

Audit Report

Edinburgh Napier School of Computing and the Institute for Informatics and Digital Innovation carbon footprint of their computing equipment.

Audit conducted between the 9th of November 2011 and the 21st of November 2011

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Executive summary

This report was produced to present the results from the audit conducted between the 9th of November 2011 and the 21st of November 2011, in Edinburgh Napier the School of Computing and the Institute for Informatics and Digital Innovation. The purpose of the audit conducted by Clément MOUCHET was to evaluate a prototype auditing-tool developed during his dissertation.

Two server rooms, six labs and thirty-six staff offices were audited to measure the carbon footprint of the computing equipment used in those rooms.

The reports produced by the auditing tool enabled the auditor to draw conclusions and propose some recommendations regarding the energy policy of the computing equipment in order to reduce the power consumption and overall carbon footprint of the School of Computing and IIDI operations.

This audit report explains the methodology used, the results of the audit and presents the recommendation proposed by the author.

Overall the results of the audit showed that the Labs have a strong and efficient energy policy and that little could be done to reduce their footprint. Almost all the computers in the SoC and IIDI are recent computers that are energy efficient. However, their capacity to save power is under-exploited, and much could be done to reduce the carbon footprint of the staff offices computing equipment, since they are left on much more than necessary. Recommendations to setup new energy policies that would contribute to drastically reduce the carbon footprint of the School of Computing and IIDI operations are made in the last section of this report.

Methodology

As stated in the executive summary, Greensight, the platform, is a web-based application that has been used for the audit. Although it is still in a development stage; it was considered mature enough to be evaluated on a fairly large organization, in order to refine its requirements and continue its development.

The audit was preformed in 3 stages. Labs were audited first, followed by Staff Offices and Server rooms.

The audit of the Labs was conducted over two days to allow a couple of hours of development, for fixes and improvements after the first two rooms where audited. The time use evaluation of the computing equipment was evaluated based on the timetable of the rooms.

Auditing the staff rooms took more time as access to their offices depended on the presence and availability of staff members. A large majority of them accepted to be shortly questioned about how they use of their computing equipment. In order to minimize the time needed for the audit and avoid disturbing them, questions were kept as simple and short as possible.

The following questions where asked to all the staff members interviewed:

- What and how many computing equipment are used?
- How many weeks per year is the computing equipment used?
- How many days per week?
- How many hours it is on?
- How many hours is it on standby?
- How many hours is it off?

Nearly sixty people accepted to answer these questions, covering almost every staff office of both the SoC and IIDI. Assumptions were made to estimate the few remaining computing equipment, when no one was available to provide information about them.

The server rooms proved to be the most difficult to audit, as their access is very restricted. Only a few minutes were spent in them, to list the hardware, and evaluate it. The second problem was that different parties are responsible for the

management of the servers. Unfortunately, not all of them were able to provide detailed information regarding the hardware they are responsible for. Thirdly no data was available for servers in the datasets currently used by the platform. As a consequence, servers were counted in terms of number of CPU: a single CPU server = 1 Desktop without monitor, a dual CPU server = 2 Desktop without monitor and so on.

The limitation of the dataset did not only affect the audit of the server rooms but other audits as well. Networking equipment are absent from the audit as no data was available to evaluate it. Other specific systems such as labs microcomputers for instance were replaced by equivalent products such as ultra low power netbooks in this case.

Results

The result of the audit revealed that most the computers currently used in the School of Computing and IIDI are recent and energy efficient. Most of them have the Energy Star label, and are from brands, such as HP, Dell and Apple that are known for making efforts to reduce their carbon footprint and design energy efficient equipment. (Greenpeace, 2011) There is no need to renew them to reduce the carbon footprint of the SoC and IIDI, but the power management and energy policies of the computers and printers should be improved.

Generally the accuracy of the estimation is questionable, since generic values have been used, and the estimation of time use can be quite rough in some cases. But it still provides interesting insights regarding the use of computing equipment and enables to draw conclusions and propose recommendations to reduce the carbon footprint of computing equipment, without replacing computers. The findings of the audit were that a large number of staff members are leaving their PC on all the time. Many of them justified that they need to access it from home using a VPN. The audit also revealed that the computers and monitors used are hardly exploiting they standby and low power mode. Computers in the labs do have suitable energy policies, and go to sleep, or even shutdown after a period of time idle, varying from 40mins to 2h. All computers in the labs are automatically shutdown at 9PM is not used, and the monitors are also set to go to standby when not used.

However, in the staff offices computers are not set to standby if not used, and even monitors stay on unless they are switched off. This is not suitable to the reality of an organisation such as a University where staff members come and go from their offices for long period of time such as lectures, meetings etc. In such situation, computers are wasting power and life span for no reasons.

Most of the monitors are left on all day and are switched off at night. This revealed that staff members are aware of the importance of reducing the power usage during night-time, but improvements could be made during daytime.

Printers are also drawing much more power than they should, almost not printer whether shared or not are switched off at night or during holidays. Again this represents a power usage at least twice more important than necessary.

Based on those results, recommendations to improve the current policy regarding the use of computers and computing equipment are proposed in the next section.

Recommendations

As explained earlier, most of the computers are very recent and compliant with energy efficient standards and labels. However, the current policy does not really exploit the new capabilities of the computers to reduce their power usage.

Computers should be:

- Automatically set to standby using ACPI S3 sleeping state after a short period of time (20mn)
- Automatically shutdown every night, unless remote access is needed. In this case the computer would be left on standby were it can use the “wake-on-lan” function.

Monitors should be:

- Automatically going to standby after a short time period idle (10mn)
- *Placed on timer plugs to be switched off automatically at night.*

Printers should be:

- Switched off during holidays
- *Placed on timer plugs to be switched off overnight*

These recommendations are very easy to setup and represent little spending compare to the savings they would provide. They would reduce the power usage and carbon footprint of much equipment such as printers by two, and would contribute to increase the lifespan of all the equipment used, by reducing their activity and operation to the time actually used.

Staff should be encouraged to take an active part in this effort as literature showed that a collective focus is crucial to the success of carbon footprint reduction. (O'Neil, 2010, p. 5) (Jenkin, Webster, & McShane, 2011, p. 26)

For instance, if reminders were displayed to encourage them to put their computer to standby when they leave the room, or to switch off their printer when they are finished using it, this would reduce the carbon footprint even more.

References

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