PartnerEquip:Virtual

Augmenting Lambda Function Capabilities with Partner Extensions

Anton Aleksandrov
Pr. Solutions Architect
Serverless, AWS

Agenda

- The problem
- The solution
- Lambda-ready partner extensions
- Technical perspective
- Usecases
- Action items

Stakeholders terminology

This is us

Vendors / Partners

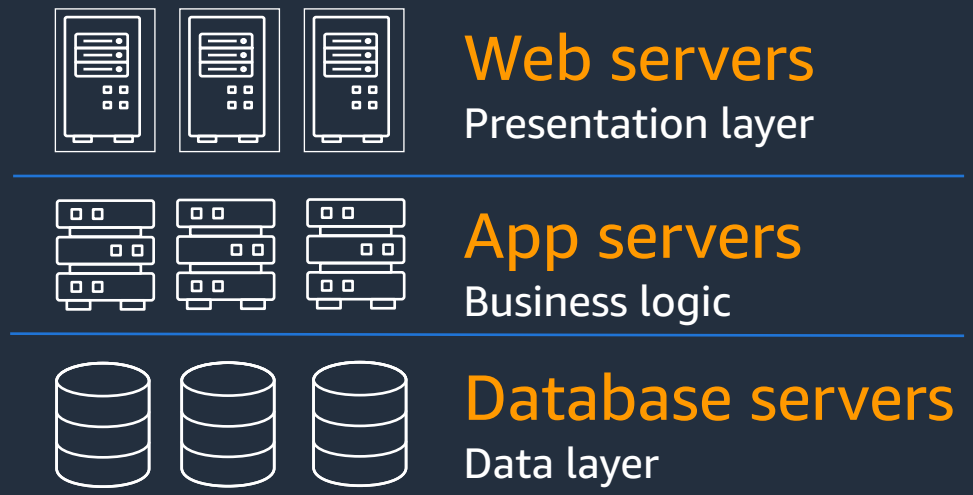
This is you

Tenants

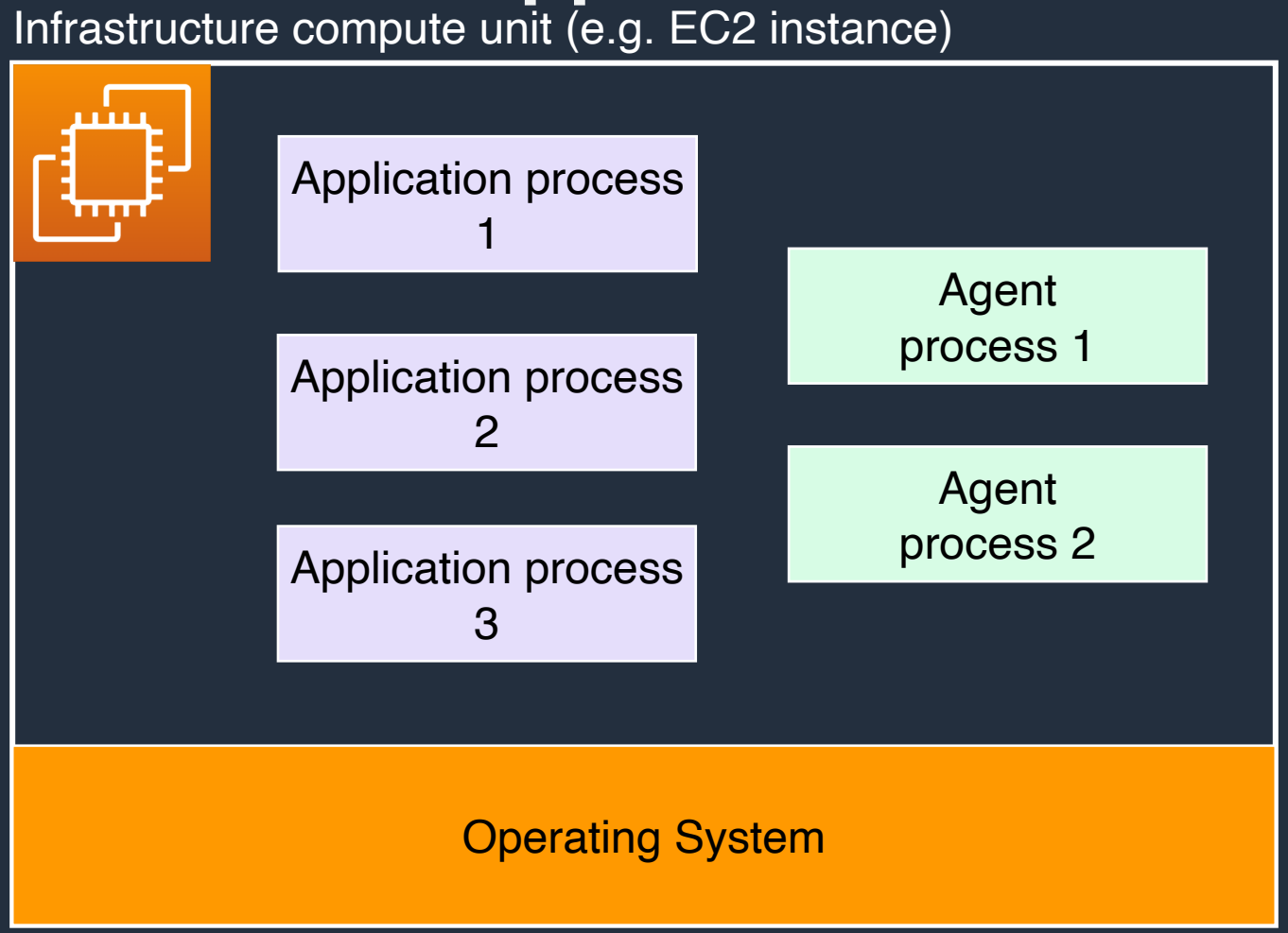
This is our joint customers

Building Modern Cloud Applications

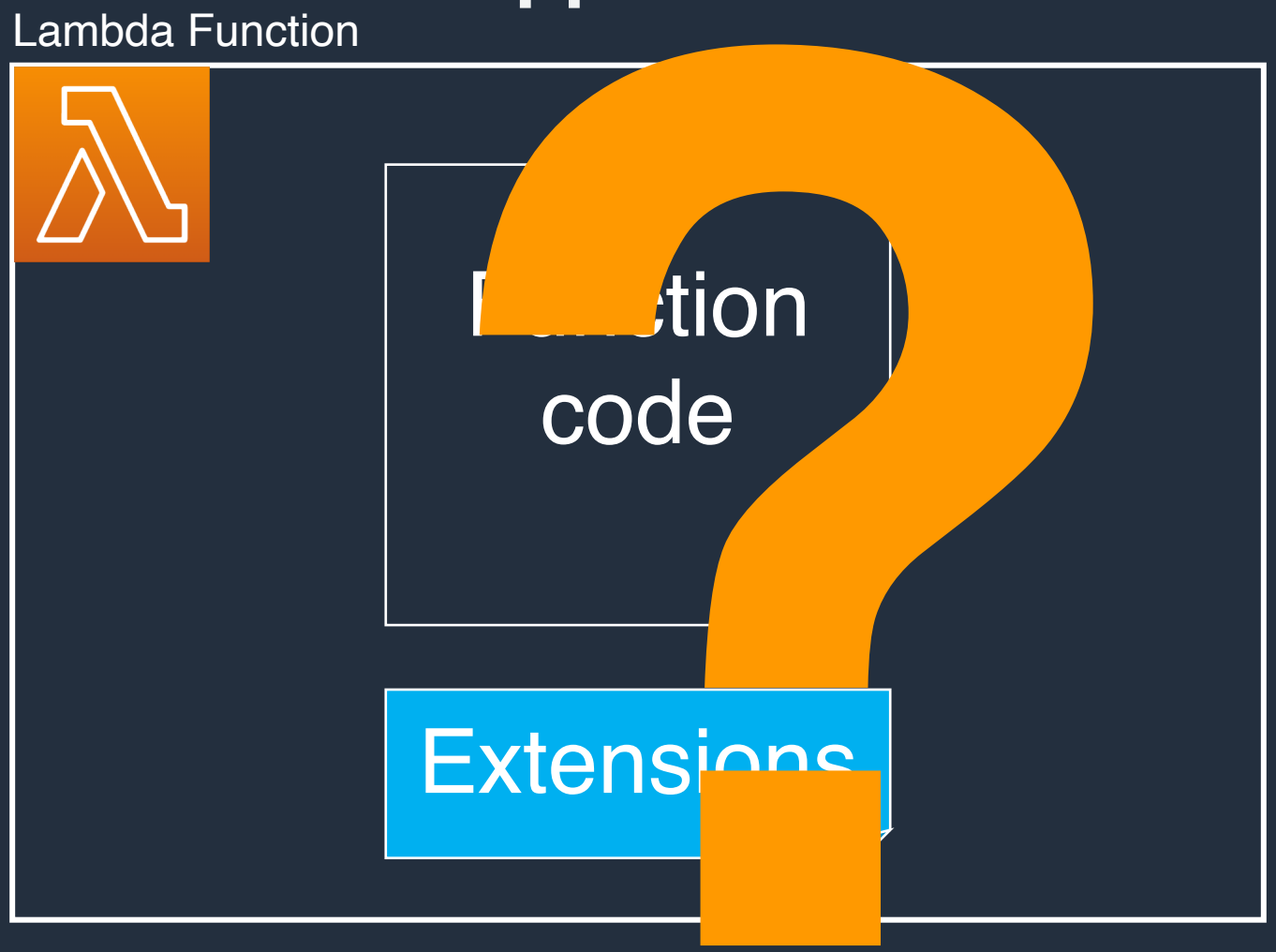
Traditional ⟷ **Serverless**



Building Modern Cloud Applications



Building Modern Cloud Applications

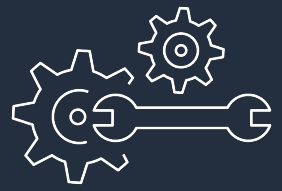


Augmenting Lambda function capabilities with Extensions

Enables long-running background processes, such as agents, proxies, web servers and more

Integrate deeply into the Lambda execution environment sandbox and lifecycle

Augment Lambda functions in an app-agnostic way with zero code changes



Build new and plug-in existing enterprise and vendor tools

Can be implemented in any programming language. Recommendation is binary.

Augmenting Lambda function capabilities with Extensions

Observability

Receive fine-grained telemetry direction from Lambda service

Security

Intercept, audit, and access control for requests/responses

Governance

Introduce governing agents and policies into function runtime

