



The Virtual Client

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2008 is the year of x86 Virtualization

- VMware
- Xen
- Oracle VM
- Microsoft Hyper-V
- Parallels
- KVM

Virtualization implies Scale-Up to big servers

IBM x86 High End Servers have:

- 4 times bigger than the competition (16 processor sockets versus 4 for HP and Dell)
- scale from very small to huge (2 processor sockets to 16)
- 25% better performance than equivalent HP machine
- 20% less power than equivalent HP machine
- Much higher consolidation ratio of Virtual Machines
- more reliable than the competition (Mainframe reliability built onto IBM Intel servers)
- at an Intel price (priced to be equivalent or less than HP)

Only 6% of x86 servers use virtualization

Test and Development
60%

Disaster Recovery
30%

Production
10%
Bus Apps
Mail Boxes
Database
Desktops

We expect to see the future effect of Hyper V here.



Why now for the Virtual Client?

The day the Internet Revolution started:

Wednesday, Aug. 9, 1995

a 16-month-old Silicon Valley start-up called Netscape went public, but demand for the shares was so high that for almost two hours that morning, trading couldn't open. The stock, which had been priced at \$28 a share, zoomed as high as \$75 that day and closed at \$58.

... and Larry Ellison says, "The PC is dead!"
to be replaced by:

"The Network Computer"

Inhibitors:

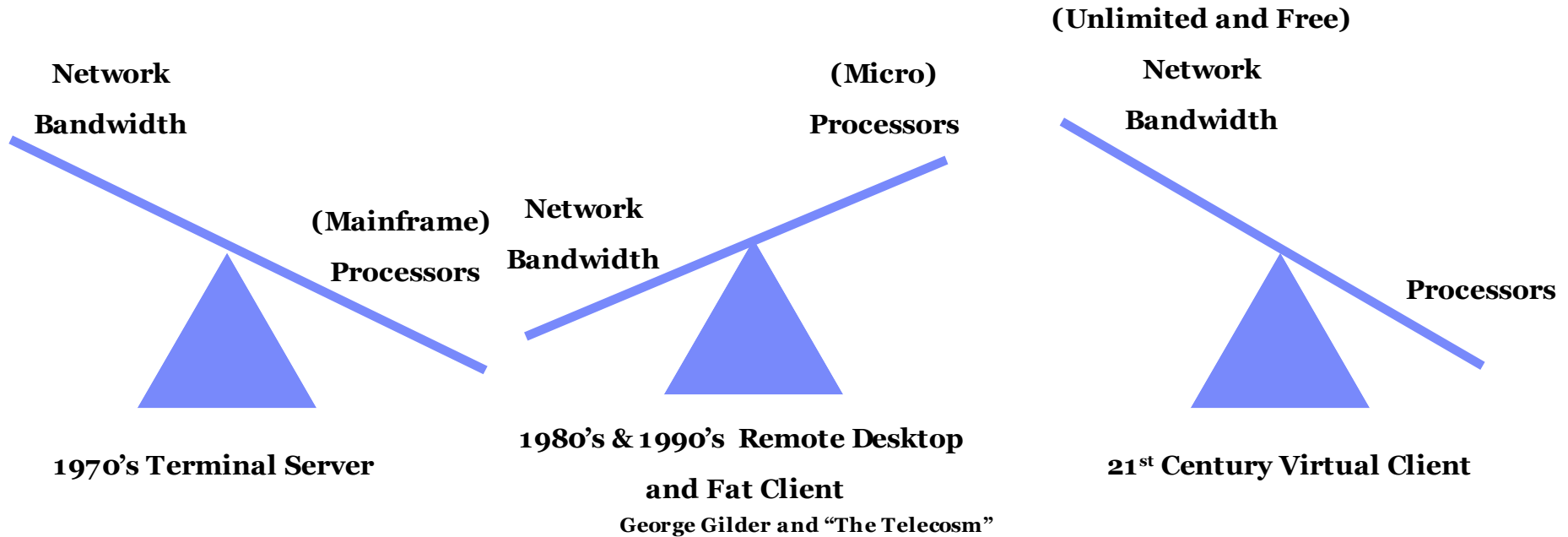
1. Bandwidth
2. Microsoft formats: Word; Excel; Outlook



Bandwidth: *almost* Unlimited, *almost* Ubiquitous, and *almost*

Free!
 2nd Buyer advantage: the use of all the fibre laid by telecom companies and which has since been acquired for a pittance.

