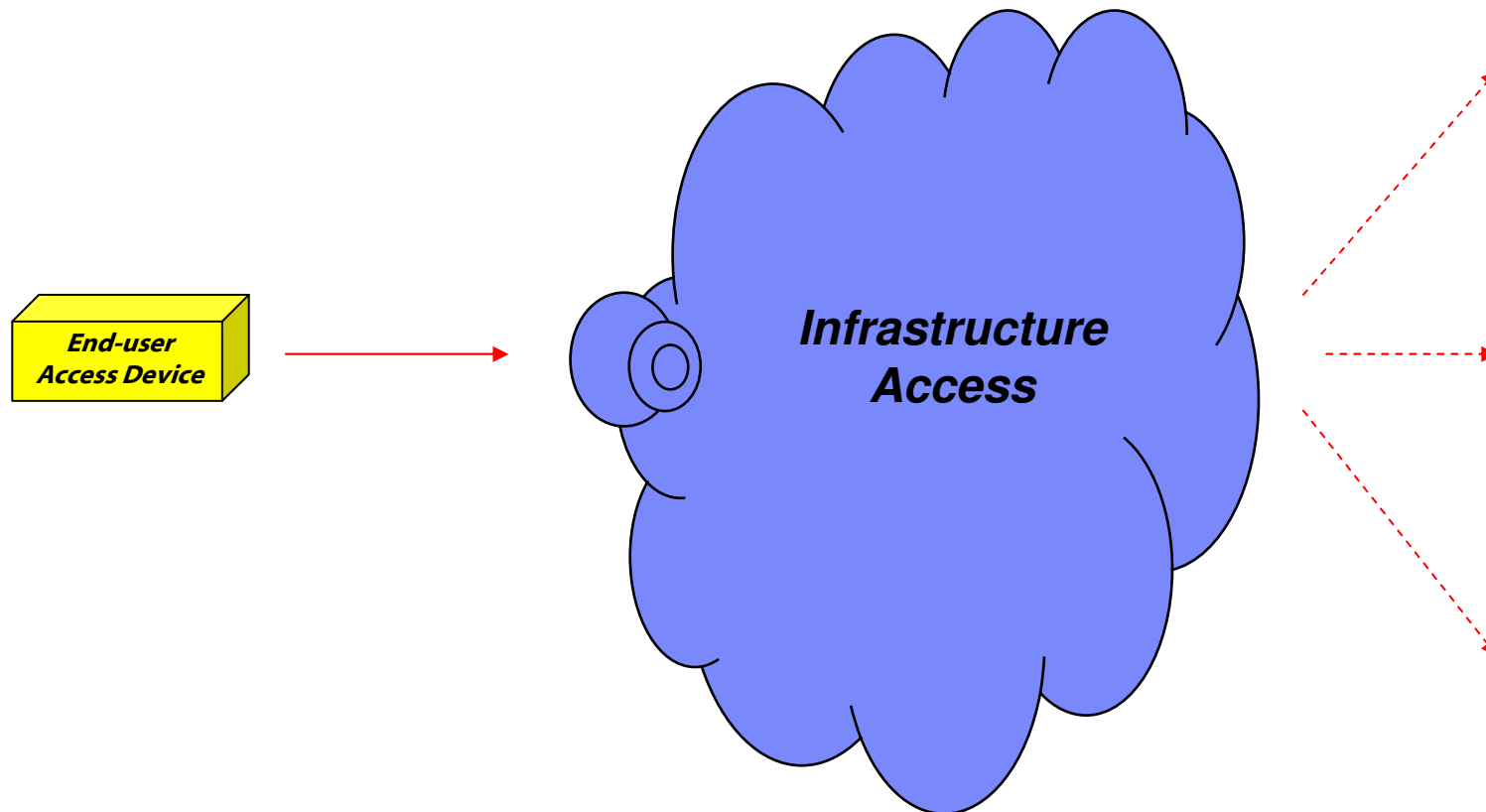
- *It depends on many factors:*
 - *the Thin Client to be used*
 - *the protocol I am using (RDP, ICA...)*
 - *the Broker software to be used (this can determine the remote access protocol)*
 - *the type of device I want to attach*



- *Rule of thumb:*
 - *Locally attached printers are not usually a problem*
 - *Any other peripheral: double check!*

What is the “Infrastructure Access” layer ?

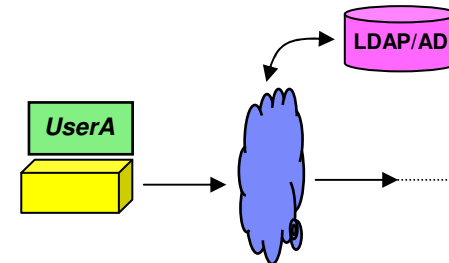
- *Also known as “connection broker”*
- *Coordinates everything between the Client Access Devices and the target resources (virtual machines, sessions, workstation blades.....)*



What does the “infrastructure access” provide ?

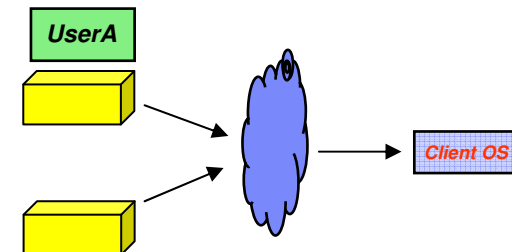
- Integrates with LDAP/AD to validate users

- the broker itself does not validate the user
- the broker interacts with LDAP/AD to validate the user and then it applies the brokering policy



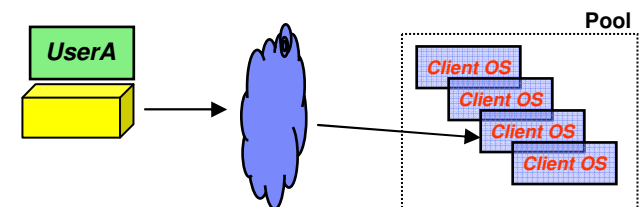
- It allows the user to float around client devices

- user A logs-in on terminal X and gets his/her session
- user A logs-out
- user A logs-in on terminal Y and gets his/her same session



