circular computing

Remanufactured - not refurbished:

Demonstrating superior performance of Circular Computers

We know that when it comes to procuring IT products for business, performance and quality matter. We also know that the current standard model for purchasing IT products 'as new' is damaging our environment beyond repair, with huge socio and economic repercussions.

We need a new procurement model

Performance and quality are two concerns we hear every day from corporations around the world - weighing up the option of being more sustainable versus productivity and performance.

Circular Computing products perform at 97% of the performance of new

We can challenge that concern head on by presenting some brand new research by Cranfield University academics, which reveals that Circular Computing products perform at 97% of the performance of brand new computers. That means the planet is suffering for 3%, vulnerable communities are exploited for 3% and companies are throwing money at unnecessary incremental differences for 3%.

Is 3% worth it?

Here's the problem: 160 million new laptops are made every year, with 160,000 being disposed of every day in the EU alone. That's 3 million tons of IT equipment waste. The result is excessive resource consumption, climate change, conflict mining, human rights issues, pollution and e-waste.

Yet, 70% of those laptops can be reused

There is a perception that the circular economy is just another way to describe recycling, but that isn't the reality. The circular economy is much more than recycling. A linear economy makes, uses and disposes of materials. The circular economy looks at all the options across the supply chain to use as few resources as possible in the first place, whilst keeping resources in circulation for as long as possible and extracting maximum value from them while in use. The circular economy principle then sees manufacturing processes recover and regenerate products at the end of service life. This means designing products for longevity with 'repairability' and repurposing in mind, so that materials can be easily dismantled and recycled.

Some say that the premise of the circular economy is misunderstood. Some see it as an ongoing battle between environmentalists and corporations - that one wants to see the environment protected and the other prioritises profits.

However, we want to stress that the circular economy connects both, delivering economic as well as environmental gain.

But beyond the sustainability argument, can Circular Computing deliver a solution free from any performance and reliability risk, at enterprise level?

We know now conclusively that yes, they can and they do.

The research

In early 2017, we commissioned a study by Cranfield University under the guidance of Professor Mark Jolly, we took a look into the comparative performance of our remanufactured laptops versus brand new.

Cranfield's research explored the following objectives

- To identify final user needs
- To define performance indicators
- To measure the performance of each laptop within the research sample
- To assess the differences among groups
- To discuss results and obtain an understanding of the research insight

This research sought to identify the extent to which Circular Computers are as good as new ones. At Circular Computing, we realised that the circular economic model is not a new concept and the sustainability argument is being increasingly recognised across the business community. However, we also know that businesses are concerned specifically about performance. Therefore, it is absolutely crucial for us to demonstrate that not only are our products sustainable, but they can deliver the performance required by organisations in the 21st century.

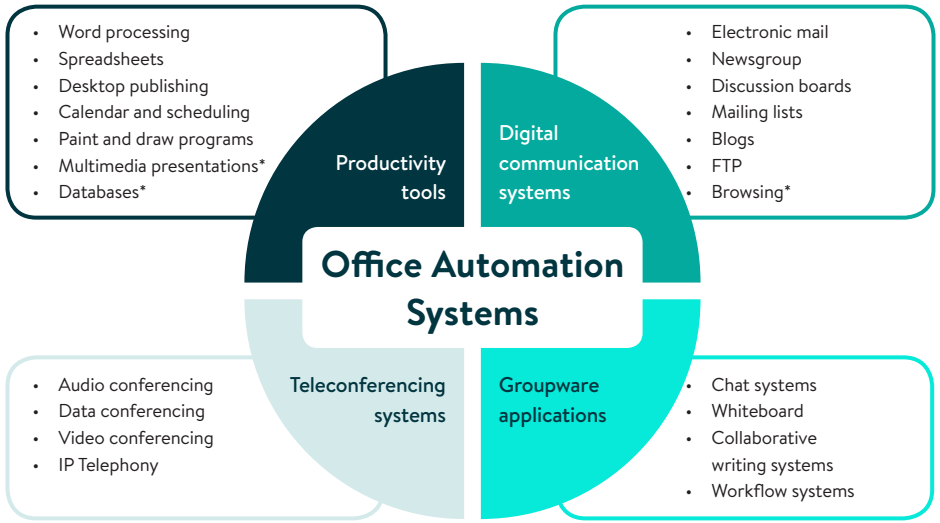
The study compared the performance of new and Circular Computing laptops in order to discover the real differences from a standard office user's perspective, focusing on the true performance of the computer as a whole.

The research looks at two groups of computers - the sample consisted of 10 new and 11 Circular Computing laptops, of well-known brands including HP, Dell and Lenovo.