("The Earth is Flat")



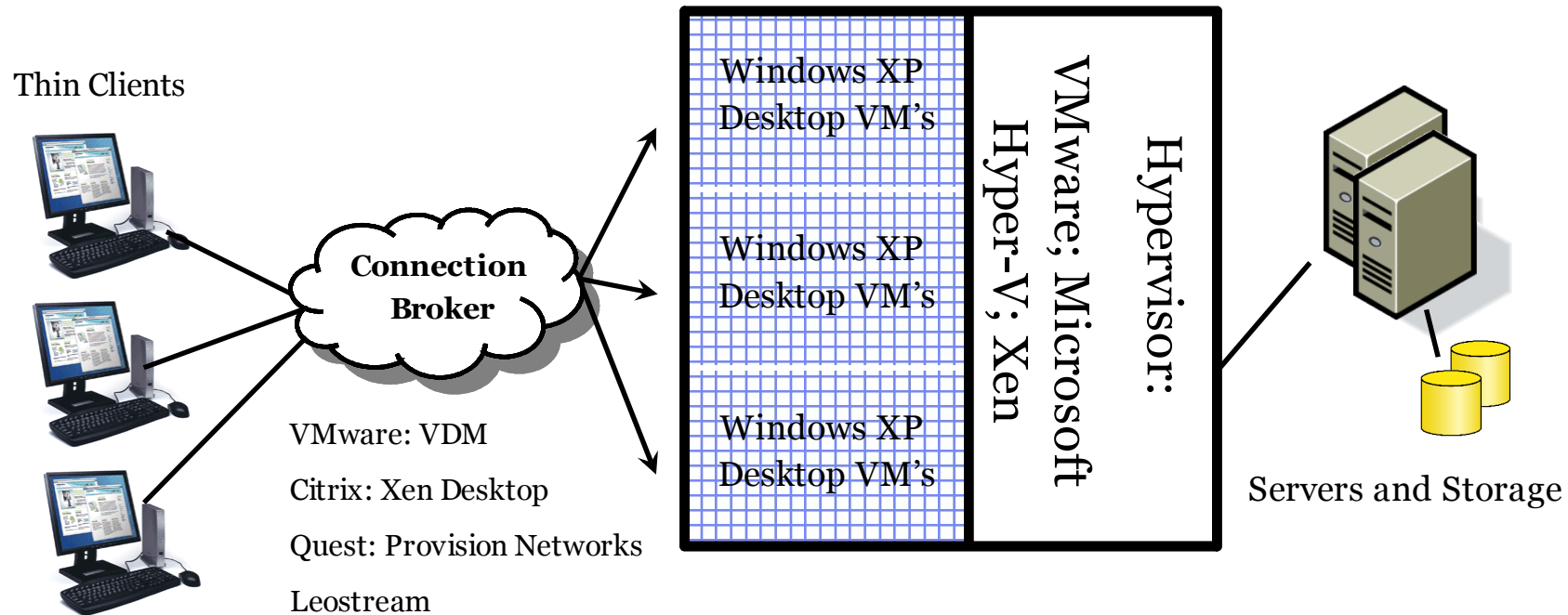
"In the next five years, PC architecture will change dramatically as virtualization shifts from the periphery to the center stage and will replace the standard OS and application installs."

Source: Forrester Research, January 2006

"The PC era is over, dead, gone, not to reappear...."

