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Advancing Healthcare Sustainability: Embracing MACH Architecture for Health IT System Transformation

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Abstract. The emergence of new collaborative systems, coupled with uncontrolled data accumulation in traditional systems, poses sustainability challenges. This poster advocates the adoption of the MACH architecture as a potential framework to enhance sustainability and credibility within healthcare systems by offering robust system designs and management controls.

Keywords. Sustainability, MACH, healthcare systems, sustainable healthcare.

1. Introduction

Healthcare systems are increasingly utilising innovations in computational technologies to enhance care delivery and care management, however, are often challenged by sustainability demands. Traditional software development principles often compromised scalability and sustainability aspects of system operations [1]. Recently, new software architecture paradigms have emerged to rectify these oversights by integrating socio-ecological and technical considerations into software design principles, striking a balance between sustainability, scalability, and dependability aspects [2] [3] (Figure 1). This poster examines the potential adoption of the MACH (M: **M**icroservices, **A**: Application Programming Interface-API, **C**: Cloud Computing, **H**: Headless) architecture for healthcare computing, to accommodate evolving system needs [4].

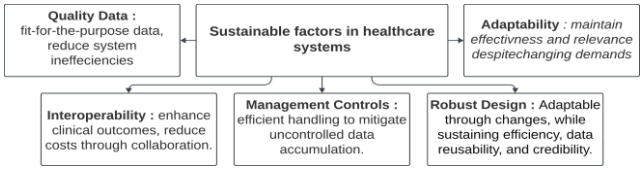

Figure 1. Factors driving sustainable healthcare systems.

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2. The Sustainable Impact of MACH

The MACH architecture is an innovative and adaptable approach, promoting responsible resource consumption, ultimately reducing carbon footprint [5]. **M**icroservices architecture effectively decreases operational expenses, energy usage, and performance decline. By employing independent services to execute tasks, it disperses workloads across operational workflows. This optimises processing power and memory usage by assigning each task to a dedicated service. **A**PIs serve as conduits for exchanging data between services, fostering accessibility and collaboration among external systems. They support economic sustainability and reusability and prevents redundant assets creation. **C**loud-native environments reduce localised hardware dependency by utilising resources virtually, reducing electronic waste and infrastructure demands. **H**eadless architecture decouples the front-end system from the back-end system, promoting adaptability, increasing the potential for patient-centred, agile systems. Figure 2 illustrates an abstract representation of a MACH adoption for healthcare computing architecture.

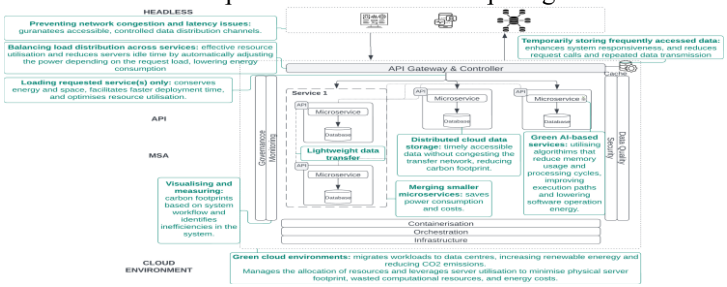

Figure 2. Sustainable characteristics of MACH architecture

3. Conclusions

Healthcare IT is challenged by collaborative systems that include uncontrolled data accumulation, which can be mitigated by robust system designs and management controls. Given the substantial volumes of data involved, along with the focus on safety, confidentiality, scalability, and interoperability, integrating MACH could infuse sustainability features, and help shape the next generation healthcare systems. It has the potential to manage complex data flows and alleviating bottlenecks while responding to evolving societal and technical demands. Planned future work includes, testing the architecture units through sequential pilot studies.

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