To measure the performance, Cranfield found and used two benchmarking programs that could meet the criteria of testing Windows based operating systems across a wide range of hardware. The first is PCMark 8, which is an industry standard PC benchmarking tool. It has five benchmark tests. Secondly, OPBM is a comprehensive, verifiable office application benchmark that utilises popular office productivity software. Both softwares test PC efficiency and performance by simulating workloads representative of the modern day office user, giving a single score. Cranfield measured three different analysis: two considered performance, giving the same importance to short and long tasks, and the other one explored the impact in terms of overall time.

Both of the software systems measured against the office needs:

Figure 2-1
Main Office Automation Systems. Adapted from (Cardoso, 2006)



* Added to the original figure

Table 2-2: Office automation systems - Productivity tools and teleconferencing systems
The table shows what data is being collected through each test

Productivity Tools	**Word processing**	Application that allows the user to create a text document, edit it, save it, display it and print it.
	Spreadsheet	Presents data in columns and rows and allows establishing mathematical and logical relationships between them and representing data as graphs.
	Desktop publishing	Enables the user to create high-quality documents to be printed for publication, such as books, magazines, flyers or posters.
	Calendars and schedulers	Application that help in planning or recording appointments or events, manage projects, coordinate among people or manage resources.
	Paint and draw	Pixel-based (painting) and vector-based (drawing) art creation. Some also include photo editing tools.
	Multimedia presentations	Shows information visually presented in slides, as a combiniation of text and multimedia.
	Databases	Collections of data and the tools that simplify the access, manipulation or filing of data.
Teleconferencing systems	**Audio, video and data conferencing**	Applications that allow real-time audio, video and/or data sharing. Useful for working with people located in different geographical areas.
	IP Telephony	Technology that enables transmission of voice or data using the IP. The call travels through a network (typically LAN or the Internet), avoiding the Public Switched Telephone Network (PSTN), resulting in a cost reduction.

You can see above that tests were conducted on the most everyday uses of PC's in a workplace - office systems such as email, word processing and the use of spreadsheets, databases and video conferencing plus specialist programmes like Adobe's Design suite.

The research process

Test conditions are the specification that a researcher must follow for testing, allowing for the repeatability of data on each machine for conclusive evidence. Cranfield specifies the test conditions below performed by the two softwares:

- Check and install Windows Updates.
- Install Microsoft Office 2010 – 32 bits - Free Trial (Word, Excel, PowerPoint, Access and Publisher).
- Install Adobe CS6 Free Trial (Photoshop, InDesign and Illustrator).
- Install Adobe Acrobat X, Google Chrome, Mozilla Firefox, Safari and Opera.
- Define Adobe Acrobat X as default for opening pdf files.
- Install Java SE Development Kit 8, create a copy of the installed folder in the same root folder (C: \ Program Files \ Java \ ) and rename it as jre7 .
- Unable User Account Control: Registry Editor (regedit) HKEY_LOCAL_MACHINE/ SOFTWARE/Microsoft/Windows/ CurrentVersi on/Policies/System Unable LUA Set to 0.

Table 5-1: Data collected per test
The table shows what data is being collected through each test

PCMark 8			OPBM
Work Conventional	**Work Accelerated**	**Tuning**	**General**
• Writing • Spreadsheet • Web Browsing – JunglePin • Web Browsing – Amazonia • Video Chat • PCMark 8 Work Conventional Score	• PCMark 8 Work Accelerated Score	• Video Group Chat • Microsoft Word • Microsoft Excel • Microsoft PowerPoint • Photo Editing • Adobe Photoshop light • Adobe InDesign • Adobe Illustrator	• Word Processing • Spreadsheet • Database • Publisher • Presentation • JavaScript

Table 5-2: Data collection process
The table shows how the data is being collected

	PCMark 8	OPBM
Process	1. Install all critical updates to ensure your system is up to date. 2. Install the latest approved drivers for your hardware. 3. Plug the computer (observed to affect the results). 4. Restart the computer or device. 5. Wait 2 minutes for start up to complete. 6. Close other programs, including those that may be running in the background and activate flight mode. 7. Wait for 15 minutes. 8. Run the benchmark.	
	9. Repeat from step 4 at least three times to verify your results.	9. Run each benchmark, n times. 10. Record the last 3 values.

The results

These tests showed overall that the remanufactured computers performed at between 93% and 97% of the level set by the new computer. The research evidently showing that for everyday use by employees, the differences between new and remanufactured are minimal.

Figure 6-24: Performance summary for laptops
The study investigated the performance of Circular Computing laptops in comparison with brand new devices. To do so, three different types of tests were created, focusing on quantifying the performance of a standard office user.