Web applications

A programming model to run traditional web applications on Lambda

Configuration

Decouple dynamic secrets and configurations management from application code

Reliability

Graceful shutdown, resource cleanup, circuit breakers

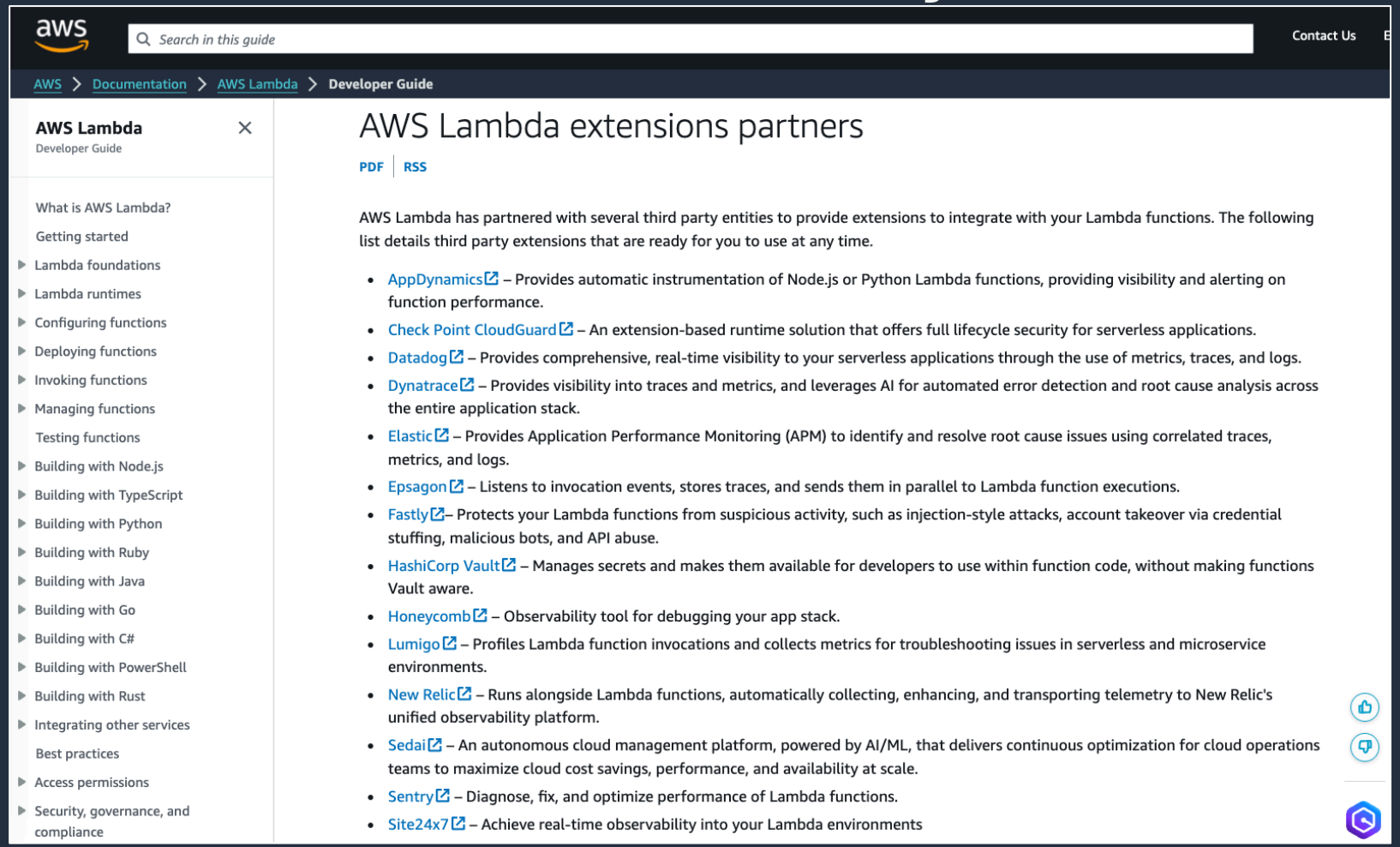
Resiliency

Test system resiliency with runtime-agnostic chaos testing decoupled from application code

Diagnostics

Capture low-level diagnostics information and live-debugging

Extensions available today



aws | Search in this guide | Contact Us

AWS > Documentation > AWS Lambda > Developer Guide

AWS Lambda
Developer Guide

- What is AWS Lambda?
- Getting started
- Lambda foundations
- Lambda runtimes
- Configuring functions
- Deploying functions
- Invoking functions
- Managing functions
- Testing functions
- Building with Node.js
- Building with TypeScript
- Building with Python
- Building with Ruby
- Building with Java
- Building with Go
- Building with C#
- Building with PowerShell
- Building with Rust
- Integrating other services
- Best practices
- Access permissions
- Security, governance, and compliance

AWS Lambda extensions partners

PDF | RSS

AWS Lambda has partnered with several third party entities to provide extensions to integrate with your Lambda functions. The following list details third party extensions that are ready for you to use at any time.

