Vidyavardhini's College of Engineering & Technology

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Serverless Computing

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Introduction

- Serverless computing, often referred to as Function as a Service (FaaS), is rapidly transforming the way applications are developed, deployed, and scaled in the cloud.
- This paradigm shift in cloud technology has gained immense popularity for its ability to simplify infrastructure management, reduce costs, and allow developers to focus on code without worrying about server provisioning or maintenance.
- In this article, we'll explore the concept of serverless computing, its key principles, benefits, and real-world applications.

What is serverless computing?

- Serverless computing, despite its name, doesn't mean there are no servers involved. Instead, it abstracts the infrastructure layer, allowing developers to execute code in response to events without managing servers directly. Key features of serverless computing include:

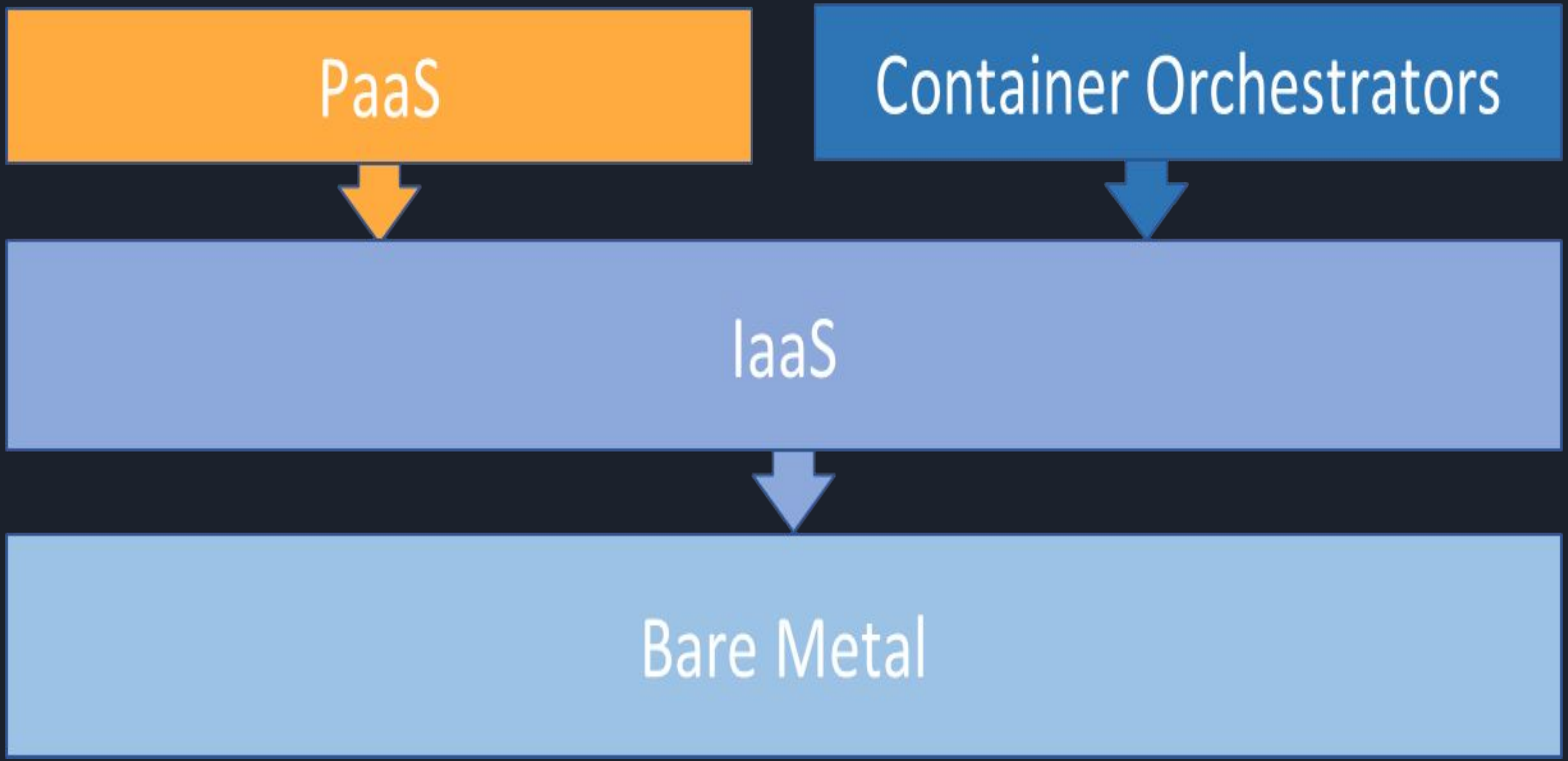
- Event-Driven Execution: Serverless functions are triggered by events, such as HTTP requests, database changes, file uploads, or IoT sensor readings. Functions run only when needed, which minimizes idle time and reduces costs.

