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# Serverless Computing and Future of Cloud Architecture

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***Abstract: Serverless computing is rapidly emerging as a transformative paradigm within cloud computing, fundamentally changing how applicationsaredevelopedanddeployed. Byabstractingawayserverprovisioning, maintenance,andscaling responsibilities, itallows developers to concentrate solely on writing and deploying code. In this model, cloud providers dynamically manage infrastructure resources and execute functions in response to events, charging only for the actual compute time consumed. This pay-as-you-go approachsignificantlyreducesoperationaloverhead, improvescostefficiency, and enablesseamlessscalability—fromhandlingafew requests to processing millions—without manual intervention. As a result, organizations can accelerate development cycles, reduce time-to-market, and allocate more resources toward innovation rather than infrastructure management.***

***Keywords: ServerlessComputing,CloudComputing,Serverlessarchitecture,Pay-as-you gomodel,Scalability,Developerproductivity, Resource Utilization, Debugging challenges, Vendor lock-in, Innovation in cloud applications, Technological advancements, Future trends in computing.***

## I. INTRODUCTION

Over the past ten years, cloud computing has experienced a dramatic shift from conventional infrastructure models to increasingly abstracted service paradigms. Serverless architecture, a groundbreaking strategy that radicallyreimagines howappsare created,implemented,andmaintainedincloudsettings,isatthevanguardof this change. by using the pay-as-you-go model and doing away with the requirement for explicit server provisioning and management. This paradigm change has opened the door for operational effectiveness and development agility in addition to improving scalability and developer productivity.

Serverless architecture represents a computing approach based on event-driven execution, wherein cloud providers dynamically assign and manage infrastructure resources. To ensure they only pay for the exact resourcesusedduringexecution, developerssimplydeploycodeasdiscretefunctionsthatruninresponseto particular events.

Compared to earlier cloud paradigms that necessitated meticulous capacity planning and ongoing infrastructure maintenance, even during idle times, this architecture represents a substantial shift.Consequently,serverlesscomputinghas becomeadrivingforce behindshorteningtime-to-marketand speeding up development cycles for cloud services.

## II. LITERATURE REVIEW

TheAWScloudproviderwhitepaper,ServerlessArchitectureswithAWSLambda:OverviewandBestPractices (Amazon Web Services, 2018), describes how to construct serverless applications using Lambda. It discusses typical use scenarios (such as chatbots, IoT pipelines, and mobile/web backends) and describes how Lambda's fully managed, event-driven paradigm allows developers to concentrate on code whileAWS takes care of infrastructureandscaling. Thestudyhighlightshow" goingserverless "cansignificantlyacceleratedevelopment and lower operating costs.An influential industry-academic report from UC Berkeley that offers a historical and forward-thinking perspective on serverless computing is Cloud Programming Simplified:ABerkeley View on Serverless Computing (Eric Jonas et al., 2019). Similar to switching from assembly to high-level languages, it contends that serverless computing "handles virtually all the system administration" for cloud developers. The authors examine state-of-the-art serverless applications, list major issues (such as data access and scaling constraints),andforecastthat serverlesswould"growtodominatethefutureofcloudcomputing"iftheseissues are resolved.

## III. METHODOLOGY

The methodology used in this seminar is grounded in an analytical review of serverless computing concepts discussed in the selected journal paper. The study focuses on examining the architectural design, execution mechanisms, and performance attributes of serverless platforms.

It also includes a comparison between serverless computing and traditional cloud service models to highlight their functional and operational differences.The analysis covers core components of serverless architecture, including Function as a Service (FaaS),eventtriggers,managedcloudservices,andautomaticscalingfeatures.Majorserverlessplatformssuch asAWS Lambda,Azure Functions, and Google Cloud Functions are studied to understand their approaches to functionexecution,resourcemanagement,andpricingmodels.Theevent-drivenmodelofserverlesscomputing is explored by analyzing how functions are activated through HTTP requests, database updates, message queues, and other cloud-based events.

## IV. FUTURE SCOPE

serverlesscomputingisexpectedtoplayasignificantroleintheevolutionofcloudarchitecturebyredefining how applications are developed, deployed, and managed.As organizations increasingly move toward digital transformation, the demand for scalable, flexible, and cost-efficient cloud solutions continues to grow.

Serverless computing meets these requirements by abstracting infrastructure management and enabling developersto focusexclusivelyonapplicationlogic.Thisshiftreducesoperationalcomplexity,minimizes deployment time, and improves overall system efficiency.

Serverless computing is also expected to drive innovation through its integration with emerging technologies suchasartificialintelligence,machinelearning,InternetofThings(IoT),andedgecomputing.Theevent-driven execution model enables real-time data processing and intelligent decision-making, which are critical for next- generation applications. By executing functions closer to data sources through edge computing, serverless architectures can further reduce latency and improve performance in time-sensitive applications.

## V. CONCLUSION

The analysis demonstrates that serverless computing significantly reduces infrastructure management responsibilities by abstracting server provisioning, scaling, and maintenance. Through its event-drivenexecutionmodeland Functionasa Service(FaaS)framework,itenablesautomaticscalability,efficientresource utilization, and a cost-effective pay-as-you-go pricing model. These characteristics make serverless computing highly suitable for modern cloud-native, microservices-based, and event-driven applications .The report also compared serverless computing with traditional cloud models such as IaaS and PaaS. While traditional models offer greater control and customization, they require higher operational effort and continuous resource management. Serverless computing, in contrast, minimizes operational overhead and accelerates development cycles, making it ideal for applications with dynamic or unpredictable workloads.

