Experimentus
excellence in software quality management

QA & Test Embedded Software Testing

Sustainability in software testing needn't be rocket science

10th October 2024

Simon Frankish

Assess | Visualise | Transform | Manage | Train

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Introduction

Simon Frankish

- Over 34 years experience in the software testing industry
  - Mixture of in-house test teams and test consultancy
  - Worked in test roles from Test Analyst to Head of Testing

- Currently head of the Process Improvement practice at Experimentus, the world's leading supplier of test process improvement through TMMi

- Working with financial institutions to promote sustainable testing practices



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The problem …..

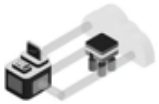
GoCodeGreen

The Climate Impact of Information and Communication Technology (ICT)



"The share of ICT in global greenhouse gas emissions has increased by half since 2013, rising from 2.5% to 4% of global emissions. This footprint is increasing by 9% per year."

Source: The Shift Project



"Worldwide, it is estimated that data centers consume about 3 percent of global electric supply and account for over 2 percent of total GHG emissions."

Source: The Climate Neutral Group



"ICT has emissions greater than the aviation industry, which are around 2% of global emissions"

Source: Small World Consulting



"The ICT growth rate is estimated at 9%, at this rate, the share of ICT may rise up to 20% of total electricity consumption in 2030."

Source: EnerData

www.gocode.green

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How did we get interested?



Dominic Plummer – Head of Sustainable Quality Engineering at Natwest



Richard Bishop – Quality Engineering Lead for Lloyds Banking Group



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Examples of progress made (Natwest & Lloyds)

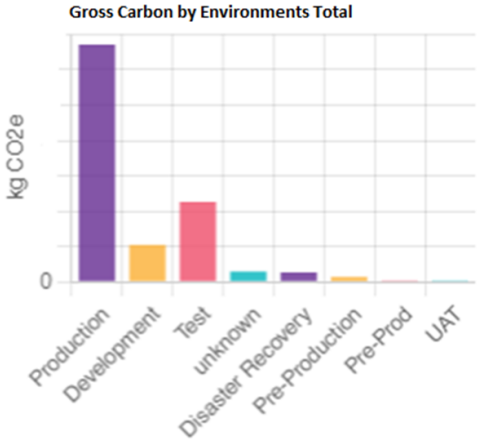
Climate Action
Path to net zero for own operations

2020-2021	2022 - 2025	2025 – 2030	2030 – 2050
Achieved net zero & climate positive for direct own operations	**Halve emissions for own direct operations**	**Halve emissions of the operational value chain**	**Net zero emissions for operational value chain**
	Reduce: Achieve 50% reduction in carbon emissions **Zero Waste:** Increase resource efficiency and the circular economy to ensure resources are valued and nothing is wasted **Restore nature:** Regenerate natural ecosystems and remove carbon from the atmosphere **Supply Chain:** Identify highest impact suppliers and compile carbon emissions data to support the setting of ambitious reduction targets	**Direct Operations:** Continue to reduce the carbon impact of our gas, electricity and oil consumption by 90% Upgrade bank properties to a meet minimum MEES, based on the current BEIS consultation this is anticipated to be an EPC or equivalent rating of B by 2030 50% reduction in wider **value chain operational emissions,** including supply chain emissions	Minimum of 90% reduction in **all operational emissions** by 2050 **Neutralise** (offset) remaining 10% emissions

Beyond Value Chain: We will continue to make investments to mitigate GHG emissions through carbon removal projects, programs and solutions that provide benefits to climate, especially those that generate additional co-benefits for people and nature

Partnerships: We will work collaboratively with stakeholders and environmental advocates to develop shared strategies and identify solutions necessary to meet future climate ambitions

Colleagues: We will support all colleagues to adopt environmentally friendly activities at work, home and in their communities



Drill down perspective



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The problem of measurement

- Whilst it is laudable, there can be issues with the measurement of progress in the way that Natwest and Lloyds are doing it

  - Information may not be readily available
  - Data collection and analysis may be prohibitively time-consuming
  - The information held in various areas of the business may not be compatible
  - There may not be high-level management support for such measures
  - There may be unknowable variables



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How can we look at it differently?

We believe that whilst absolute measures are the ideal, progress can still be made using relative measures

- Relative measures that track progress over time can be used
- These measures can be based on information that is readily available to test departments
- Support from higher management may not be needed as measurements can be made quickly and easily



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Efficiency in testing isn't new – but we can look at it differently – Test Process

What elements of an effective set of test processes can contribute toward more sustainable testing?

- Are there organisational sustainability objectives in place that are reflected in the test function's objectives?
- Are effective risk-based testing processes in place?
  - Are tests prioritised and only run when necessary?
  - Is progress against mitigating identified risk measured?
- Is there a clear ownership of testing process (including sustainability elements)?
- Are testers roles, including their responsibilities toward sustainability, clearly defined?
- Is there a consistent set of implemented test processes?