- Automatic Scaling: Cloud providers handle the scaling of serverless applications, automatically allocating resources to meet demand. This ensures optimal performance and scalability without manual intervention.

- Pay-Per-Use Billing: With serverless, you're charged only for the actual compute time your functions consume. There's no need to pay for idle server capacity, making it cost-efficient.

- No Server Maintenance: Developers are relieved from server provisioning, patching, and maintenance tasks. Cloud providers handle the underlying infrastructure, allowing developers to focus on writing code.

Evolution of serverless computing



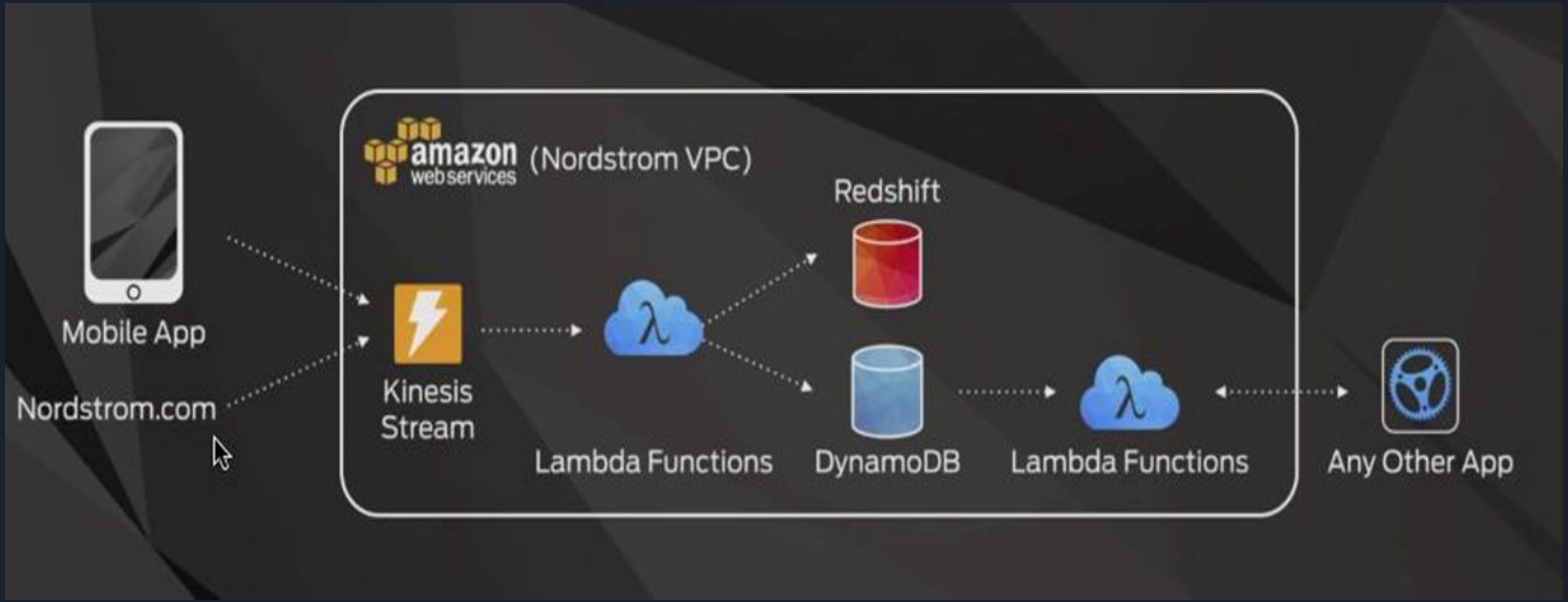
PaaS

Container Orchestrators

IaaS

Bare Metal

Nord-storm recommendation



What is Serverless good for?