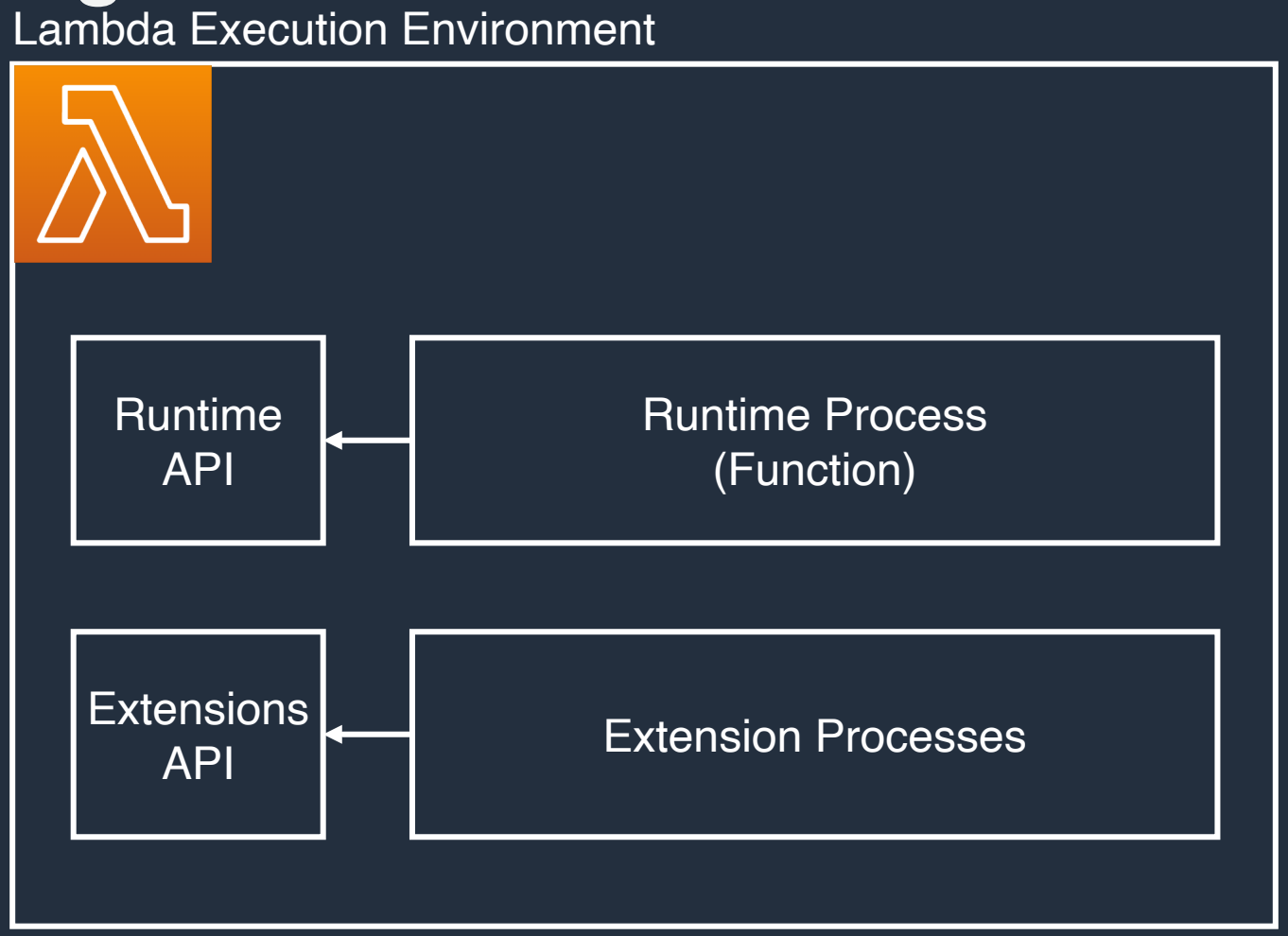
- AppDynamics – Provides automatic instrumentation of Node.js or Python Lambda functions, providing visibility and alerting on function performance.
- Check Point CloudGuard – An extension-based runtime solution that offers full lifecycle security for serverless applications.
- Datadog – Provides comprehensive, real-time visibility to your serverless applications through the use of metrics, traces, and logs.
- Dynatrace – Provides visibility into traces and metrics, and leverages AI for automated error detection and root cause analysis across the entire application stack.
- Elastic – Provides Application Performance Monitoring (APM) to identify and resolve root cause issues using correlated traces, metrics, and logs.
- Epsagon – Listens to invocation events, stores traces, and sends them in parallel to Lambda function executions.
- Fastly – Protects your Lambda functions from suspicious activity, such as injection-style attacks, account takeover via credential stuffing, malicious bots, and API abuse.
- HashiCorp Vault – Manages secrets and makes them available for developers to use within function code, without making functions Vault aware.
- Honeycomb – Observability tool for debugging your app stack.
- Lumigo – Profiles Lambda function invocations and collects metrics for troubleshooting issues in serverless and microservice environments.
- New Relic – Runs alongside Lambda functions, automatically collecting, enhancing, and transporting telemetry to New Relic's unified observability platform.
- Sedai – An autonomous cloud management platform, powered by AI/ML, that delivers continuous optimization for cloud operations teams to maximize cloud cost savings, performance, and availability at scale.
- Sentry – Diagnose, fix, and optimize performance of Lambda functions.
- Site24x7 – Achieve real-time observability into your Lambda environments

AppDynamics · Coralogix · dynatrace · HashiCorp Vault · STACKERY · lumigo · new relic · sumo logic · sedai · honeycomb.io · SALT · DATADOG · fastly · CloudGuard · splunk> · elastic · YOUR LOGO HERE