Despite its advantages, certain limitations such as cold start latency, vendor lock-in, debugging complexity, and security concerns remain important considerations. However, ongoing advancements in runtime optimization, open-source frameworks, multi-cloud strategies, and standardization efforts are gradually addressing these challenges.

Overall, the seminar concludes that serverless computing is not merely an alternative cloud model but afoundational component of next-generation cloud architecture. As organizations continue adopting artificial intelligence, IoT, edge computing, and real-time analytics, serverless computing will play a crucial role in enabling scalable, intelligent, cost-efficient, and future-ready cloud solutions

Serverless computing fundamentally changes the cloud service consumption model. Unlike traditional Infrastructure as a Service (IaaS) and Platform as a Service (PaaS), where users are responsible for managing virtual machines, operating systems, scaling policies, and deployment configurations, serverless computingfullyabstractsinfrastructuremanagement. Developersareonlyrequiredto implementbusinesslogicintheform of small, event-driven functions. The cloud provider automatically handles provisioning, scaling, faulttolerance, runtime management, and resource optimization.

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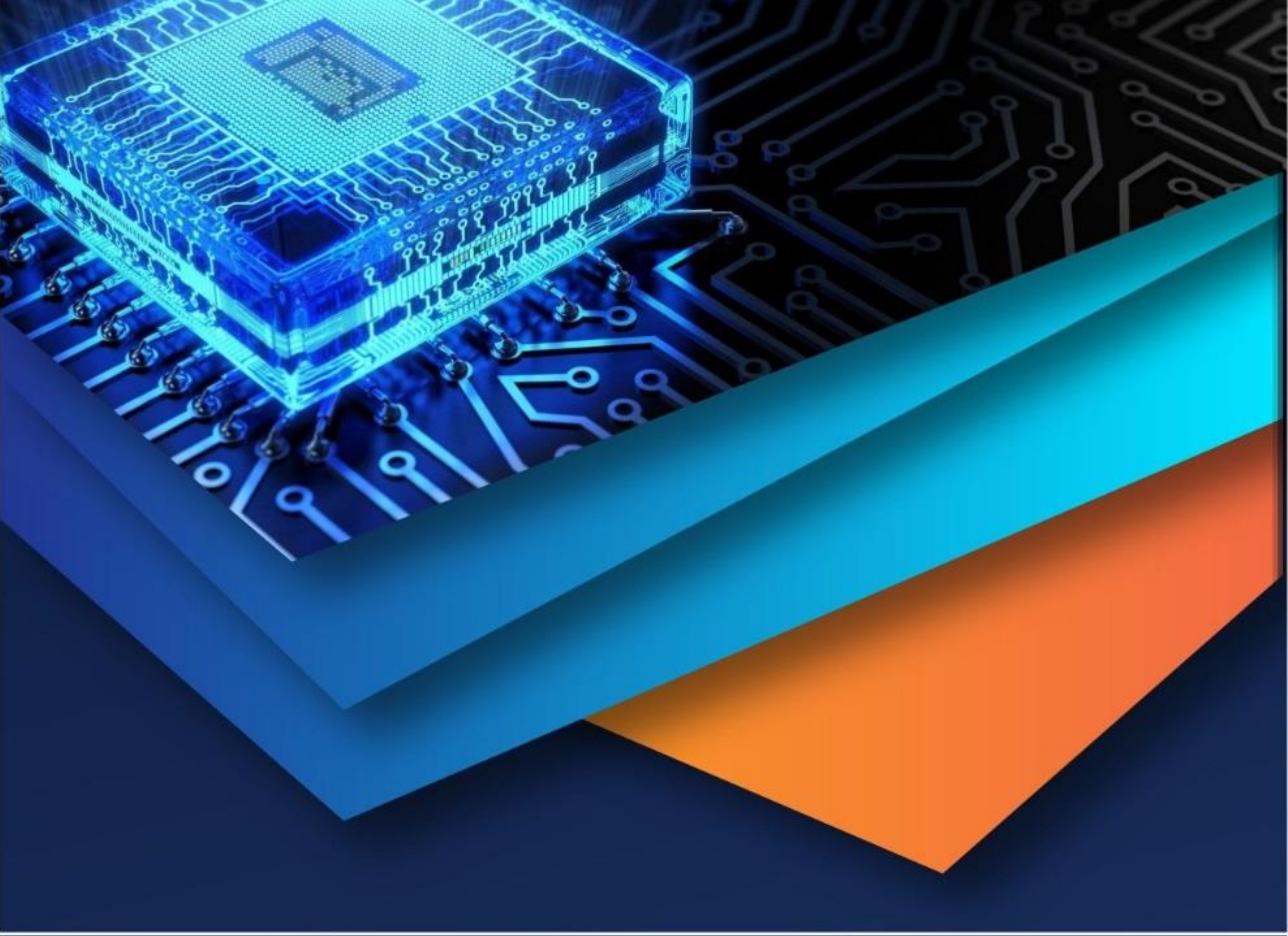


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