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Operating Systems for Serverless and Edge Computing: A Shift Towards Lightweight and Specialized OS Designs

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Abstract: *The advent of serverless computing and edge computing paradigms has caused a major shift in the challenges organizations face in operating systems (OS) design. Existing operating systems (OS), monolithic Linux and Windows, are overkill that is slow and resource-heavy in the context of distributed, cloud, and edge environments. This article analyzes lightweight OS to address the problem. We specifically examine the architecture and implementation of unikernels, library OSs, and micro-OS designs (i.e. MirageOS, IncludeOS, and OSv). We also highlight the serverless computing and edge attributes of these OSs, namely the deployment speed, low latency, and small size. Finally, we look at the future of OS design characterized by security, scalability, and levels of automation*

Keywords: lightweight virtualization, IoT, embedded systems, FaaS, secure boot, fast startup, latency-sensitive applications, cloud-native workloads

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