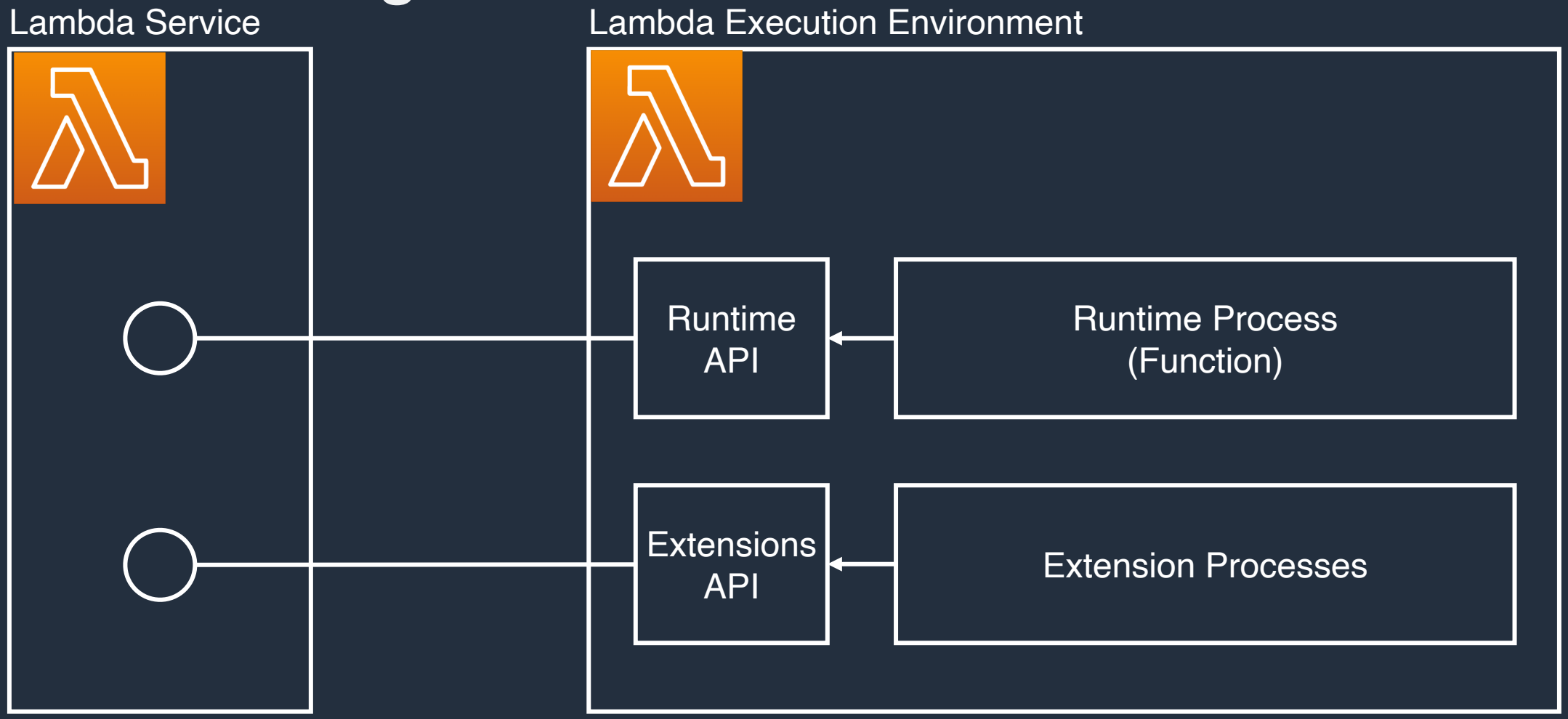
https://aws.amazon.com/lambda/partners

Let’s dive deeper

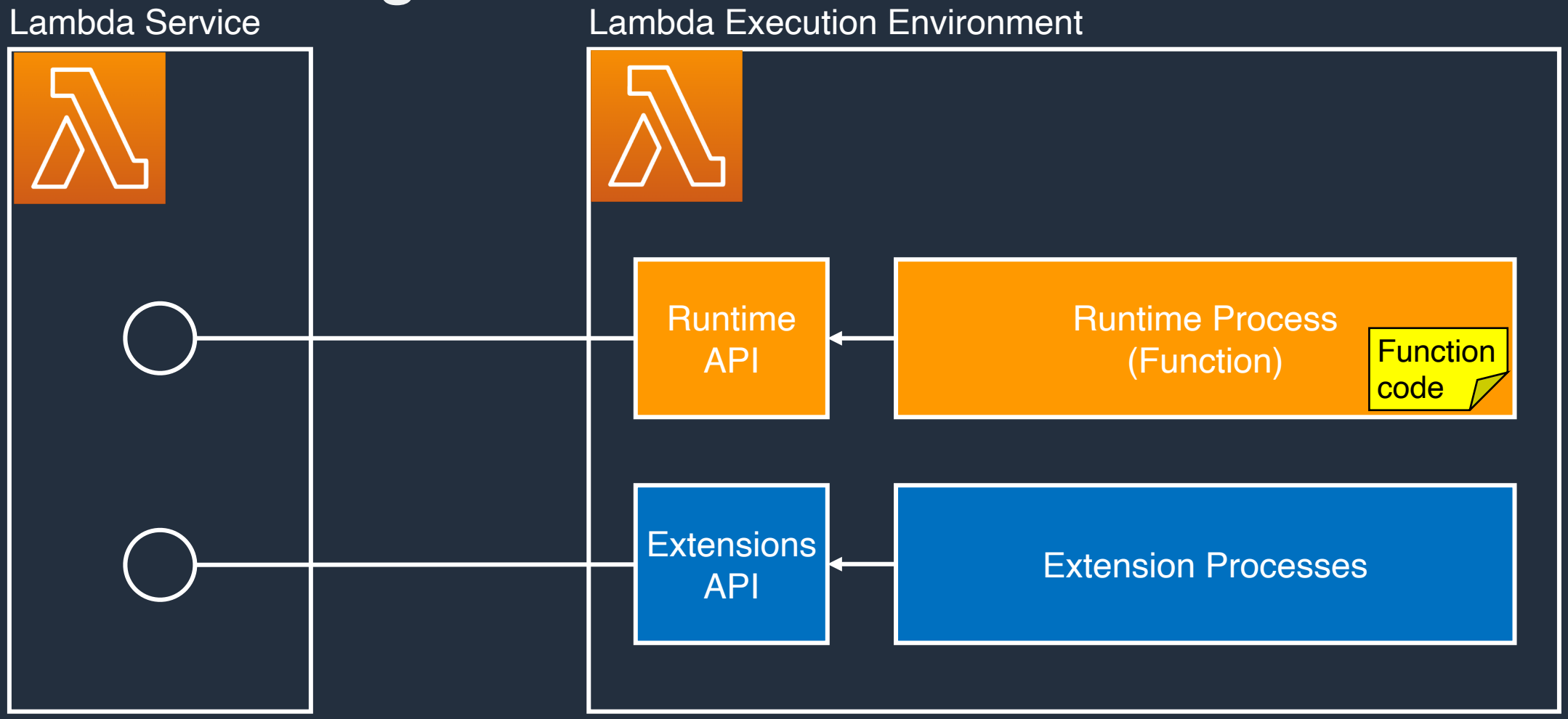
Understanding the Lambda Execution Environment



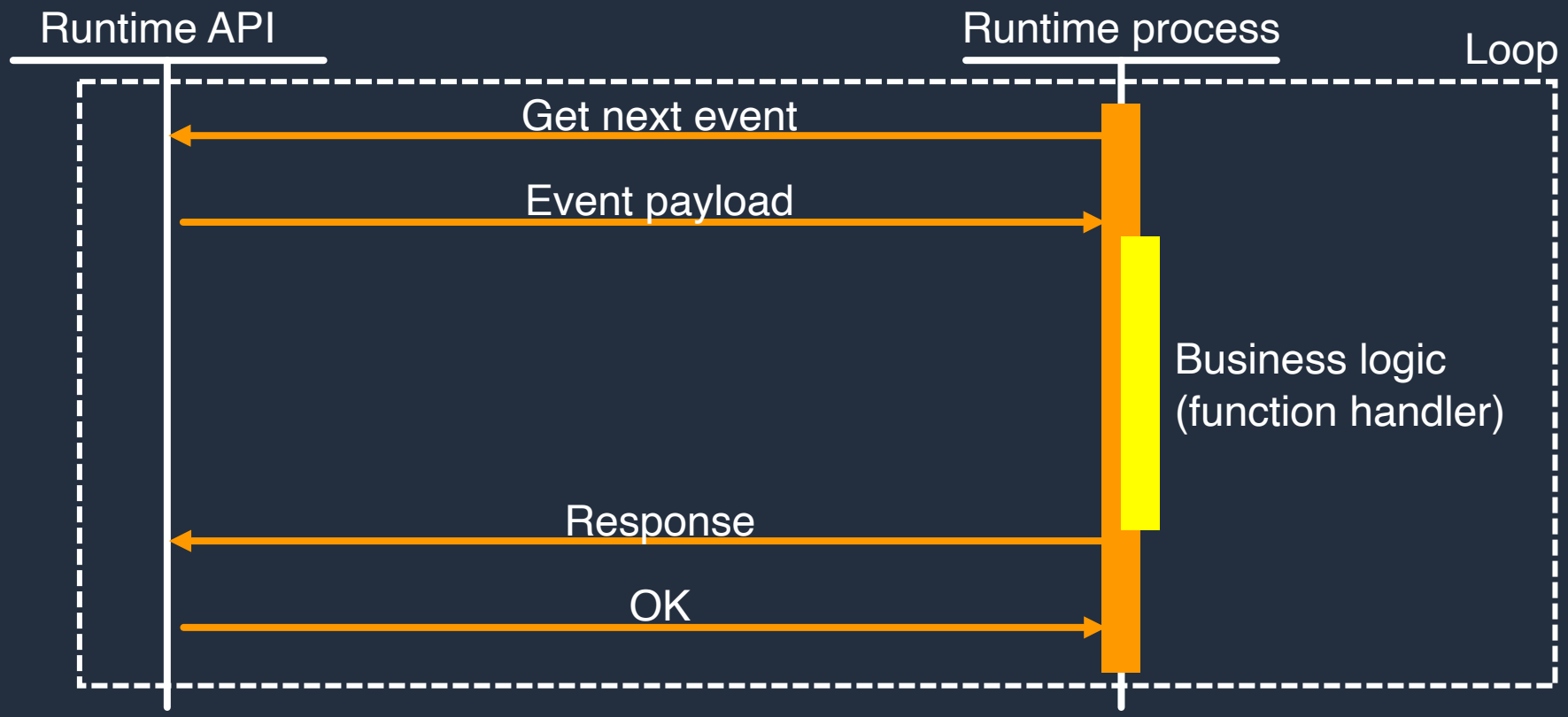
Understanding the Lambda Execution Environment



