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Nicola Hogan, Project Manager

JISC funded **SUSTE-TECH**

project Sustainable ICT in
Universities & Colleges

SUSTE-TECH

Sustainable Technology in
UK Universities and Colleges

Principle Aims of the Sustainable ICT Project

To help Universities and Colleges across the UK become more sustainable in their choice and use of ICT systems

- To reduce ICT related energy use,
- CO₂ emissions, running costs
- improve their “green credentials” : increase in college applications, help with funding, avoid penalties.

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What is Thin Client ?

“Thin Clients are small, silent devices that communicate with a central server giving a computing experience that is largely identical to that of a PC”.

- no hard drives or internal moving parts,
- minimum processing power with a relatively small amount of RAM.
- information sent to the central server which processes the information and returns an updated image to the terminal's screen.
- All applications are stored and run on the server.



Thin Client



Applications Accessible from Any Internet Enabled Device
.. Platform Independence . Remote Access

Thin Client : Clear Advantages over Thick Client ?

Smaller, lighter equipment that uses fewer

1. **materials** : plastics, precious metals,
2. **energy** : (kWh) : during its use and manufacture (embodied energy)
3. **creates less waste** : (CO₂ and solid material) waste during its use, manufacture and disposal.
4. **uses less process water** :



Thick Client

- European PC and 17" monitor required 20kgs of materials.
- A PC and Monitor's life cycle will include the disposal of 37kgs of non hazardous waste and 0.7kgs of hazardous waste.

The production of a PC & monitor will consume..

- 3,244 mega joules of energy and 920 litres of process water

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Thick Client



Create..

- 193 kgs of greenhouse gasses
- also release heavy metals,
- contribute to acid rain and other air, soil and water pollutants.

We still need to work and educate via the use of technology, just more sustainably.



Thin Client : Clear Advantages over Thick Client ?

In terms of providing computing services, the term thin client applies to

1. virtualisation and
2. consolidations of ICT equipment

Again, ICT equipment is made smaller, more compact, using fewer resources or eliminated altogether.

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Thin Client : Clear Advantages over Thick Client ?

Thin client has its energy saving advantages but depends on the size of your institution

e.g. researchers at Cardiff University carried out



“Thin Client V’s Thick Client Annualised Capital Costs”

analysis & concluded that institutions would need convert significantly more than 1,000 PCs, from thick to thin client before demonstrating financial savings.

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Thin Client : Clear Advantages over Thick Client ?

CARDIFF
UNIVERSITY

PRIFYSGOL
CAERDYFF

Purchase Price of Thin V's Thick

low spec PC costs £400 : Thin client costs £210

Assume PC life = 5yrs, thin client life = 7yrs.

Difference p.a. = $(400/5 - 210/7) = £50$ per client

So, for 1000 thin clients, **you save £50,000 p.a.**

Energy Savings of Thin V's Thick

Thick Client PC : 75W : Thin Client : 5W energy.

so for 1,000 PC's = savings of 70kW x 1760hrs

(220 working days x 8 hrs day) 123,200 kWhr p.a.

x 11p = saving of **£13,552.0 = £12,000 -14,000**

Thin Client : Clear Advantages over Thick Client ?

However, .. **Costs** associates with Thin Client.
(assuming 4 yr life)

- **energy cost for additional terminal servers**
(thin client) = £1,600 p.a. (1.6kW
(rate) x 8,760 (hrs in the year) x 11.4p (cost)
- **rack rental** for server equipment = £2,400 p.a.
- additional **hardware and software purchase cost** for the servers =£6,000

= £10,000 p.a.



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Thin Client : Clear Advantages over Thick Client ?

Windows CAL **licences** (6 year lifespan) cost £15 per PC, and 750 licences are needed for every 1,000 thin clients = $\text{£}11,250/6 = \text{£}1,875 \text{ p.a.}$

2 **FTE** to install, maintain and support the servers and applications = **£100,000**

$\text{£}10,000 + \text{£}1,875 + \text{£}100,000 = \text{£}111,875$

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To summarise

Savings on Thin Client purchase cost = **£50,000**

Energy savings p.a. = **£12,000-14,000**

Total Savings = **£62,000 - £64,000**

Cost of switching to Thin Client = **£111,875**

£111,875 - £62,000 - £64,000 = £50,000 – £48,000

Reduce Costs :

- employ 1 FTE instead of 2: (cost neutral),
- convert significantly more than 1,000 PCs.

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Thin Client : Clear Advantages over Thick Client ?

- However, Thin Client doesn't always deliver in terms of computing efficiency.

Advantages of Thick Client over Thin Client

- In terms of PC's, no need to connect to a server
- Installing PC Powerdown, can be more energy efficient (virtual servers need to be on 24 x 7)

Thick Client can be less expensive, more practical in smaller numbers.





Success Stories



- Queen Margaret University saved £50,000 in energy costs alone (at halfway stage) due to thin Client.
- WLC estimated a 70% reduction in energy costs due to thin client (consultants implemented same sustainable ICT initiative reported same savings).
- will also be able to demonstrate the anticipated 40% savings through the use of Server Virtualisation



Barriers to Implementing Thin Client

mis and pre-conceptions surrounding the technology.

- You need to overcome it !
- QMU undertook “roadshows” where staff were able to play with a terminal and see how similar it was to their existing PC configuration.

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Advice for those wanting to make change

- **Do the 4M's**
- Do the **math, meet** with all stakeholders, **merge** ideas with technology & **make** IT happen.

Install Thin Client in just a few labs, or buildings or whatever suits your institutions needs and equipment best.

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To conclude

Using thin client is better in terms of

- Initial purchase costs
- Running costs
- CO₂ emissions
- Less waste
- adds up to a smaller **Ecological Footprint..**

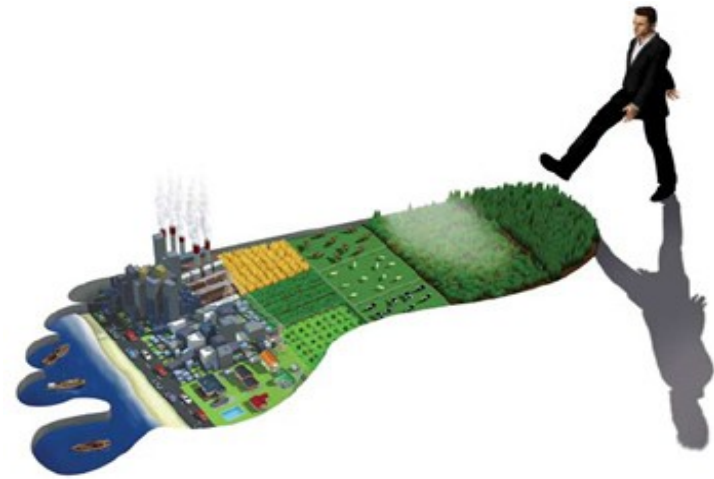
which is the bottom line



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