GPP 2020 | procurement for a low-carbon economy

Purchase of Thin Client Systems

Oeste CIM, Portugal

- Savings of electricity - 785 kWh/ year; 3.927 kWh/ equipment lifetime (5 years)
- CO_2 savings - 0,5 t/year; 2,5 t/equipment lifetime
- Electricity costs savings - 90 €/year; 452€/equipment lifetime
- Energy savings of 35,6% compared with the standard product/old tender
- Pilot procedure that is evaluated and if successful rolled out to 12 municipalities

Standard product / old tender = benchmark

- 25 desktop computers
- 1,1 t CO_2/ year
- 2.208 kWh/year of energy consumption

GPP 2020 tender

- 25 VDI terminals and 1 server
- 0,6 t CO_2/ year
- 1,423 kWh/year

Results (over the lifetime)

- 0,34 toe energy savings
- 2,5 t CO_2 savings

Contract tendered

- Tender for the purchase of thin client systems composed by 25 terminals and 1 server to supply Oeste CIM. If this technology proves to be efficient, a new procedure will be published to supply the 12 municipalities associated to OesteCim.
- 25 terminals and 1 server purchased to substitute old desktop PCs.
- Contract time. one time supply.
- Total Cost: maximum. 25.000 €
- This tender forms part of the GPP implementation strategy of the OesteCIM and contributes directly to the Government's Action plan for better air quality Horizon 2015, and the Energy and Climate Plan 2012-2020.

Procurement approach

Direct purchase agreement.

Thin Client Terminals	
Technical specifications	**Award criteria**
• Optimizing for virtualization environments • Simple User Interface with early plug and play • Support virtualization systems: Citrix Xendesktop 4.0 to 5.6, Citrix XenApp 4.5 to 6.5, Citrix Presentation Server, Microsoft Windows terminal Server 2003/2008/R2/2012, VMware View 4.0 to 5.2, Quest vWorkspace, Desktone and Leostream • Support for Citrix HDX and ICA protocol 12, namely: Improved media flow control-HDX Mediastream-HDX Plug-n-Play-HDX Realtime-Flash (server rendered)-HDX Broadcast (Branch Repeater)-Progressive Display-Seamless Windows-HDX IntelliCache-Desktop Restart (XenDesktop)-Session Reliability- Smartcard authentication & redirection • Access Gateway Support (direct LDAP or RSA authentication) • Support for L-shaped desktop (and other rotated monitor set up) • Granular control on HDX USB redirected devices • UDP Audio • User roaming • Support for the Microsoft RDP Protocol, namely: 7.1-Rich Multimedia (TS MMR)-Up to 32-bit color depth connections-RDP7 Multimedia 16-RDP7 Bi-directional audio-True multi-monitor Support-Network Level Authentication (NLA)-Smartcard authentication and redirection-optimization for Windows 7-Microsoft ® RDS support broker (including RemoteApp)-Microsoft ® certified • Supported RemoteFX Protocol VmWare View Client 5.2, namely: Smartcard Authentication-SSL Tunneling-SecureID Authentication-Restart VM • Processor with at least 1.0 GHz; • 1 GB DDR3 RAM	Lowest price

• DVI-I video output with DVI-I to VGA; • Possibility of support for 2 monitors with resolutions up to 1920 x 1200 @ 60 Hz/32bpp • 4 USB ports 2.0 • Network port 10/100/1000 BASE-T GbE • Audio Output and microphone input • Possibility of placing support for VESA mounting	

Server	
Technical specifications	**Award criteria**
• Dense 1U server rack installation 19 '' • 2 processors, each with 10 colors, 2.2 GHz of clock speed and 25 MB of cache per processor-independent. Must support & enable virtualization technology of colors in 1 physical core ratio for virtual 2 • 64 GB of RAM expandable to 768 GB RDIMM 1866MHz of RAM • Minimum number of 24 dimm slots, supported Dimms 2 GB/4 GB/8 GB/16 GB/32 GB DDR3 up to 1600MT/s • Availability of at least 16 memory slots not occupied, for future expansion. • Chassis for minimum of 4 support hard disks 2.5 '' • 2 146 GB SAS hard disks 2.5 '' 15 k RPM, 6 Gbps RAID 1, Hot Plug • Hardware RAID controller with 512 MB of non-volatile cache, with the following minimum characteristics: • - Eight internal ports SATA + SAS supporting up to 32 SAS or SATA hard drives or solid state disks (SSDs) • Support for cryptographic security capacity discs (SED) • 6 Gb/s door speed 12 • 512 MB of cache • Load balancing • Disk power management • upport for RAID levels 0, 1, 5, 6, and RAID spans 10, 50, 60 • Support for Online RAID Level Migration (RLM) • Stripe size configurable up to 1 MB • Support for Online Capacity Expansion (OCE) • Support for up to 64 and 64 TB logical disks in LUN • Possibility of enclosure management for SES (inband), SGPIO (sideband) • Automatic restart after power loss during array reconstruction or rebuilding/RLM • Routine check of consistency and data integrity • Global Hot-Spare and dedicated with possibility of reversal • 8 Gigabit Ethernet network ports • 2 Ports Fibre Channel 8Gb • Advanced System Management Card-of-the-art enterprise • Read/write optical drive DVD +/-RW • Redundant power supply, Hot Plug and respective power cables; • Sliding Rails with smart cable management mechanism • Support for Swiitch independent partitioning option	Lowest price