Sam Palmisano, IBM Worldwide employee broadcast March 2008

Virtual Client – architecture view



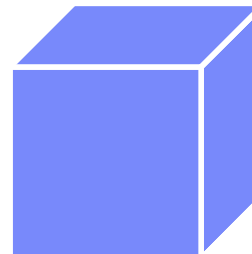
Typically, Solid state devices

With firmware based
Operating system

Windows Vista Enterprise
Centralized Desktop
(VECD) Licencing

Package and
stream apps to
users:

Word, Excel,
Powerpoint,
others



Application Virtualization
(Application Streaming)

- SoftGrid (Microsoft)
- Thininstall (VMware)
- Xenapp (Citrix)
- Appsense (Symantec)

Potential Power Savings & CO₂

The Virtual Client uses much less power than traditional desktop deployments

e.g. Assume 200 users

Traditional desktop power consumption:

200 users X avg 150 watts per PC = **30,000 watts**

Virtual Client power consumption:

(1 BladeCenter x 3,200 watts) + (200 Thin Clients x 20 watts) = 3,200 + 4,000 = **7,200 watts**

or

(4 x3850 x 900 watts) + (200 Thin Clients x 20 watts) = 3,600 + 4,000 = **7,600 watts**

Cost savings are estimated at 110 watts per desktop

Average Desktop today = 200Kg CO₂ per annum

Estimated power savings of £80 per PC per year!

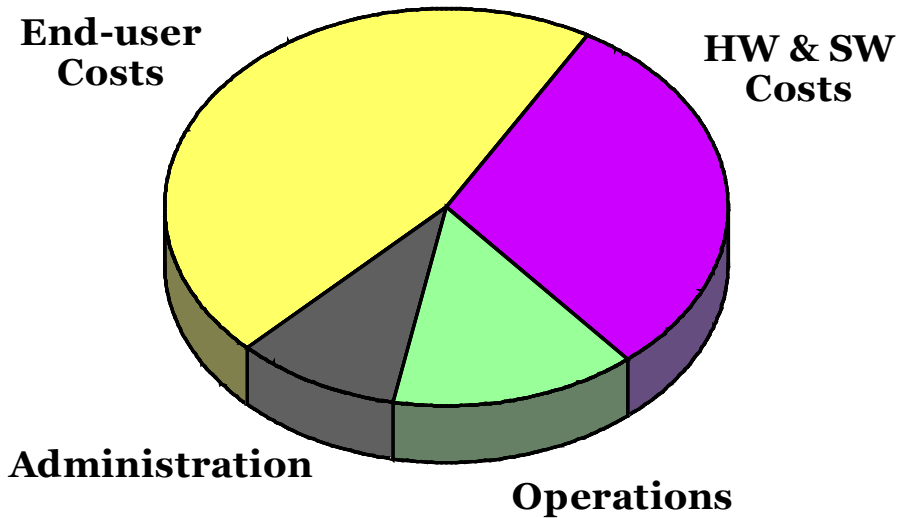
(assumes 8 pence per KW hour price for electricity and 24 hour power on – UK figures)

£100 per user per year!!!!

