

The Role of Site Reliability Engineering in Sustainable Development

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ABSTRACT From the standpoint of the organisation of software development, the age of sustainable corporate growth is expanding rapidly right now. The objective is to offer a thorough examination of the SRE approach's properties and show how it organises continuous software development. By applying these SRE principles, a company may easily adjust to changing business needs while maintaining a climate conducive to long-term success. SRE focuses more on the production environment and code that is ready for deployment. This development is largely made possible by a cultural shift in which teams are urged to be functionally diverse so they may take into account the whole lifetime of an activity rather than just one particular component..

KEYWORDS Sustainable Development; Software development

I. INTRODUCTION

The Software development has been under various changes in the last decades. Software engineering field has had impacts from new programming languages, software architectures, developing methods, and technologies. Thus, these have created a pressure to change a culture and habits to aim for more quality orientated working ways in software engineering [1] [2]. Digital transformation has led to the situation that software and technologies are present in many business operations. [3]- [8] states that increasing competition and a rapidly changing environment have led to businesses searching for solutions from non-traditional and more flexible ways in software development [9]. This has also increased a need for updating software constantly, taking account of security aspects from different businesses, and managing version control between releases. For example, adding user centric and design thinking considerations to software engineering skill space [2] [10] [11].

Agile software development is how businesses have responded to the continuously changing environment. One strategy for adapting to shifting client needs and increasing release frequency without lowering customer happiness is agile development. Agile software development and SRE have joined more conventional software development practices like the waterfall technique as a result of digitalization. SRE may be viewed as an enhanced form of DevOps that incorporates Agile methodologies and focuses on operational elements [12]- [14].

II. SUSTAINABILITY ASPECT OF SRE

Numerous guises of reliability exist [15]. The architecture of the system, the connections and trust built therein, the

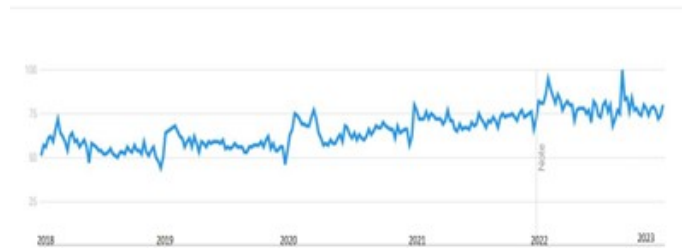


FIGURE 1: “SRE” term search trends over the years from 2018-2023

daily cultivation of blameless and learning cultures, and the limitless curiosity that underlies all human endeavors all contribute to consistently reliable performance. Not just dependability but also long-term reliability maintenance is desired [16] [17]. And a very excellent approach to describe sustainability is dependability over time. It has a lot of potential in the future, considering the influence of Covid as well, and is seen to be the missing element in the SRE function [21]- [22].

Sustainability in the environment, often known as "the effect on the planet of our collective Technical and Operational decisions." It especially has to deal with issues like your carbon emissions, the power sources for your gear, resource usage, and the waste your technological decisions produce [23]. This speaks to a system's stability throughout time. Ephemeral drives, virtual machines, and objects that may simply be discarded in a cloud with almost endless resources are all part of our everyday lives. And although that's fantastic and helpful for our employment, we have neglected the long-term and need to take it back into consideration [24]-

[28].

III. SRES SHOULD FOCUS ON ALL 3 AREAS OF SUSTAINABILITY

In fact, it may even be said that sustainability should be the main priority in each of these three domains rather than simply system dependability. The technical and operational components have been balanced, and now it’s time to balance the environmental and long-term implications. Thoughtfully striking a balance is the key [29] [30]. The system that never gets created is the most sustainable. Overcompensating results from swinging too far in one way. Invoking concepts from game theory and economics, you want to identify the Pareto optimal point between these three sectors where each is maximising its own gains while not disproportionately harming the others [31]. As new technologies are developed, dependability shifts, power grids change, and corporate objectives and laws change, this argument will vary over time [32]. Find that balance, then keep it. Building will always be necessary for us to execute our jobs; however, we can construct with purpose and with the three pillars of sustainability in mind.

- 1st Area: Create carbon-efficient apps by reducing the amount of carbon released per unit of effort.
- 2nd Area: Create energy-efficient programmes; if you’ve ever written code for a mobile device, you presumably already know how your work affects battery life. In order to decrease energy consumption, sustainable software engineering assumes responsibility for the electricity it uses [33].
- 3rd Area: Utilize your computers and servers to the fullest extent possible. Make the most of what you currently have and reduce the amount of cycles and resources that are squandered.

IV. FUTURE SCOPE OF SRE IN SUSTAINABILITY

Scope	Sustainable Software Development	SRE
Quality of software	Appropriate tests ensure that software works as it should	Automatization, information sharing
Slow development pace	With maintainable software development speed doesn’t decrease during time and faster iterations are possible	Increased number of releases with agile working and sharing the information between operations and developing team
High costs	There is more time spent on actual development than solving problems of old solution	Makes it possible to automate tests and deployments, automated created reviews before releases

V. CONCLUSION

SRE and sustainable software development have strong ties to one another. Both ideas will seek to improve software quality and alter working practises in order to do so. The enablers aid in writing high-quality code and in preserving the sustainability of the software, which is necessary for

sustainable software development. Additionally, they enable automated testing, which are essential for producing long-lasting software

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