- Creates pools of client vm's / blades

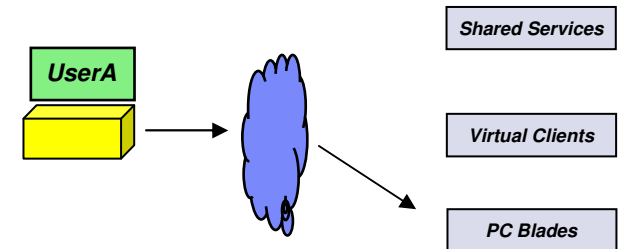
- user A belongs to AD group X so he/she is entitled to use a client OS from pool Y
- user B belongs to AD group K so he/she is entitled to use a client OS from pool Z



What does the “infrastructure access” provide ? (cont’ed)

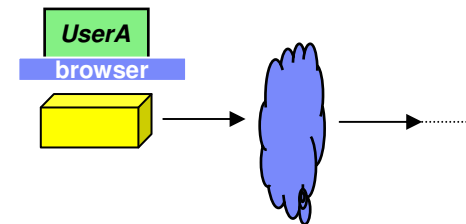
■ Coordinates user access across different models

- user A is entitled to use a “shared session”
- user B is entitled to use a client from a vm pool



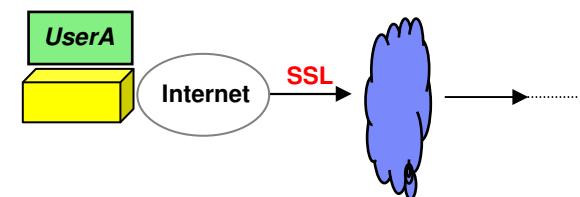
■ Provides a web based portal interface

- userA opens the browser against the infrastructure
- userA can launch the target objects (vm, blade, shared services appl) from the browser



■ Secure access

- UserA connects to the Internet
- UserA can access the target objects through a secure established channel



Should I use pools or personal desktops ?

- “Personal desktops” means users maintain their own consistent Client OS images
- “Pools” means that a user is associated to a pool of “non-personal” Client OS images
- You can have either one or the other or even a mix of the two in your deployment

- “Personal desktops” characteristics:
 - Client OS Images to be managed independently (n users = n Client OS images)
 - Users can be allowed to do whatever they want (install/uninstall stuff)
 - Sweet migration (no need to change anything in your operations)
 - Users could even continue to have data on C:\ and be “secure” (not a best practice though)

- “Pools” characteristics:
 - Usually requires some level of change (roaming profiles / folder redirections)
 - Users cannot install their own applications
 - It’s a “read-only” image if you will
 - Images can be managed as “one” logical entity (they are all identical)
 - Users cannot install their own applications

- The “Personal Desktops” model can be configured with or without a connection broker
- The “Pools” model require a connection broker

“Infrastructure Access” product example

The screenshot displays the IBM Infrastructure Access console interface. On the left, a tree view shows the hierarchy: Provision Networks Segite > Managed Desktop Infrastructure > VirtualCenter Management Servers > vc20 > Separate > ProvisionsXPs. Red dashed circles and arrows highlight this path, with annotation (1) pointing to the ProvisionsXPs folder.

The main window shows the 'Virtual Machine Group [ProvisionsXPs]' configuration. The 'Virtual Machines' tab is active, displaying a table of VMs:

Resource Pool	VM Name	DNS Name	Power State	Current Task	Permanent User	Current Us
Resources	ProvisionXP0001	ProvisionXP0001.xseries.internal	Powered On	<None>		
Resources	ProvisionXP0002		New	Create @ 2/9/2007 03:45 AM	1%	

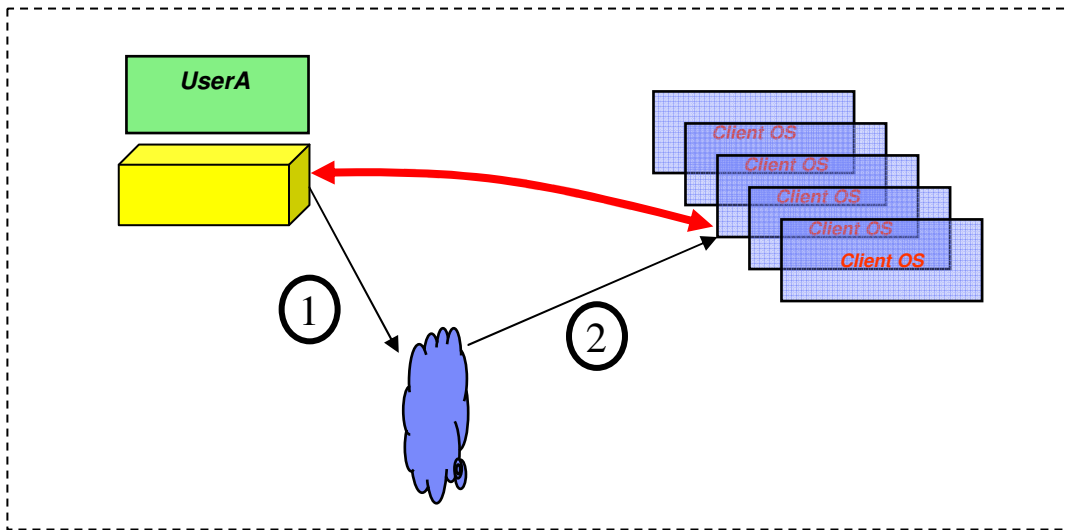
Annotation (2) points to the 'ProvisionsXPs' folder in the tree, and annotation (3) points to the table. Annotation (4) points to the 'ProvisionXP0002' row, which is highlighted in blue and has a 'New' icon, indicating it is still being deployed.