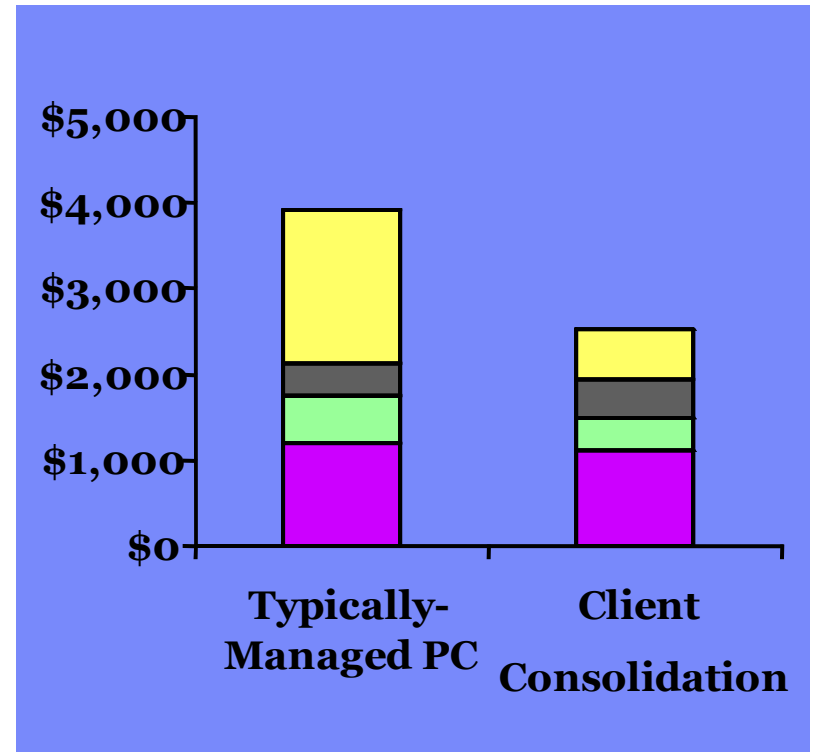
Cost Savings with the Virtual Client

Non-hardware and software costs dominate total costs of PC's

PC TCO



Hardware and software make up less than 30% of PC total cost of ownership
 (Source: Gartner Research)



Client Consolidation can lower TCO by reducing cost of operations and end-user support

(Source: Gartner Research)

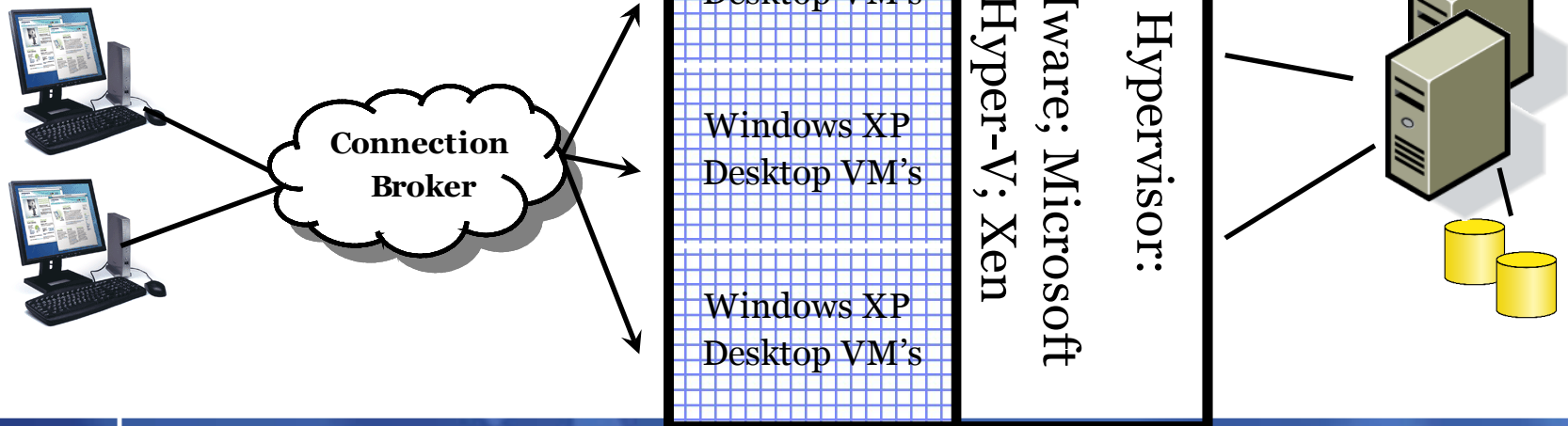
Security

Nicholas Negreponte

- MIT's Medialab
- Book - *Being Digital* – “Move bits, not atoms!”
- First backer of “Wired” magazine
- \$100 PC for Africa
- \$10m laptop



- Data Held Centrally
- Mobile solution
- Severe financial penalties for lost data



Virtual Desktop consolidation with IBM



- · Proliant 580 47:1
- · HP Blade 685 25:1
- · HP Blade 680 27:1
- · IBM x3850 M2 98:1

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- PC = 66% of IT budget; PC utilization = <1%
- Most of the IT spend is going on something we are hardly using!

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