Understanding the Lambda Execution Environment

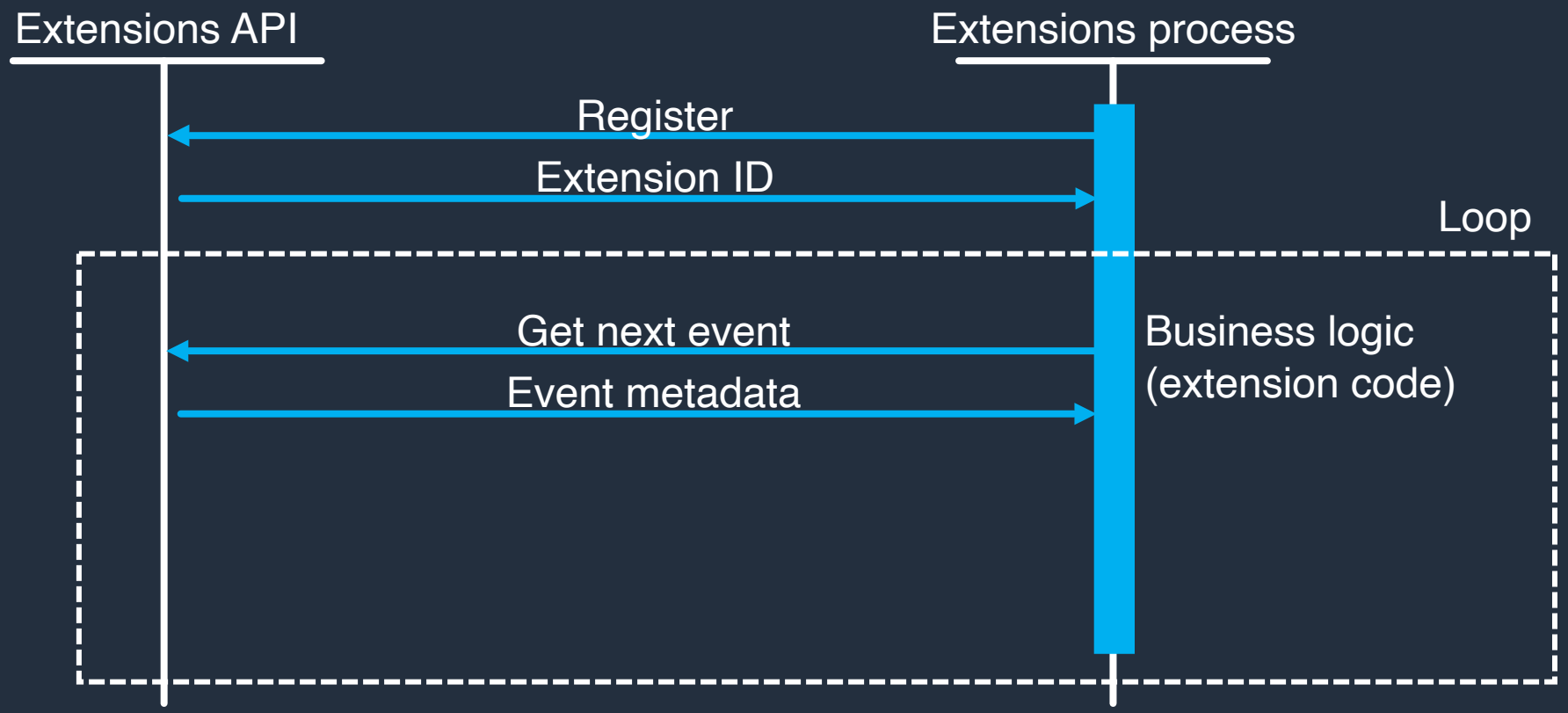


Lambda Runtime API



https://docs.aws.amazon.com/lambda/latest/dg/runtimes-api.html

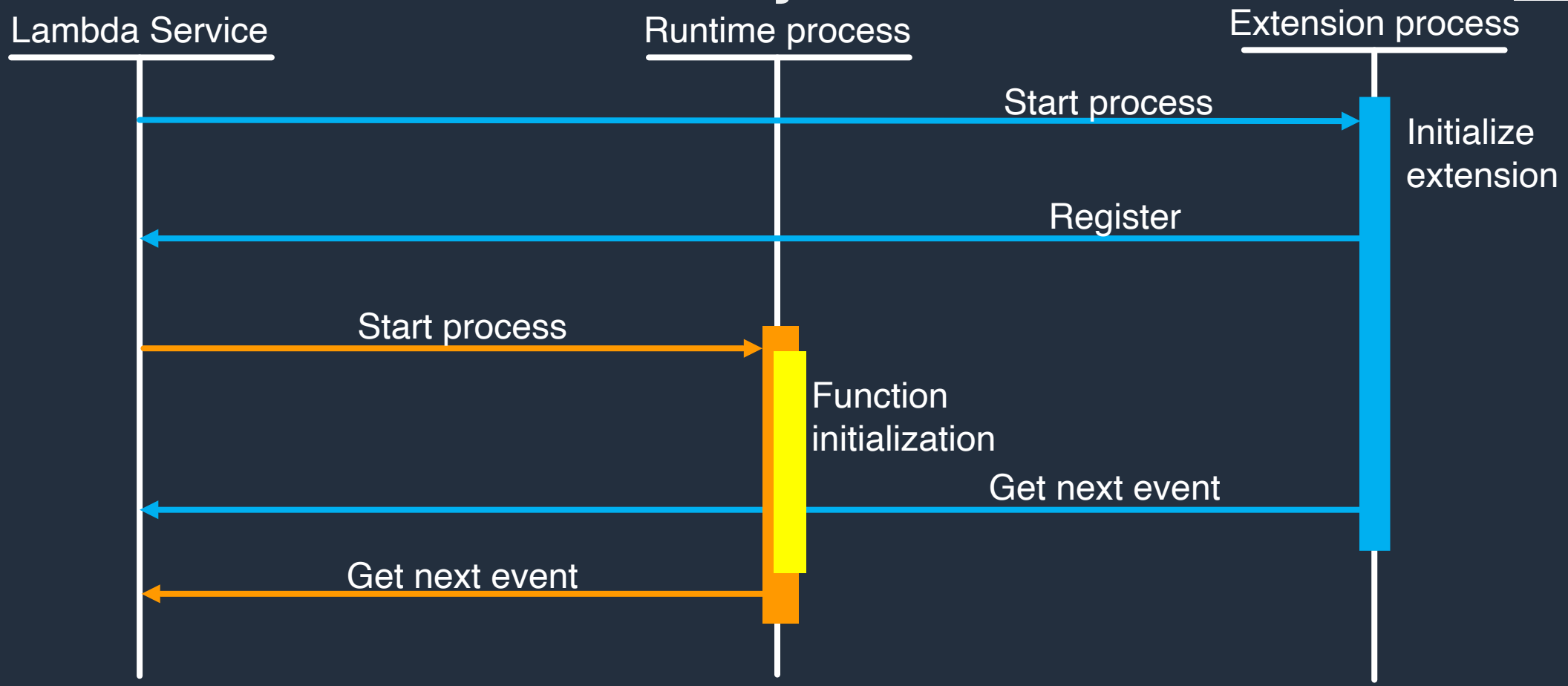
Lambda Extensions API



https://docs.aws.amazon.com/lambda/latest/dg/runtimes-extensions-api.html

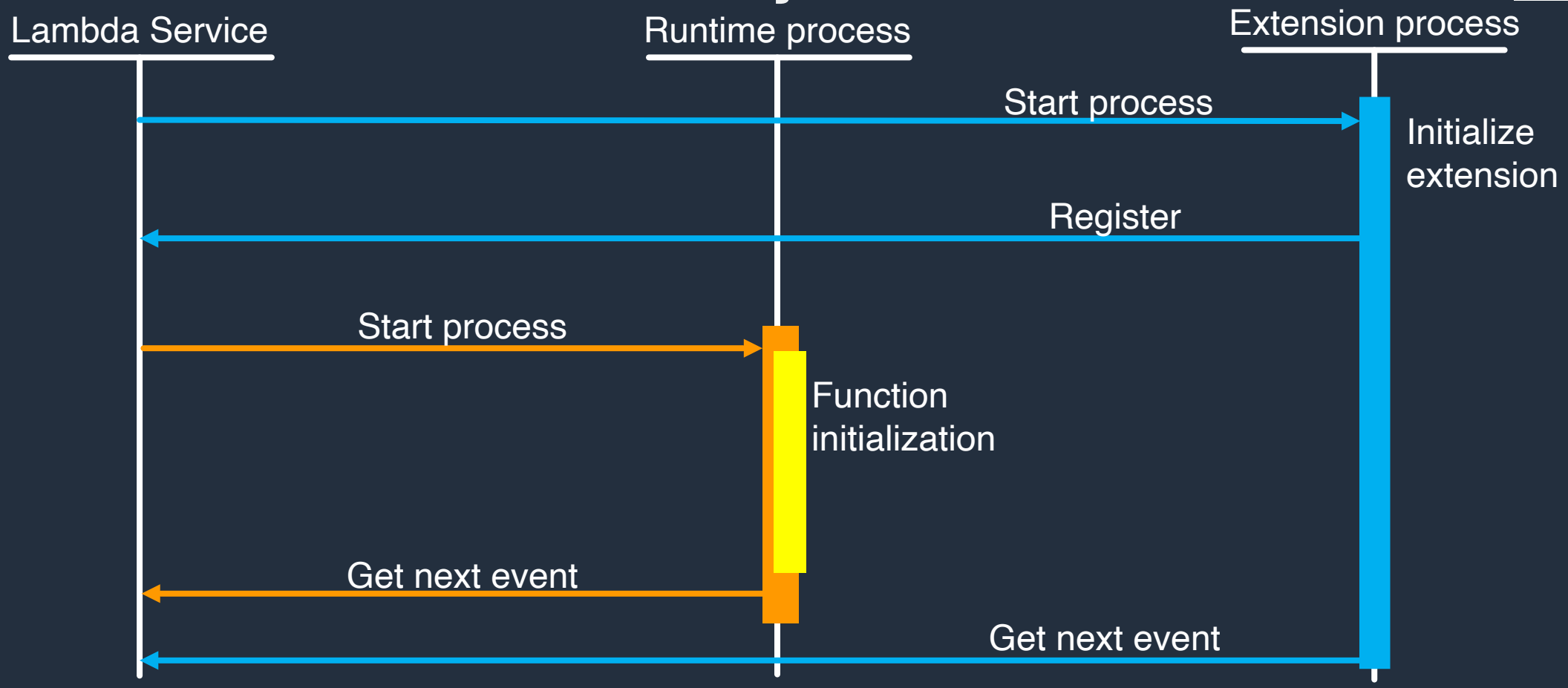