An 'Edit Virtual Machine Group Policy' dialog box is open, showing the 'User Assignment' tab. It lists users and groups that can access the VMs in this group:

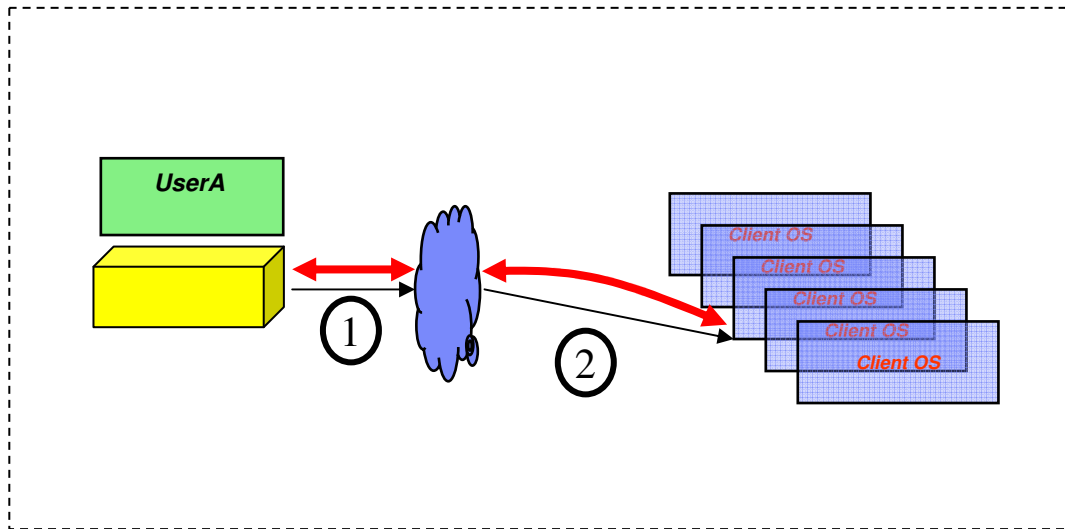
- XSERIES\Domain Users
- XSERIES\MassimoR

Annotation (5) points to the 'XSERIES\MassimoR' user, which is highlighted in blue, indicating that the admin has entitled this user to access the pool.

Infrastructure Access architectures



- thin broker layer
- gives you the session and gets out of the way



- thick broker layer
- gives you the session and remains on the way
- needs to scale rapidly with the number of users

Brokers side-by-side (as of Feb 2007)

- *There are too many brokers popping up to describe them in details. Some of them are:*
 - *Citrix Desktop Broker*
 - *Leostream Connection Broker*
 - *Propero WorkSpace*
 - *Provision Networks VAS*
 - *Dunes VDO*
 - *etc etc*

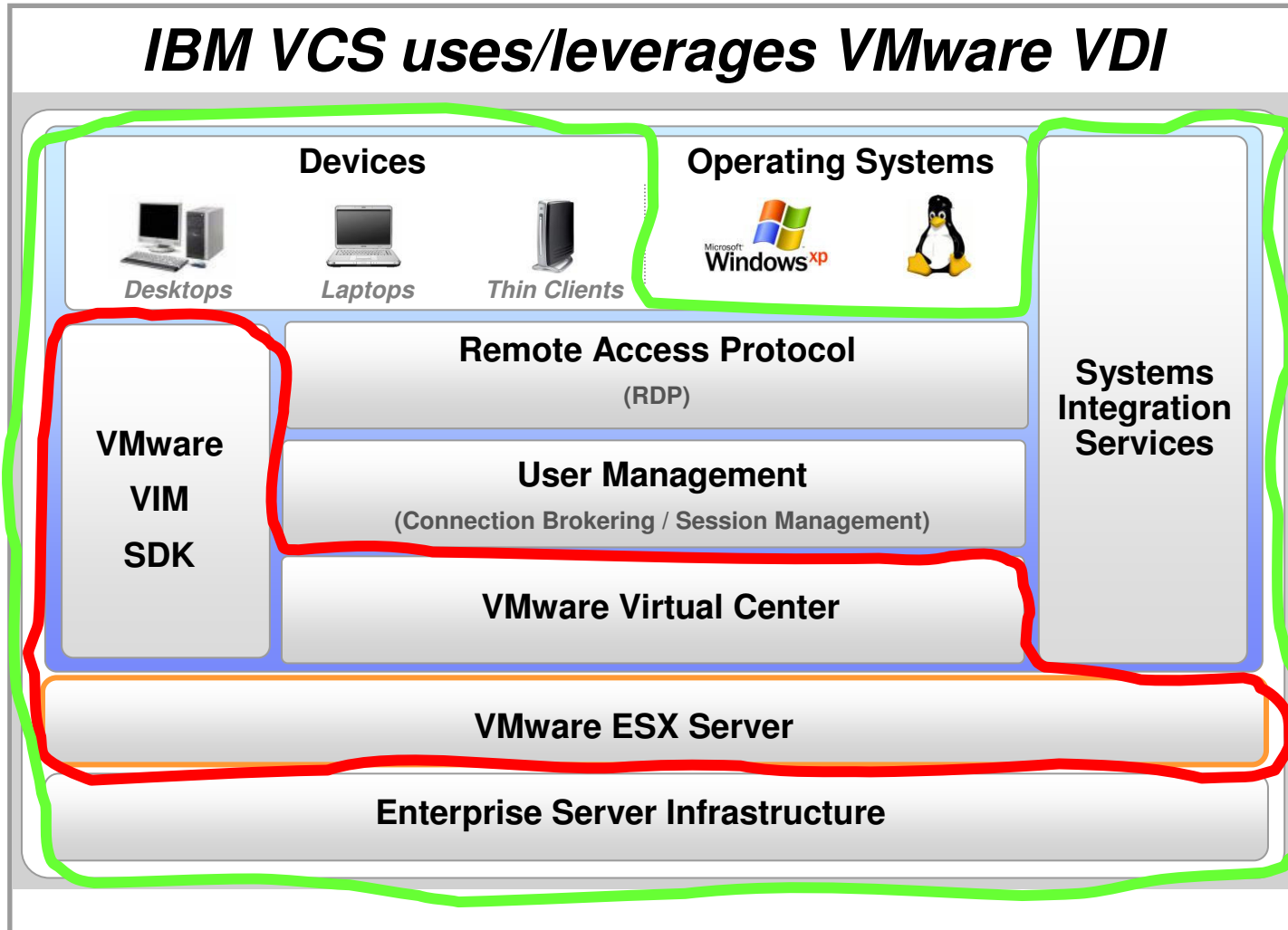
- *Also there are so many characteristics that should be described for each of them*

- *I am trying to maintain on-line a list of these technologies here :*

www.it20.info/misc/brokers.htm

- *All of them have their strenghts and weaknesses*

Which technology for my virtual hosted desktops?



