Green software: measuring software carbon intensity in practice

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Software uses electricity, and the electricity has a carbon cost that varies with where and when it is used. Green software engineering aims to deliver the same value with less energy and a cleaner energy supply.

TL;DR The short version

- Software's electricity has a carbon cost that varies with where and when it runs.
- The Green Software Foundation's SCI specification measures carbon per functional unit, such as per user or per request.
- Use less energy, use cleaner energy by moving flexible work, and be honest that the measurements are estimates.

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The Software Carbon Intensity specification

The Green Software Foundation’s SCI specification gives a rate of carbon emitted per functional unit, such as per user, per request or per transaction. It counts the energy the software uses, the carbon intensity of that energy and the hardware’s embodied emissions, so progress can be compared over time.

Three levers

- **Use less energy:** efficient code, right-sized servers, no idle resources.
- **Use cleaner energy:** run flexible work in regions or at times when the grid is cleaner.
- **Use less hardware:** longer life and higher utilisation reduce embodied emissions.

Start measuring

1. Pick a functional unit that fits your product.
2. Gather energy or resource use from your platform.
3. Apply the carbon intensity of the grid you use.
4. Track the rate and look for the largest contributors.

A note on honesty

Measurements are estimates. Say how you calculated them, and avoid claims you cannot support.

> Related credential: Clean Software Telemetry Practitioner. Explore the exam facts and syllabus.

Sources and further reading

1. Green Software Foundation. Software Carbon Intensity (SCI) Specification. sci.greensoftware.foundation.

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