Serverless is good for

short-running
stateless
event-driven

- Microservices
- Mobile Backends
- Bots, ML Inferencing
- IoT
- Modest Stream Processing
- Service integration

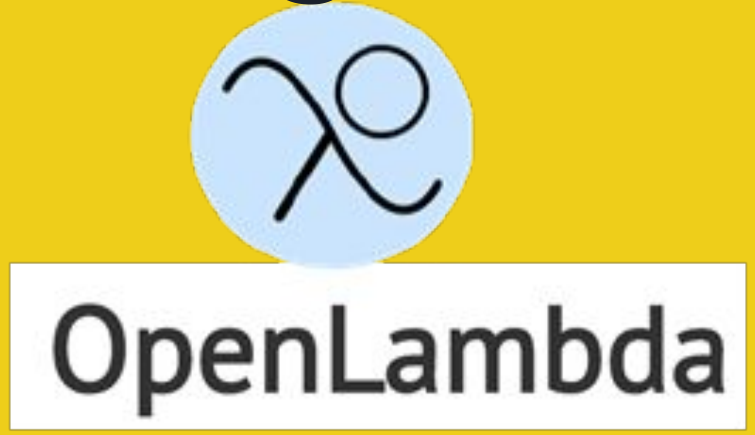
Serverless is not good for

long-running
stateful
number crunching

- Databases
- Deep Learning Training
- Heavy-Duty Stream Analytics
- Numerical Simulation
- Video Streaming