VDI

VCS

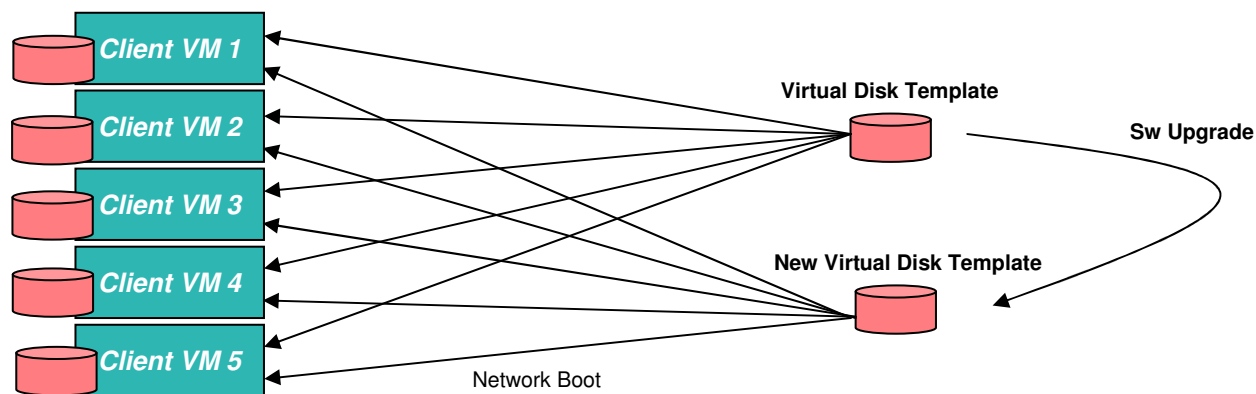
Today we heavily leverage VMware technologies because of their maturity

Storage alternatives for virtual clients

- **4 different alternatives to host virtual disks:**
 - **local storage (DAS)**
 - *low price*
 - *not very flexible*
 - *for 1-to-1 user-xp mappings it's a SPOF*
 - *for pools it's ok (pools distributed across servers)*
 - **NAS**
 - *average price*
 - *flexible*
 - *ensure your NAS is fully redundant as it is a SPOF*
 - **FC**
 - *premium price*
 - *flexibility and performance*
 - *ensure full redundancy as it is a SPOF*
 - **Disk Differencing/Streaming technologies (what?)**

Storage alternatives for virtual clients (cont'ed)

- All DAS/NAS/FC has a drawback: storage requirements
- Assuming your standard is 15GB per XP vm and you have 300 users It's going to take 4.5 TB
- This might or might not be a problem
- Specifically for vm pools there is a alternative: disk differencing technologies in order to
 - lower the space required
 - lower software maintenance efforts
- A vm is installed and customized with the Client OS and the applications
- the disk image created is then used to instantiate many vm's
 - through PXE boot
 - personality changed on the fly (different IP / name)
- 1 virtual disk -> many vm's
- SW Maintenance made easy (I need to upgrade a single virtual disk)



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VCS Typical Benefits

- *Same or better end-user experience*
- *Better control of the distributed infrastructure*
- *Minimal PC life-cycle*
- *Business Continuity*
- *Data Security*
- *Flexibility*
- *Minimal Client/Server bandwidth issues*
- *More control over software updates and patch management (through pools)*
- *Power savings (in the range of 50-100€ per client device)*
- *Easier Backup of data / configurations*
- *Etc etc etc*

How much does a PC cost your organization ?

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How much does a PC cost your organization ? (Cont'ed)

- *a PC consumes roughly 100/150 watts (more or less)*
- *a Thin Client is in the 5/10 watts ball-park*
- *a server blade consumes about 300 watts to support around 15 users (assumption).*

- *so the difference between a PC and a VCS implementation is:*
 - *125 watts (PC) – 7 watts (tc) – 20 watts (300 watts / 15 users) = roughly **100 watts***

- *at an average energy cost of 0.10€ per hour*
- *(assuming the client device is on 24/24) you would be saving:*
 - *0.0095€ every hour*
 - *0.228€ every day*
 - *6.84€ every months*
 - ***82€ every year***
- ***Per user !***

- *After 1 / 2 or 3 years you basically can get the thin client “for free” with what you save on energy costs (depending on the thin client you want)*

SW Licensing costs

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Real Life example: economics

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What is VCS then ? (VCS off-the-shelf)

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What is VCS then ? (VCS off-the-shelf graphically)

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What is VCS then ? (VCS a la carte)

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What is VCS then ? (VCS a la carte graphically)

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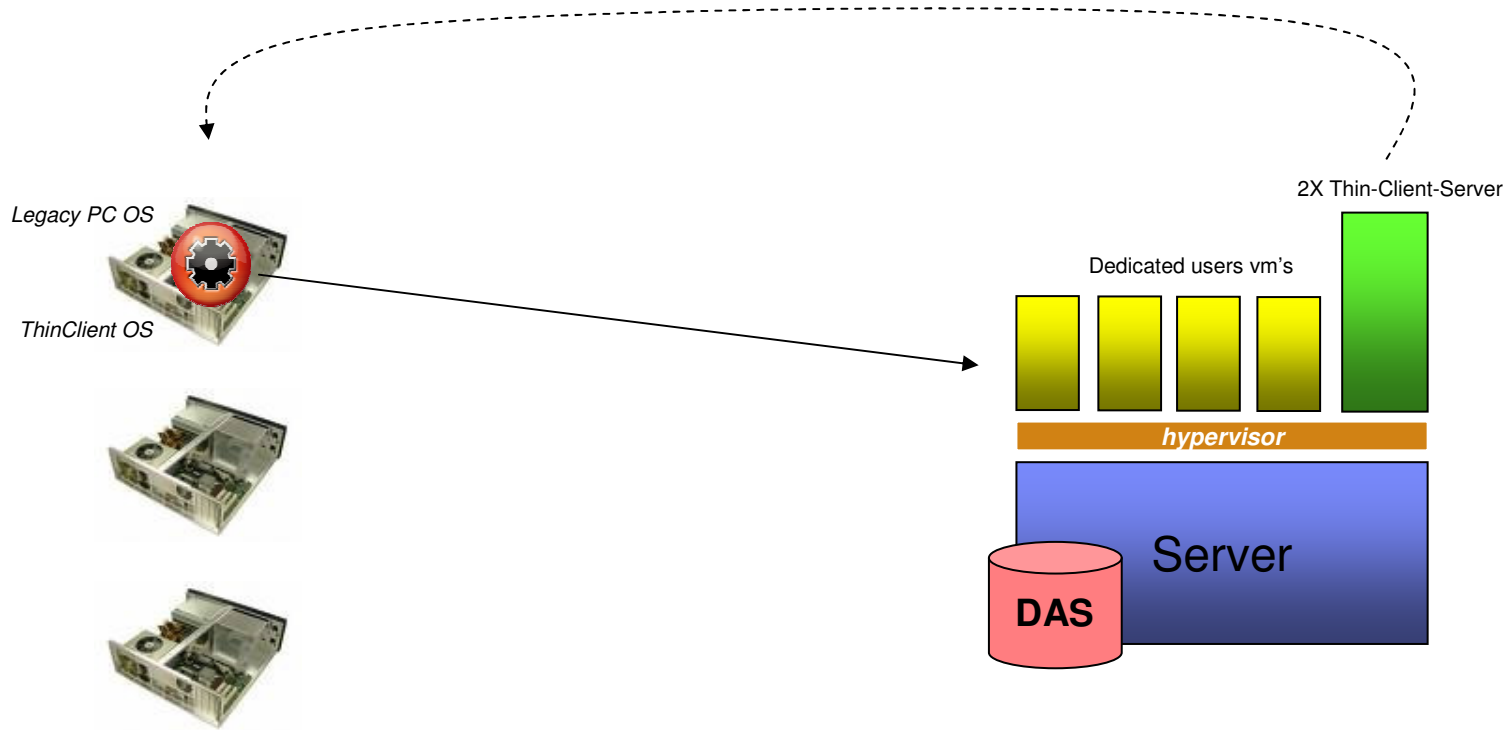
A word on “professional services”