Lambda execution environment lifecycle

Runtime and Extension lifecycle - initialization



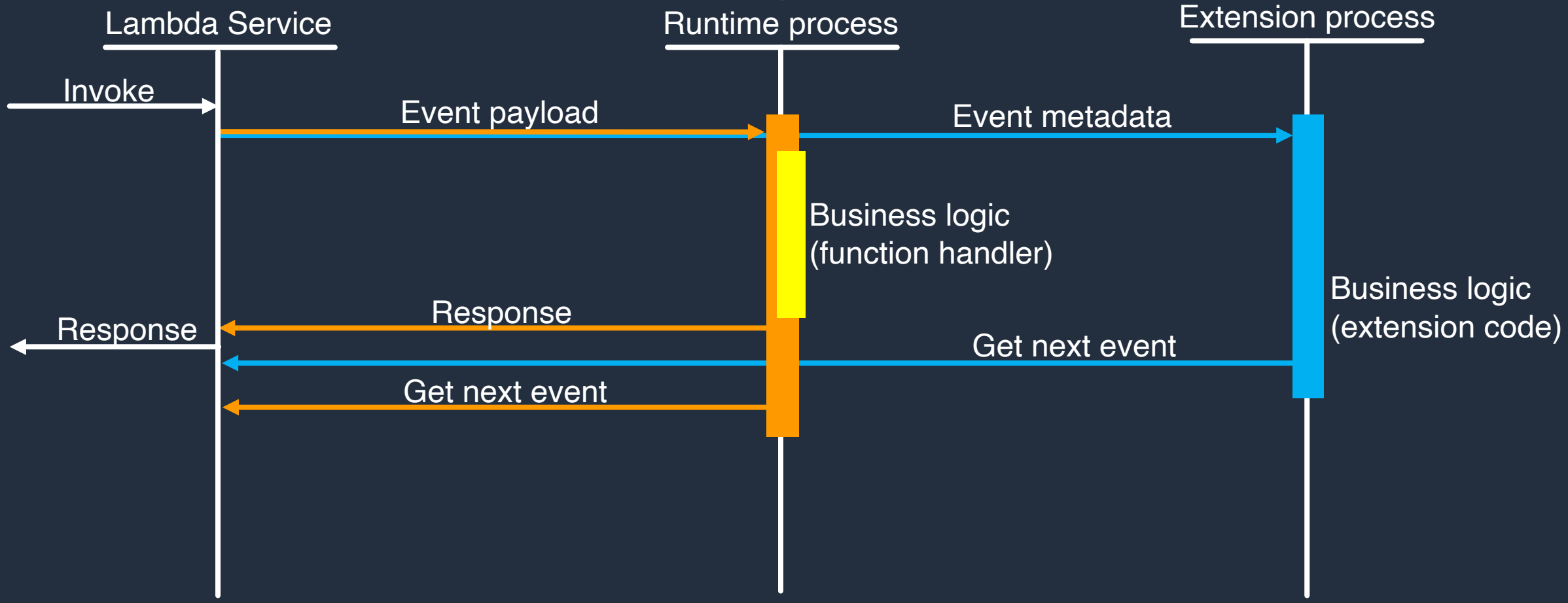
https://docs.aws.amazon.com/lambda/latest/dg/runtimes-extensions-api.html

Runtime and Extension lifecycle - initialization



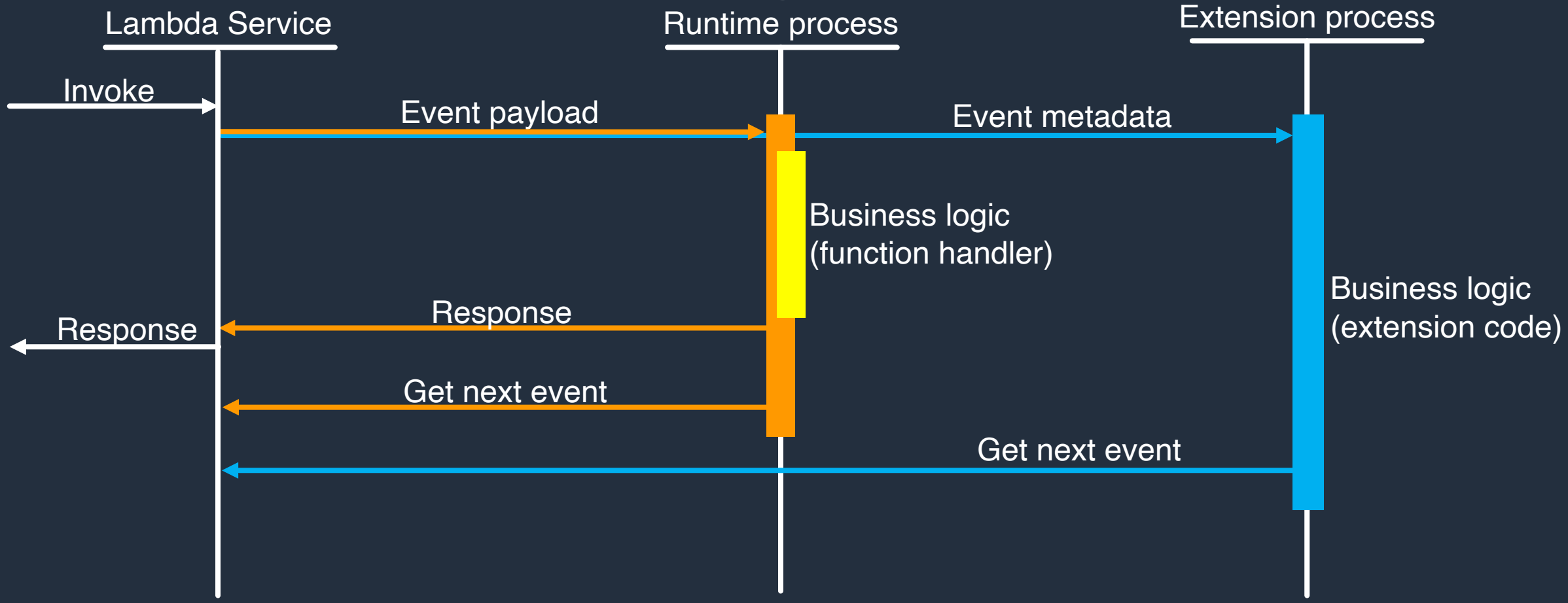
https://docs.aws.amazon.com/lambda/latest/dg/runtimes-extensions-api.html