Platforms for serverless computing

AWS
Lambda



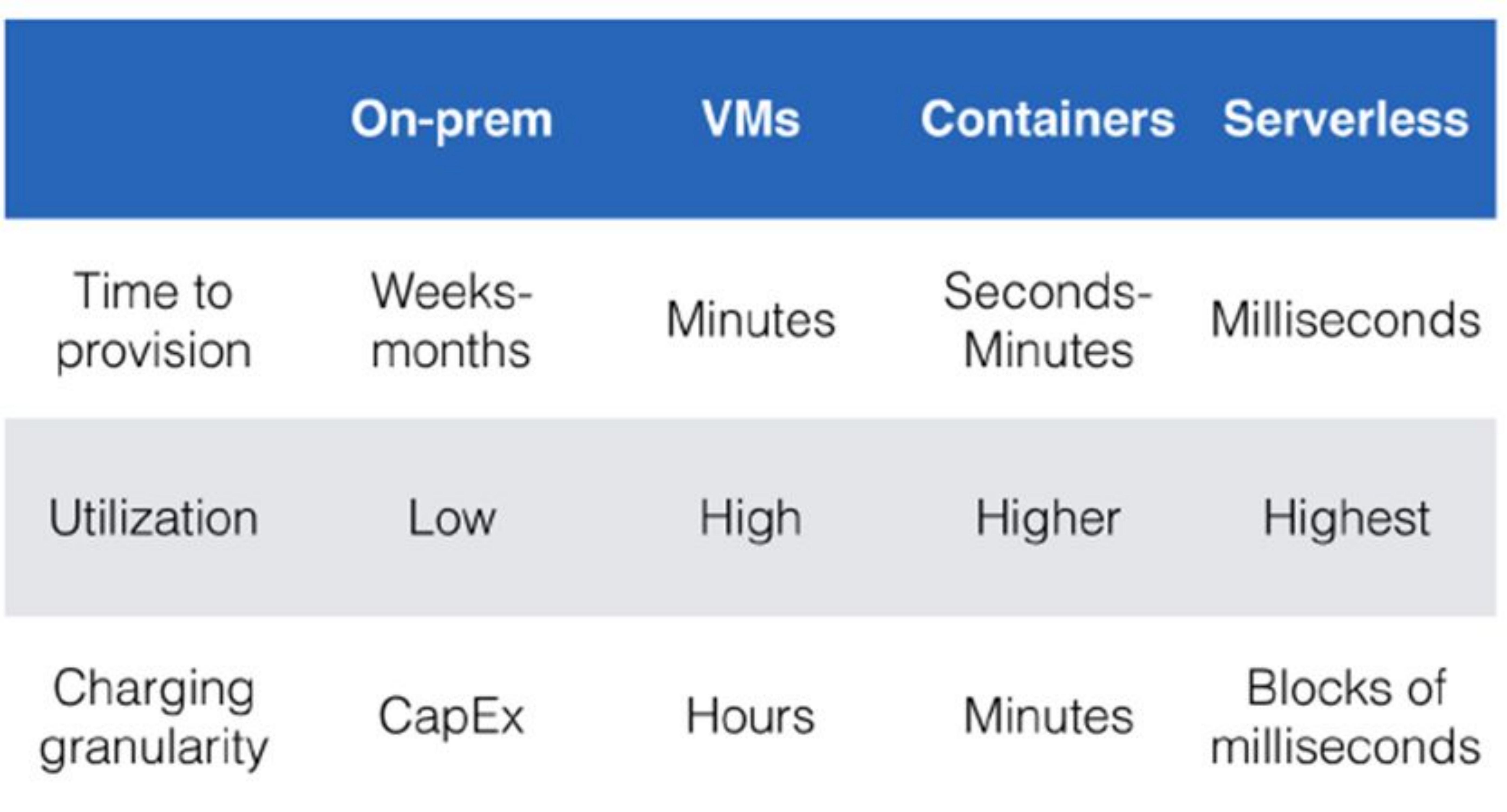
Azure Functions

Kubernetes

IBM Cloud Functions

Red-Hat

Why is it attractive?



	On-prem	VMs	Containers	Serverless
Time to provision	Weeks-months	Minutes	Seconds-Minutes	Milliseconds
Utilization	Low	High	Higher	Highest
Charging granularity	CapEx	Hours	Minutes	Blocks of milliseconds

Benefits of serverless computinng

Serverless computing offers several compelling benefits:

- ➔ Cost-Efficiency: With serverless, you pay only for the compute time you use, eliminating costs associated with idle servers. This cost model is ideal for applications with varying workloads.

- ➔ Scalability: Serverless applications can effortlessly scale to accommodate traffic spikes. Cloud providers automatically manage the infrastructure, ensuring your application is responsive under varying loads.

- ➔ Reduced Development Time: Serverless enables faster development cycles by simplifying deployment and eliminating server management. Developers can focus on writing code and building features.

- ➔ High Availability: Serverless functions are distributed across data centers, ensuring high availability and fault tolerance. This redundancy minimizes downtime and enhances reliability.

- ➔ Event-Driven Architecture: Serverless promotes an event-driven architecture, making it well-suited for applications that respond to real-time events, such as chat applications, IoT devices, or data streaming.

Serverless computing has found applications in various domains:

1. Web and Mobile Applications: Serverless is ideal for building the backends of web and mobile applications. It handles user authentication, data processing, and API endpoints efficiently.

2. IoT and Real-Time Data Processing: IoT devices can trigger serverless functions to process and analyze sensor data in real time, enabling smart home applications, industrial monitoring, and more.

3. Data Processing and ETL: Serverless functions are used for data transformation and ETL (Extract, Transform, Load) processes, making it easier to handle large datasets.

4. Chatbots and Voice Assistants: Serverless is a great choice for chatbots and voice assistants, as it can handle conversational interactions, natural language processing, and backend API calls seamlessly.

5. Image and Video Processing: Functions can be triggered to process and analyze images or videos, making it suitable for media-rich applications, content moderation, and video transcoding.

Conclusion

Serverless computing represents a significant shift in cloud technology, offering a more efficient, cost-effective, and developer-friendly approach to building and deploying applications.

With its event-driven architecture, automatic scaling, and pay-as-you-go pricing model, serverless has the potential to drive innovation in various industries.

As the adoption of serverless continues to grow, developers and businesses alike are poised to reap the benefits of this transformative technology, enabling them to focus on what truly matters: writing code and delivering innovative solutions to the world.