- IBM Global Services is a key component for any CCON solution
- Virtual Infrastructure Access (VIA) is the services offering for CCON
 - Workshop
 - Proof of Concept
 - Assess
 - Plan
 - Design
 - Implement
 - Manage
 - Host
- The VIA offering is “open” and “technology agnostic”
- It spans from the simplest scenario.....
- to the most complex

Which path to choose?

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CCON Scenarios: very small environment (example)

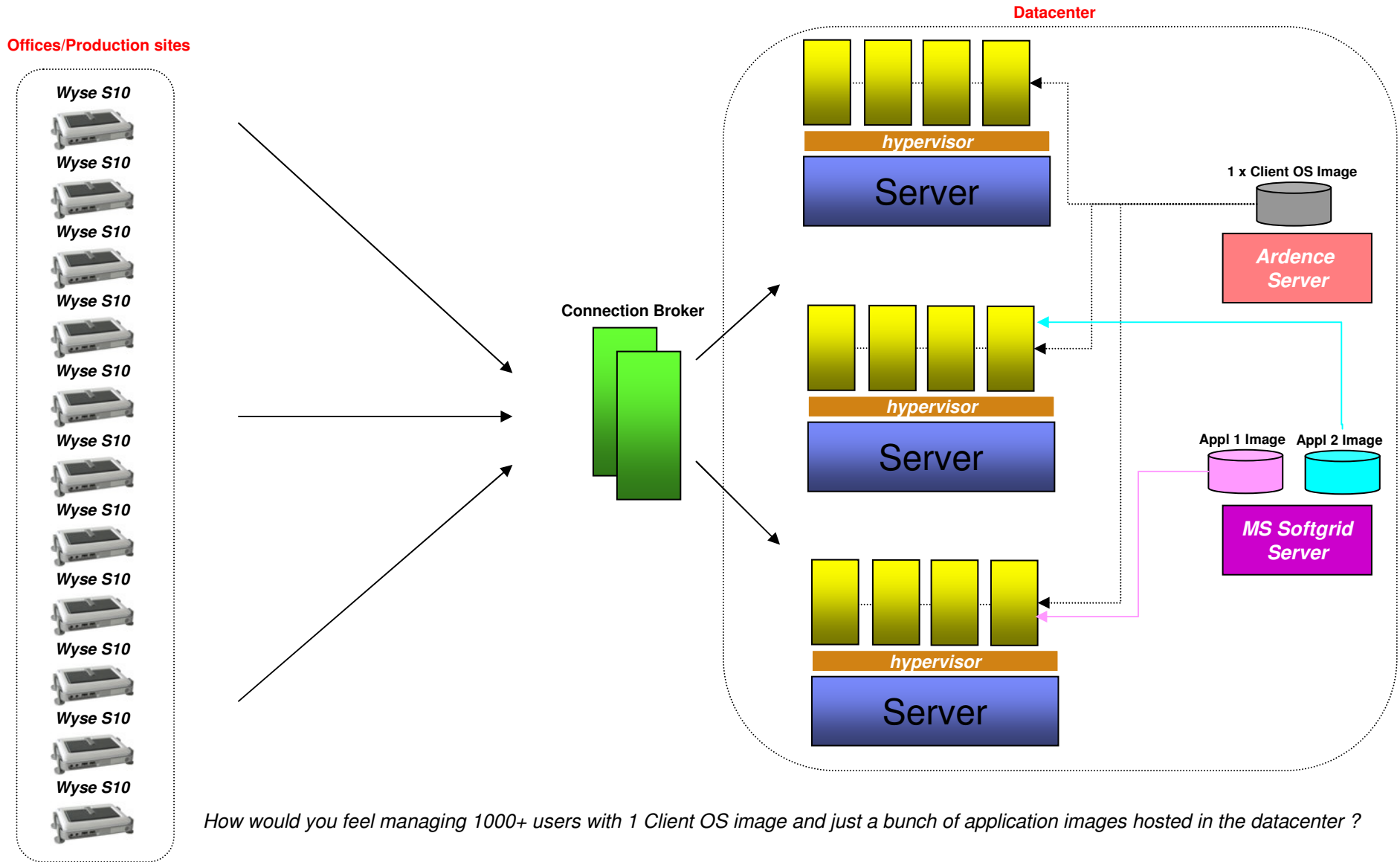


Note the 2x ThinClient Server product provides:

- *PC reprovisioning (to thin clients like devices)*
- *basic brokering technology (1 user to 1 vm mapping)*