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Efficiency in testing isn't new – but we can look at it differently – Test Process

- Are lessons learnt sessions / retrospectives carried out (including sustainable considerations)?
- Is a test plan implemented that reflects and enforces the defined processes?
- Is there a defined reviews process (static testing) in place and is it integrated with your dynamic testing?
- Is product quality measured from the outset and do you change your test approach based on its findings?
- Are defects subject to root cause analysis and are measures implemented to prevent reoccurrence?
- Are you continually looking at new ways of working and new tools to improve your testing (particularly in a sustainable way)?
- Do you have a library of test assets that can be reused as appropriate?

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Test Environments

Test environment usage is a key area of energy usage – what can be done to make this more sustainable?

- Is test environment infrastructure virtualised where possible?
- Do you make effective use of test stubs and service virtualisation?
- Is idle time for test environments minimised?
- Are test tools and infrastructure shared as much as possible?
- Is the amount of network traffic across test environments minimised?
- Are test environments made available in a timely manner and is smoke/intake testing carried out to avoid issues?

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Housekeeping

There may be some relatively simple considerations that you can look at that will make your testing more sustainable.

- Is “Green Testing” a stated objective of your team (are people aware what this means)?
- Are redundant files (scripts, results data, log files etc..) regularly purged?
- Do you free up machines and technology at the earliest opportunity?
- Are machines powered off when not in use?
- Is travel minimised?



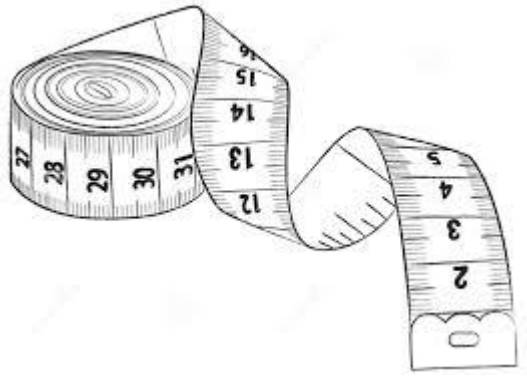


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Measurement

Measurement can be very difficult. What considerations can you think about to improve your measurement?

- Are there defined measures for testing and software quality and efficiency in place?
- Do you measure efficiency of your test environment usage?
- Can you objectively measure your team's environmental impact?
- Can you measure your team's environmental impact in a relative way?
- Does your organisation provide sustainability measures that your measures can feed into?

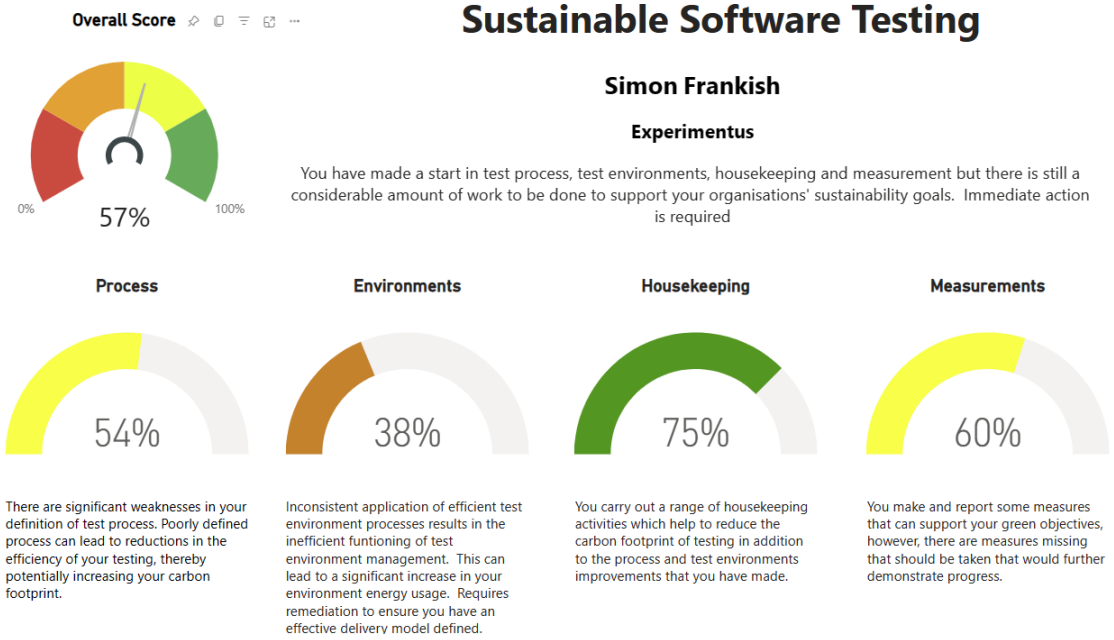


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Sustainable software testing survey

We are looking to measure the efficiency of the software test process without compromising the effectiveness through a “carbon lens”

- Focus on
  - Test Process
  - Test Environments
  - Housekeeping
  - Measurements
- Can be done at any level – project/organisation
- Provides a good baseline
- Recognise objective vs subjective answers
- Helps identify what data/information you already have in your organisation
- Different people will have different views