Runtime and Extension lifecycle - invocation



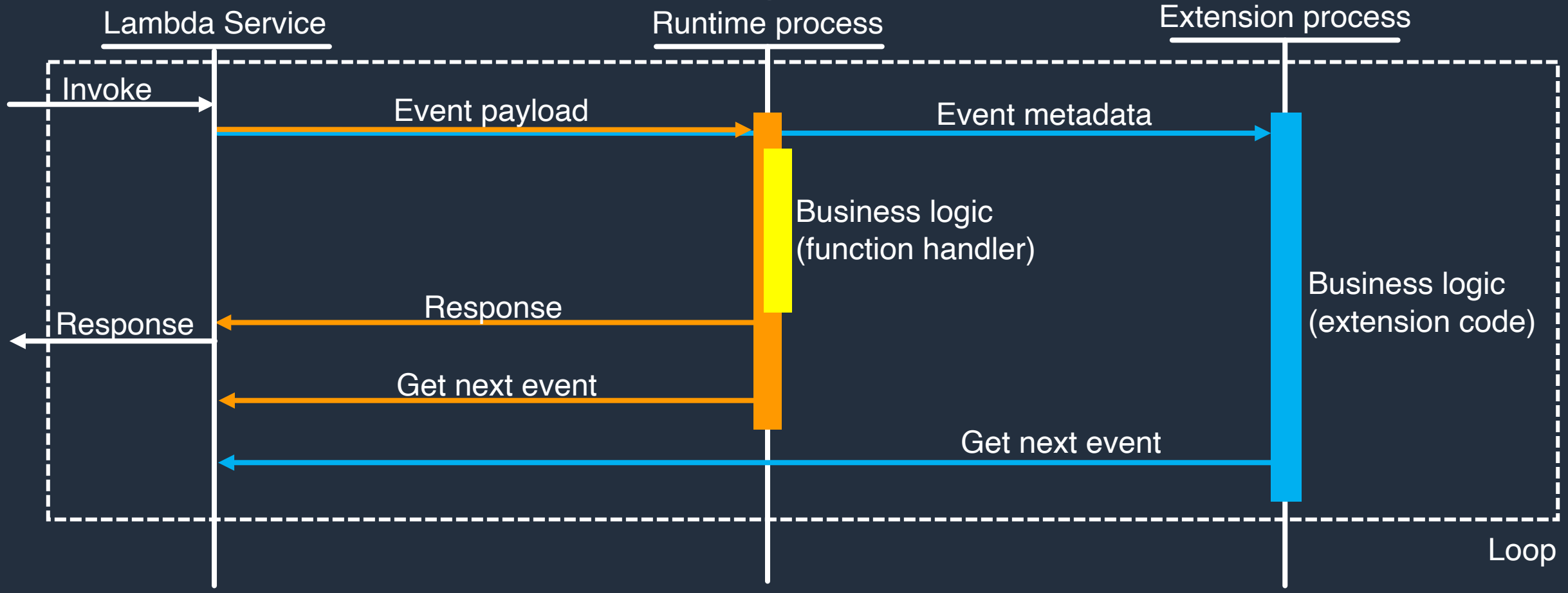
https://docs.aws.amazon.com/lambda/latest/dg/runtimes-extensions-api.html

Runtime and Extension lifecycle - invocation



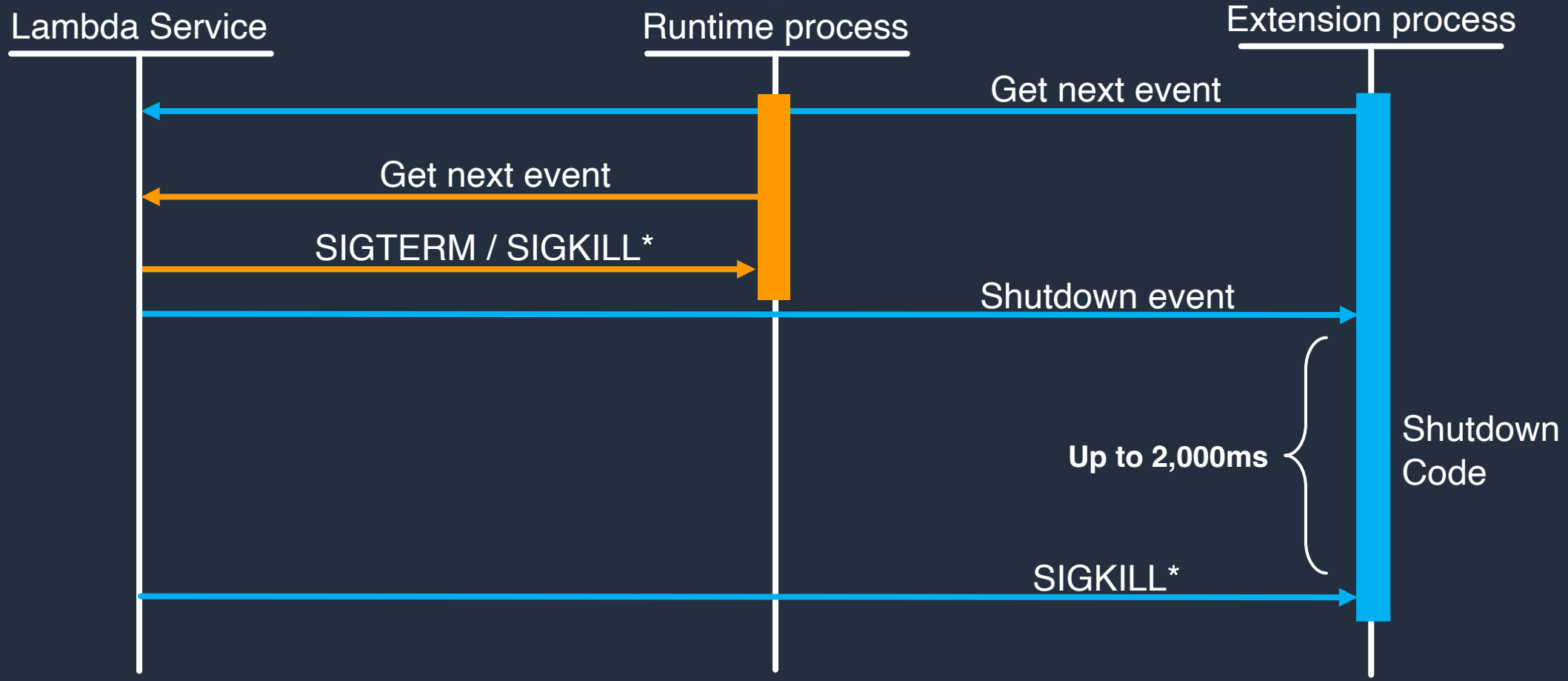
https://docs.aws.amazon.com/lambda/latest/dg/runtimes-extensions-api.html