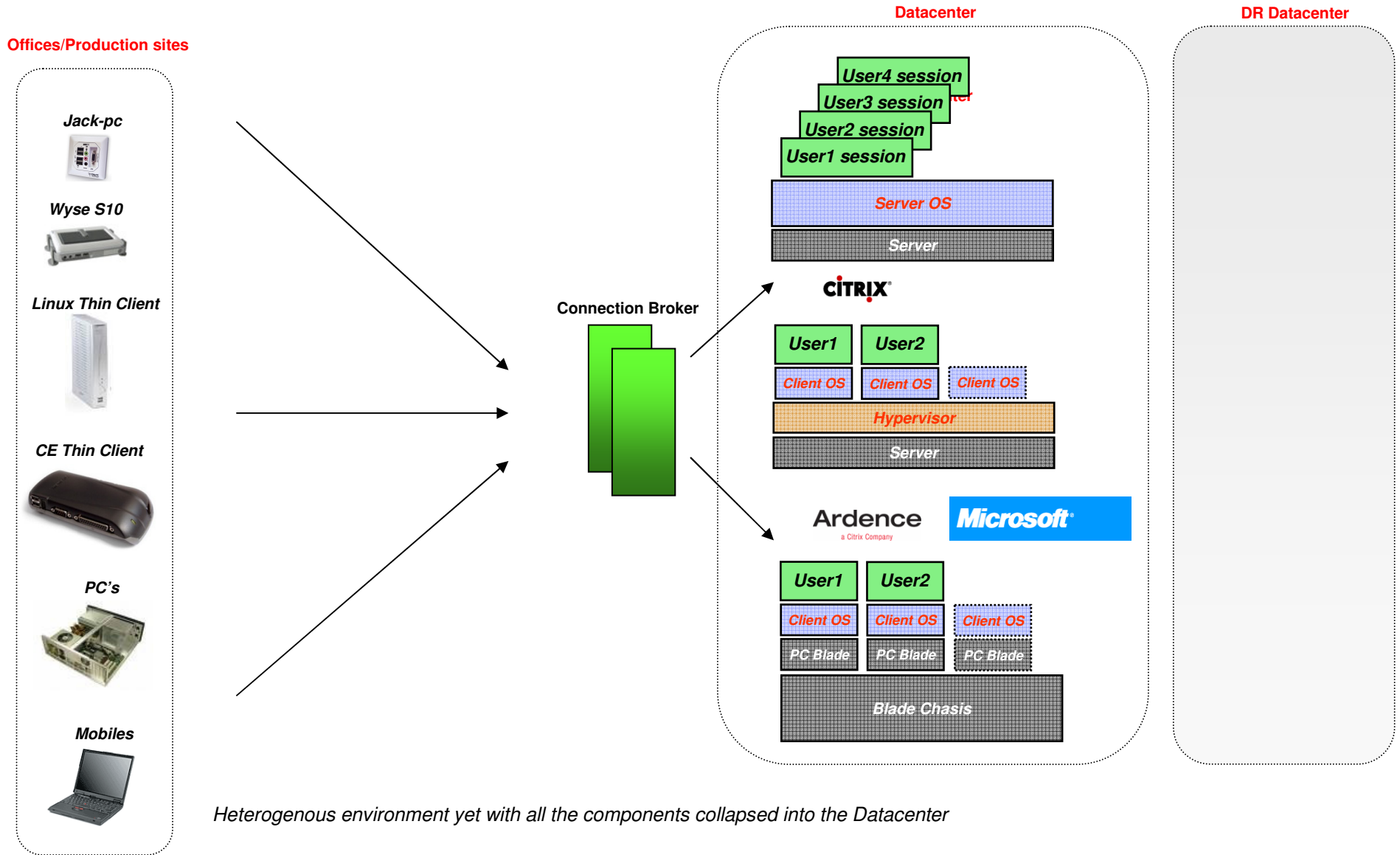
(it comes either free or with an enterprise license)

CCON Scenarios: small-medium environment (example)



How would you feel managing 1000+ users with 1 Client OS image and just a bunch of application images hosted in the datacenter ?

CCON Scenarios: Enterprise environment (example)



Real Life example in the Banking industry (problem)

- Customer needs to provide a Business Continuity plan for about 100 Help Desk PC's
- Contingency plan for worms/viruses that can cause all PC's to become suddenly unusable
- They wanted to continue using their standard Windows PC's
- They didn't want additional PC's on the end-user desks (nor additional think client devices)

Additional technical details

- Some PC's have various local printers attached (USB/LPT/...)
- Some PC's have a USB dongle that is used to license a specific application
- Some PC's need to access a USB Scanner
- The PC do not have any local CD-ROM available for security policies

Real Life example in the Banking industry (solution)

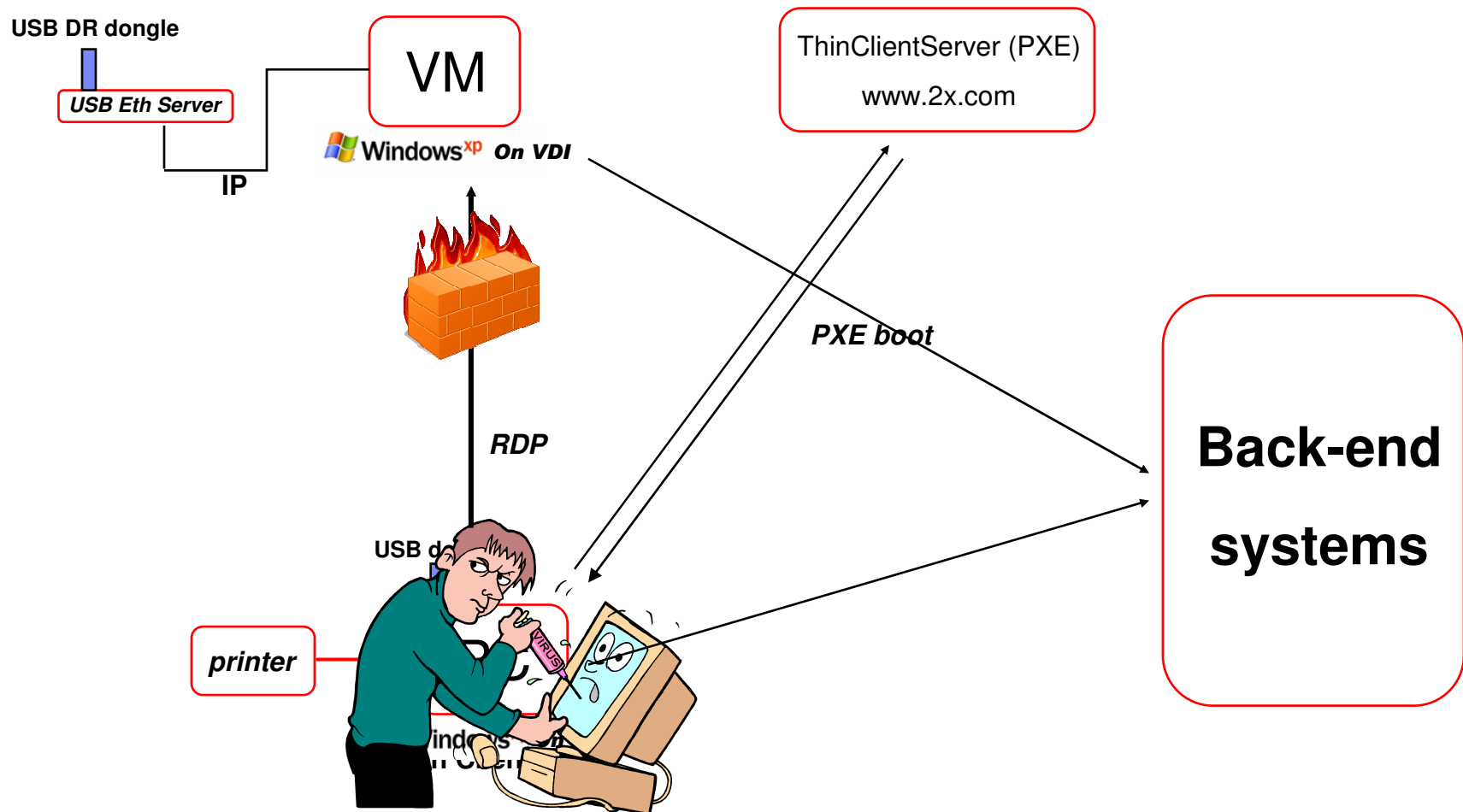
- 100 XP virtual machines should be instantiated on a VDI back-end infrastructure
- These XP virtual machines would be running idle in a different/protected network segment
- These XP virtual machines would be patched / maintained as the regular XP PC's
- These XP virtual machines would support all standard applications