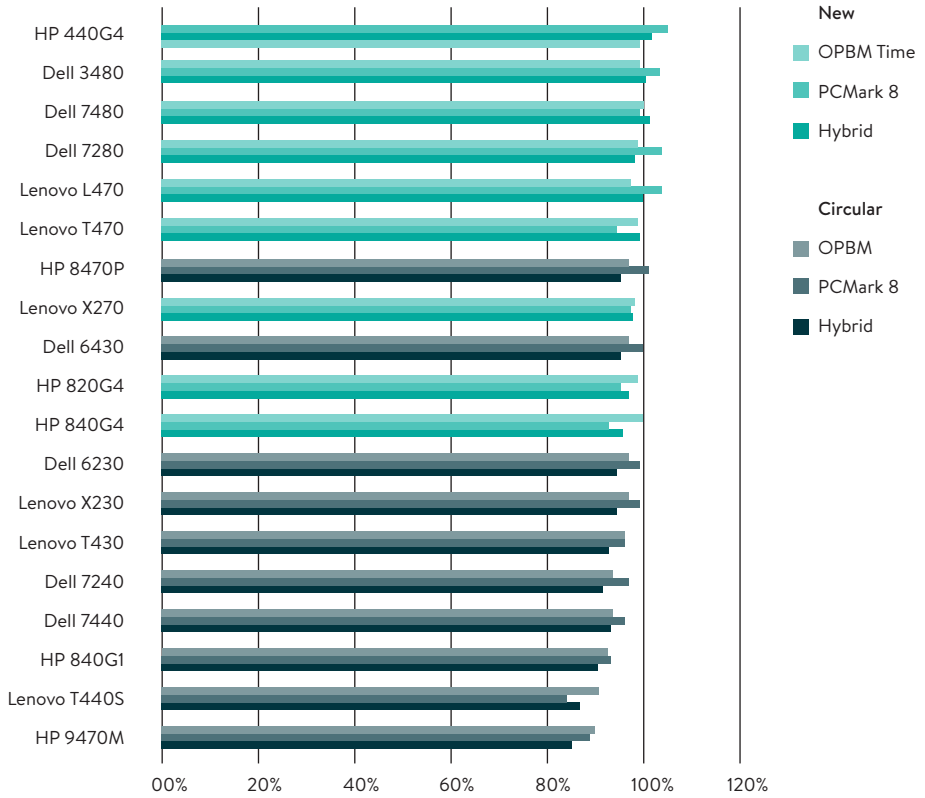


Figure 6-24

You can see from the previous page that not only did remanufactured laptops perform near equal to brand new, but also that some of the models used (HP 8470P and Dell 6430) performed better than competitor brand new laptops.

Most incredibly, and importantly, the research shows that the PCMark8 tests on remanufactured Circular Computers revealed a performance level of 96.7% against brand new.

Cranfield concludes the research by saying decisively that, "in the end, Circular Computing laptops demonstrated to be an alternative for office users to new laptops at a significantly lower price, which can be up to 50% less, showing high-performance levels in comparison [to brand new laptops]. It is fair to conclude therefore that enough evidence is provided to consider Circular Computers, alongside new computers, as part of a core IT strategy, not only for the economic benefits but also for the sustainable ones".

Sustainability and performance side by side

Looking at this research and putting sustainability and performance side by side suggests that new, updated models - delivered with another new supply of rare materials extracted at high environmental costs - do not deliver value.

For many years, we've heard IT executives tell us that refurbished IT products do not deliver the quality and performances sought after by businesses but, here, we have conclusively found otherwise.

At Circular Computing we're proud to be driven by a mission that is both commercial and environmental. Our business will always be rooted in a sustainability agenda however, we understand that technology is the lifeblood of modern business. We don't compromise on the tools that power our organisation, so we'd never ask you to. Having said that, our research findings do beg the question (whether you're sustainably-minded or not), does 'brand new' really present the smartest option for investment of your IT budget?

Remanufactured - not refurbished

There is a difference. At Circular Computing, we go further than average by embedding innovation, precision and market-leading standards into every step of our remanufacturing process, so, as you've read above, the difference between new and 'like-new' is undetectable.

Manufacture of an average new PC perhaps costs more than you think. Amongst others, it involves copper from Chile, gold from Mali, iron ore from Brazil, nickel from the Congo, bauxite from Peru. Mining operations damage land, use up huge amounts of energy and lead to pollution in the air, soil and water systems. Reportedly harsh working conditions for those within the supply chain are typical and even involve the use of child labour. And once that laptop is no longer deemed 'new enough', it is likely to be disposed in third world countries where e-waste continues to inflict further harm on people and our planet.

As an organisation, you must now ask yourself this - is 3% worth it?

At Circular Computing we're always on the lookout for forward thinking organisations who share our passion for finding more ethical, sustainable and environmental ways to do business

If you're looking for high performance, quality IT that doesn't cost the earth – we'd love to hear from you.

Simply, reach out to one of our team and we'll be in touch to explore how you can leave costly linear procurement models behind, in favour of making the circular economy a reality in your organisation.

circularcomputing.com
enquiries@circularcomputing.com
+44 (0)2392 530291

Plot 92 Al Hamra
Industrial Estate
Al Hamra
Ras al Khaimah
United Arab Emites

Unit E Railway Triangle
Walton Road
Portsmouth
PO6 1TY
United Kingdom