National Institute of Technology Rourkela

Defence Seminar

Seminar Title	: Performance Enhancement of Serverless System
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Venue	: CS208 (Convention Hall), CSE Department
Date and Time	: 24 Sep 2024 (3.30PM)
Abstract	: Serverless computing has emerged as a powerful deployment model based on the Function-as-a-Service (FaaS) paradigm, where applications are orchestrated through independent functions. The function orchestration within an application can be represented through a serverless workflow, which defines the overall execution plan of the application. Several challenges and research gaps have been identified in the serverless computing framework. The presented research focused on cost and performance models, cold start problems, response latency issues, etc. The problem is to design and develop a model that can be used to enhance the performance parameter in terms of response time in a serverless execution environment. The first contribution proposes an efficient workflow-based analytical model that can estimate the end-to-end response time and cost of the serverless execution plan. The proposed model can handle complex structures like loops, cycles, self-loops, and parallel sub-structures in serverless workflows. Additionally, it proposes a heuristic optimization algorithm to identify the optimal resource configuration to achieve the optimal response time under a given budget constraint. The second contribution proposes an integrated model, called the adaptive container provisioning model (ACPM), to reduce cold-start latency through the runtime provisioning of containers. ACPM promises to reduce the frequency of cold starts and delays due to cold-start, improving the overall performance of serverless execution in terms of response time. The third contribution focuses on state management, a critical aspect of serverless computing. It proposes an event-driven state management strategy that aligns state changes with triggering events, ensuring a scalable and natural approach to managing state in serverless architectures. This approach enhances reliability and efficiency, addressing the challenges of maintaining a state in serverless environments' transient and dynamic nature.