When the disaster strikes.....

- The 100 PC's would PXE boot a thinclientOS (www.2x.com/thinclientserver/)
- The repurposed PC's would then connect to the appropriate XP virtual machine
- The local printer would be mapped inside the RDP session
- A backup USB dongle would be connected to the XP vm by mean of a "USB ethernet Server" (www.lantronix.com)
- The end-users will continue to work without noticing any UI experience change.

Real Life example in the Banking industry (result)

- A DR plan for the Help Desk PC's has been implemented in a matter of days
- Without even touching the end-users' desks nor their habits

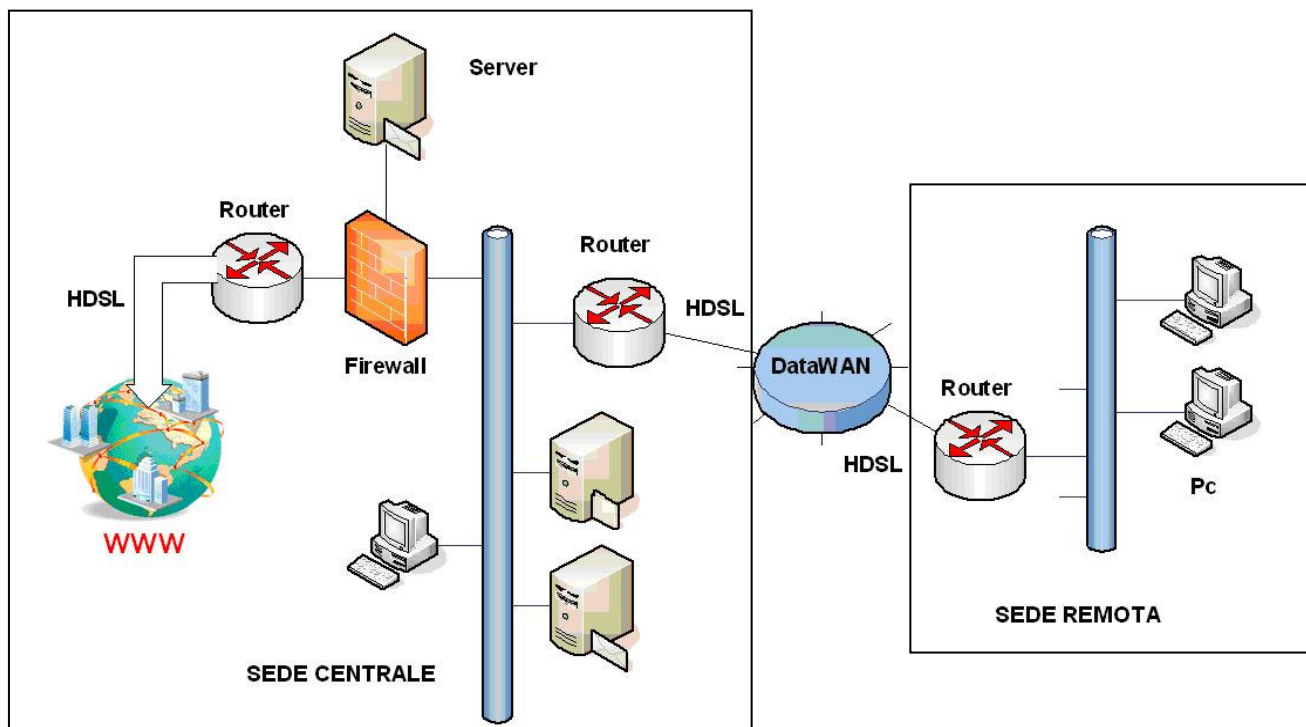


Real Life example in the Banking industry (sale cycle details)

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Real Life example in the SMB industry (problem)

- All IT services centralized (file server, mail server, web, core appl's)
- Remote PC's (at the remote site) have issues opening office documents
- They generally have performance issues because of the latency
- Networking costs have raised to the roof
- The customer would also want to find a way not to have PC's at the remote site because of the maintenance problems



Real Life example in the SMB industry (solution)

- The solution encompasses two areas:
 - The traffic-based WAN link has been switched over to a “flat” VPN on an ADSL link.
 - At the main site a new server (System x3400) has been installed with VMware Server on top of which 4 XP vm’s have been created.
- On these 4 XP vm’s all standard applications have been installed (Lotus Notes, Office 2000, Client Access, and other custom applications).
- On 4 old PC’s at the remote site (a mix of NT4 and Win98) the MS rdp client has been configured to connect point-to-point to the 4 XP vm’s above.

