

Chapter 6

Green Software

Engineering for Business

Project Management

Sustainability:

Focused Project Management


Methodologies

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ABSTRACT

As digital transition speeds up, the effect on managing software engineering has been attained by critical recognition. While green software engineering boosts the energy-efficient algorithm and system architectures, sustainability keeps insufficient from project management setup. This current chapter demonstrates that leading methodologies such as Agile, DevOps, and PM² can be redefined and designed to integrate environmental sustainability into software projects. A proposed Green Project Management (GPM) conceptual design helps to redesign project achievement to compromise environmental performance with conventional goals of time, cost and scope. The Green Project Lead (GPL), a new role committed to sustainability within

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project groups. By aligning sustainability with deeply rooted project management tools and metrics, the chapter focuses on a systemic transition in how software projects are planned, accomplished and assessed. It locates project management not just way for innovation and efficiency, but as a crucial mechanism for advancing environmental stewardship in the digital age.

INTRODUCTION: THE DIGITAL CARBON FOOTPRINT

The Myth of “Clean” Software

The digital province is often conceptualized as a clean and immaterial vibrant, symbolized by the “cloud” and the invisibility of software processes. Behind every Google search, YouTube video, blockchain transaction, and app upgradation lies a continuation of hardware and infrastructure that consumes substantial energy. Globally, the ICT sector, consisting data centers, network infrastructure, end-user devices, and digital services which accounts for approximately 3–4% of total greenhouse gas (GHG) emissions, a portion comparable to that of the aviation industry (Jones, 2018; Belkhir & Elmeligi, 2018; Andrae & Edler, 2015). Additionally, this trace is assured to develop as demand for digital services escalates, particularly with trends such as artificial intelligence, cryptocurrency mining, and the Internet of Things (IoT) (Hintemann & Hinterholzer, 2020).

Despite the carbon impact of software is routinely underestimated because of the nature of code. This tends to a problematic assumption that software is environmentally approachable, so long as hardware becomes more energy-efficient over time—a view that observes the important effect of software design, development, and deployment options on energy consumption. For instance, outdated coding, dilated codebases, and unnecessary computations can dramatically increase CPU cycles and thus energy use. The “myth of clean software” must be dismantled to promote a culture of carbon-aware digital development.

As the world becomes more digital and software takes center stage in industries, governments, and our daily lives, there's a growing concern about the environmental impact of software development and IT operations. Green software engineering is stepping up to address this by focusing on energy-efficient algorithms, sustainable architectures, and eco-friendly development practices. However, there's one area that hasn't been explored enough: how green goals fit into project management methods. Today, software project management is mostly guided by methodologies like Agile, DevOps, and PM². These are all about speed, teamwork, iteration, and optimizing delivery. But they often overlook sustainability principles. This means

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