Shaping the hidden environmental impacts of software

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Abstract

Software engineers are used to working on large-scale systems, both in size and distribution among users. The scalability of these software systems builds on multiple abstraction levels, which hide the underlying infrastructure under higher-level management tools. However, these abstractions levels also hide the hardware footprint imposed by software, and the related environmental impacts. Furthermore, these impacts are often considered only partially, as resource usage without accounting for their manufacturing, and reported from the perspective of a single category (climate change), while other categories, such as resource depletion, land use, or human toxicity are left out. Unfortunately, the ICT sector heavily relies on precious materials, which scarcity makes their extraction and transformation process highly environmentally impactful. We, therefore, show how adopting a more holistic perspective on hardware resources consumed by software can provide stakeholders with actionable insights, to adopt effective actions to reduce its environmental footprint.

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