Real Life example in the SMB industry (result)

- At least two main results have been achieved:
 - Networking costs have dropped significantly from thousands of € very 2 months to just hundreds
 - the end-user experience has improved considerably: no more complains about “slow applications”

- Following this pilot the customer has asked the BP for a study aimed at migrating all their infrastructure to VCS.

- There are roughly 60 PC's in the main site and 20 PC's in the remote site.

- The idea is to use the old PC's in both site until the end of their life-cycle and use Thin Clients afterwards.

Real Life example in the Healthcare industry (problem)

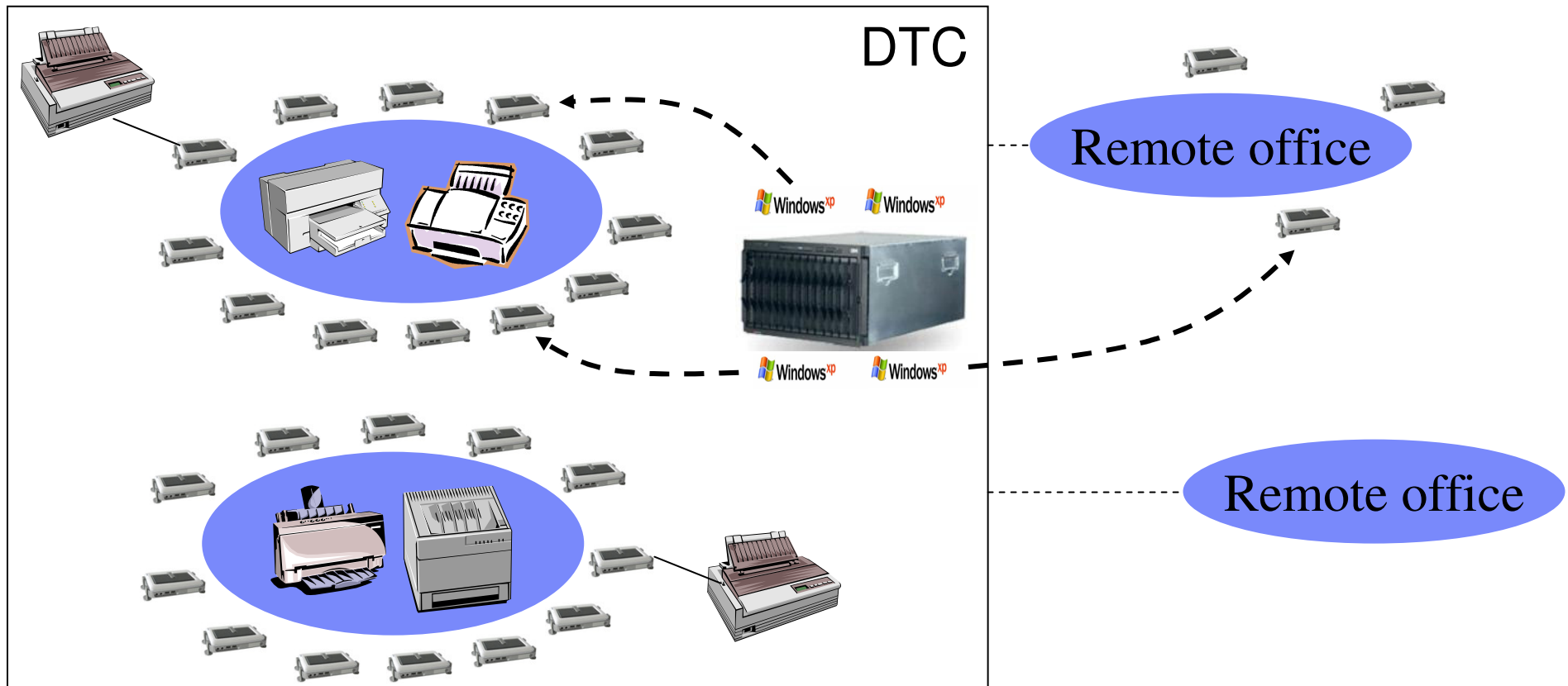
- 3000+ desktops distributed locally and in remote offices
- Citrix deployment but limited to selected applications
- Many applications could not be deployed via Citrix
- Certainly the desktop could not be deployed via Citrix
- **Their issues:**
 - on-site maintenance (hw / sw) has become unacceptable
 - PC's tend to break often (especially they had issues with power supplies)
 - PC's tend to generate lots of dust/pollution (not good in surgery rooms for example)
 - Remote users have limited bandwidth (to browse x-Ray images centrally stored for example)
 - Power consumption (watts) has become a real issue
 - PC lifecycle (roughly 700/800 PC's per year gets replaced – 2+ per day on average)

Real Life example in the Healthcare industry (solution)

- We have setup a small pilot using a Bladecenter and Wyse S10 thin clients
- Initially we have implemented point-to-point connections
- Later we have implemented a connection broker technology (Leostream)
- Finally we have also configured the thin clients to print on locally attached printers
- The customer, as of Feb 2006, has had 6 of these thin clients deployed in production with great satisfaction by the end-users

Real Life example in the Healthcare industry (result)

- They have solved many bandwidth issues from remote offices
- The customer is going to expand this solution to support hundreds of additional users



Agenda

- ***Problem statement***
- ***CCON models description***
- ***CCON components***
 - *Client Devices*
 - *Infrastructure Access*
 - *Shared Services*
 - *Virtual Clients*
 - *Workstation Blade*
 - *Client Image(s) repository*
- ***TCO Analysis***
- ***IBM VCS solution***
 - *VCS “off-the-shelf”*
 - *VCS “a la carte”*
 - *Sample Scenarios*
 - *Real life implementations*
- ***Conclusions***

Conclusions

- All three models (Shared / Virtual Clients / PC Blades) are here to stay
- Clearly there is lots of interest around Virtual Clients nowadays
- We know however that VCS is not the answer to everything
- The PC is just not dead
 - You will continue to use your PC at home for gamings
 - And many companies will just prefer to continue using their PC strategy
- There will be companies however that will be interested in this
 - Companies concerned about high IT costs
 - Companies where it is important to maintain control over the IT infrastructures....
- It's all about “business efficiency”, not “I can do cool stuff with my PC”

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