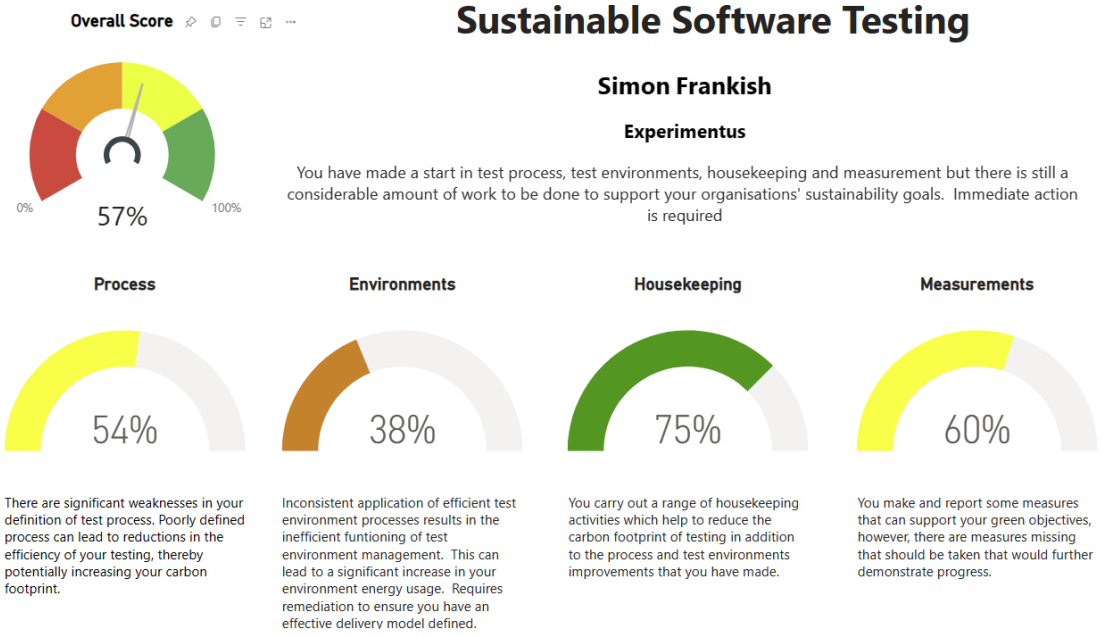
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Sustainable software testing survey

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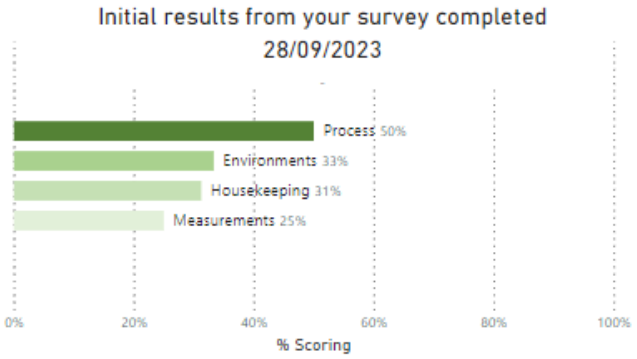


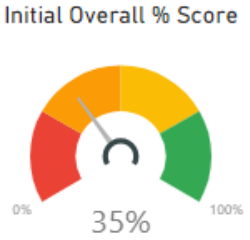
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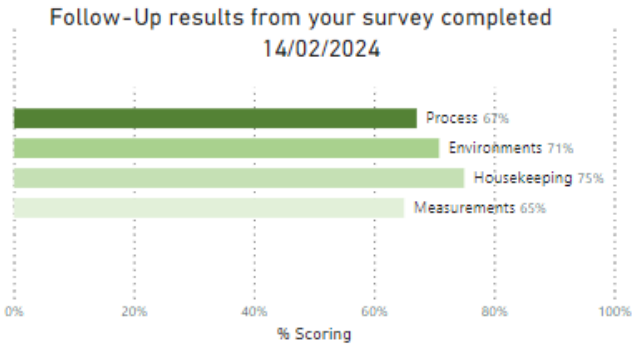
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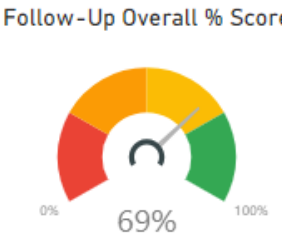
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Report showing trend of improvement between the survey





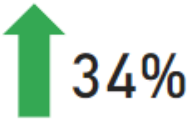




Observations

Your sustainability related test process, test environments, housekeeping and measurement are largely deployed and are supporting your organisations' sustainability goals. However it is likely there are some gaps in coverage and application that could be introducting risk to full compliance. Review recommended.

140 days between the surveys



- Comparison report between the two surveys having been completed
- Highlight areas of improvement
- Shows the number of days between the surveys
- Shows the overall trend % and direction
- Can be completed for a project, program or entire organisation
- Looks at your software testing practices from a green perspective
- We can also provide more detailed commentary on your progress

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Any Comments or Questions

SCAN ME

Take the survey…

SCAN ME

The Greener Software Testing Community LinkedIn page

If you are interested in finding out more, please contact me at:

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