Contract clauses

- Thin client terminals: Assistance for a period not less than 3 years, pick-up and delivery.
- Server: Assistance "Next Business Day" for a period not less than 5 years, provided on-site.

Criteria development

Criteria were developed taking into account a market research for thin client systems at Oeste CIM, which led to the definition of the technical specifications.

The chosen criteria were developed based in the energy savings. A thin client VDI session will use less electricity than a desktop computer. Using VDI is a way to reduce our carbon footprint on the planet and save our company money in power costs. A thin (or zero) clients consume 5-14 watts of power per hour. PCs consume 65-250 watts of power per hour. The difference comes from the thin clients having no hard drives, no moving parts, minimum processing power and a relatively small amount of RAM. Using this knowledge and some assumptions, it's easy to show that VDI will save a considerable amount in yearly energy costs.

Results

	CO_2 emissions (t CO_2e/year)	Energy consumption (toe/year)
Thin client systems (25 terminals + 1 server)	0,6	0,12
25 Desktop PCs	1,1	0,19
Savings (annual)	0,5 t CO_2e/year	0,07 toe/year
Savings (5 year – equipment lifetime)	2,5 t CO_2e	0,34 toe

Calculation basis

1) Calculations were made using the calculator GPP 2020 for IT equipment;

2) All predefined data in the calculator were kept, except the assumptions relating to consumption of the low-carbon solution and the amount of equipment. It was also necessary to add the power consumption of the server that will provide the processing power to VDI terminals. To this end it was added a page to the calculator GPP 2020 related to server calculations and a line to include the results from the server. The results of the terminals and the server were summed and compared against the benchmark.

3) The calculations were made for the procurement of 25 VDI terminals and 1 server.

- Purchased terminals have the following characteristics:
    - Idle wattage: 5,5 W
    - Sleep wattage: 1,2 W
    - Off wattage: 1,7 W
    - Annual consumption: 489 kWh
- Purchased server has the following characteristics:
    - Maximum idle wattage: 220 W
    - Minimum idle wattage: 83 W
    - Annual consumption: 934 kWh
- Conventional desktop PCs have the following characteristics:
    - Idle wattage: 50 W
    - Sleep wattage: 2 W
    - Off wattage: 1,7 W
    - Annual consumption: 2.208 kWh
- Estimated CO_2 emissions factors for electricity generation in Portugal: 0,506 kg/kWh.

Lessons learned

We have assumed that thin clients and PCs are in active use about 9 hours a day, 230 work days a year (excluding weekends, holidays, vacation, and training). The rest of the time they should be in sleep mode to conserve energy.

To be fair, let's account for the servers that will host the virtual desktops. A server hosting VDI workloads will consume 450-650 watts of power per hour, and host 60-100 virtual desktops (desktop density). Unlike PCs and thin clients, servers are in active use 24x7x365 days, since one of the key benefits of VDI is anywhere, anytime access to desktops.

Virtual desktop infrastructure (VDI) allows to have central management of all our desktops and really controlling what is being installed and used on the desktops.

Security is a key factor in rolling out VDI. With VDI, we have greater control of how we secure our desktops.

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About GPP 2020

GPP 2020 aims to mainstream low-carbon procurement across Europe in support of the EU's goals to achieve a 20% reduction in greenhouse gas emissions, a 20% increase in the share of renewable energy and a 20% increase in energy efficiency by 2020.

To this end, GPP 2020 will implement more than 100 low-carbon tenders, which will directly result in substantial CO_2 savings. Moreover, GPP 2020 is running a capacity building programme that includes trainings and exchange. – www.gpp2020.eu

PRIMES Green Public Procurement

About PRIMES

Across six countries in Europe; Denmark, Sweden, Latvia, Croatia, France and Italy, PRIMES project seeks to help municipalities overcome barriers in GPP processes, many of which lack capacity and knowledge.

PRIMES aims to develop basic skills and provide hands-on support for public purchasing organisations in order to overcome barriers and implement Green Public Purchasing. This will consequently result in energy savings and CO_2 reductions. – www.primes-eu.net

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