Runtime and Extension lifecycle - invocation



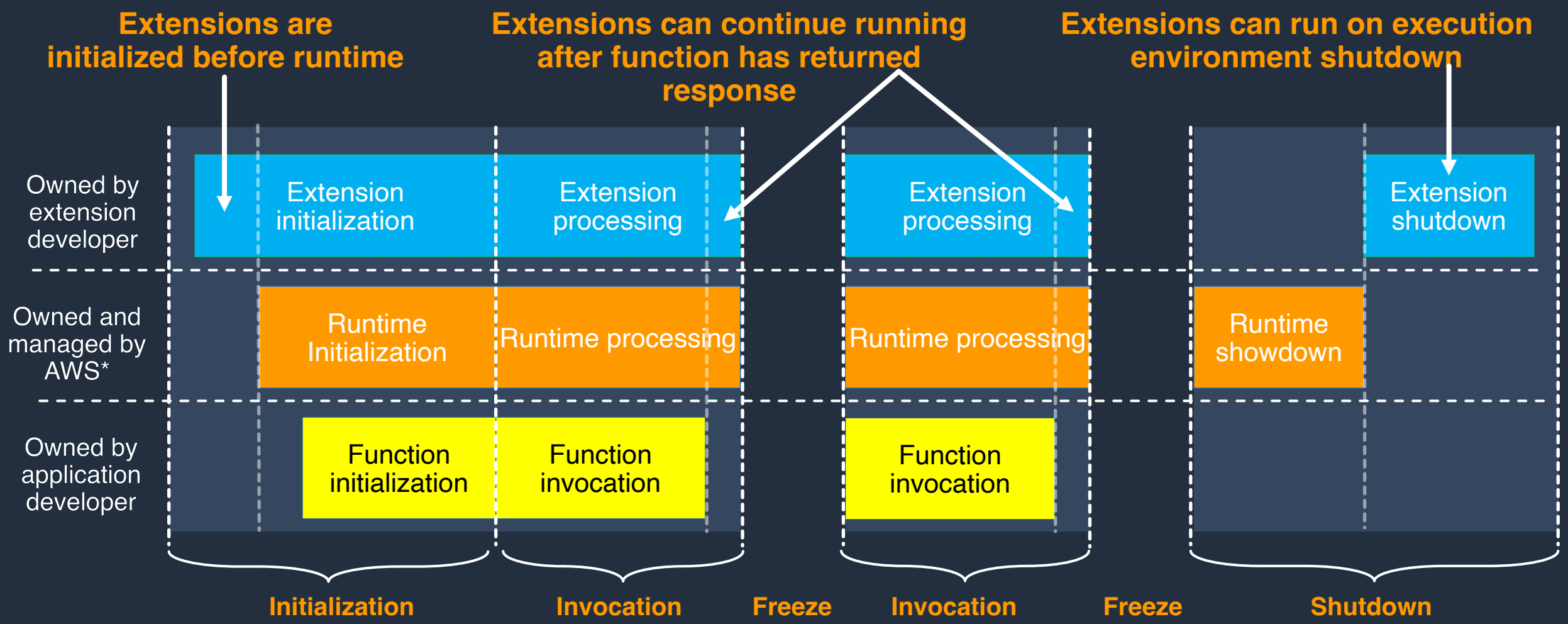
https://docs.aws.amazon.com/lambda/latest/dg/runtimes-extensions-api.html

Runtime and Extension lifecycle - shutdown

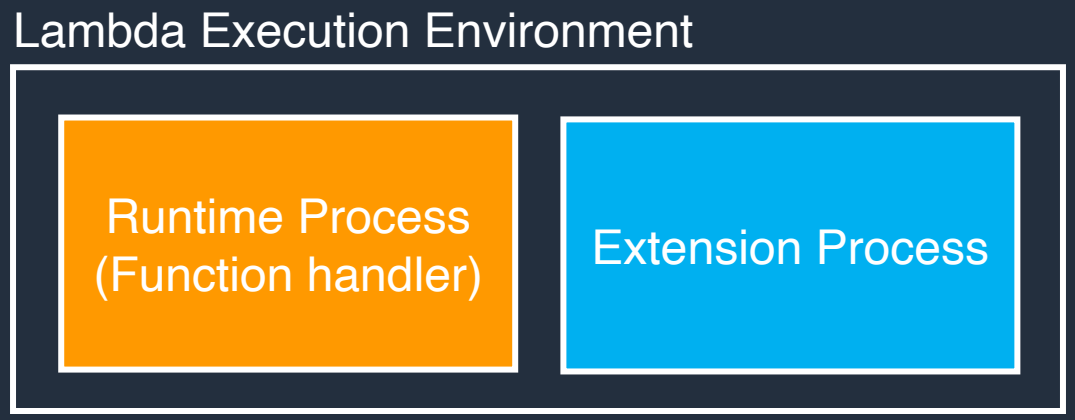


https://docs.aws.amazon.com/lambda/latest/dg/runtimes-extensions-api.html

Lambda lifecycle with extensions



Resources and security



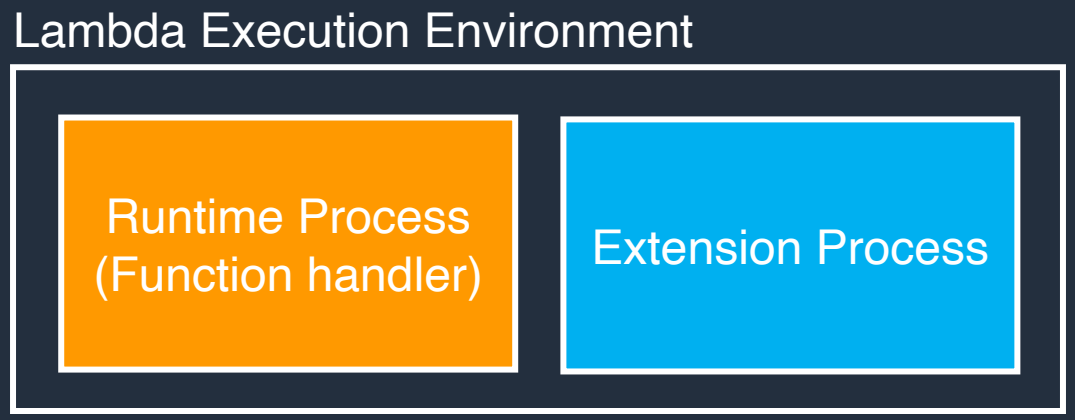
Shared **Environment**

Shared **Resources**

Shared **Permissions**

https://docs.aws.amazon.com/lambda/latest/dg/lambda-extensions.html#using-extensions-permissions

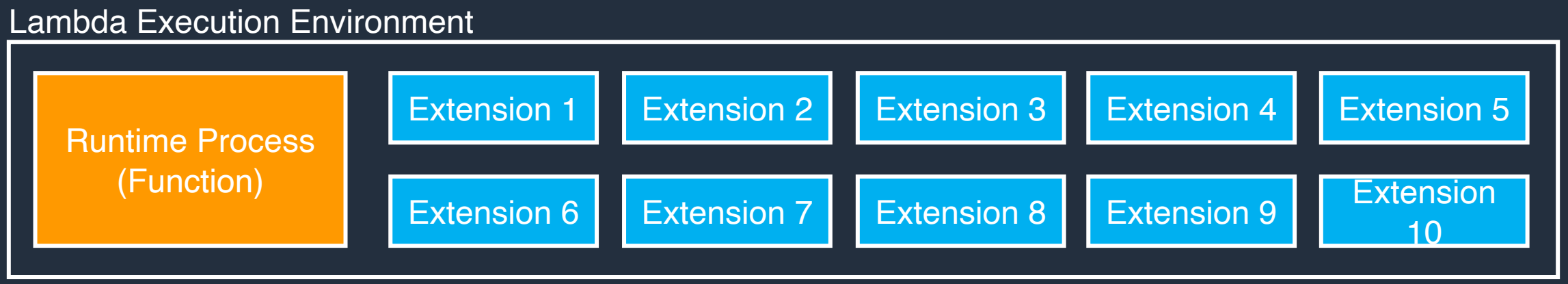
Pricing



Same as Lambda – pay for requests served and GB-s

https://docs.aws.amazon.com/lambda/latest/dg/lambda-extensions.html

Limits



Up to 10 extensions per function

(can bundle multiple extensions in a single layer)

Size counts towards the deployment package limit

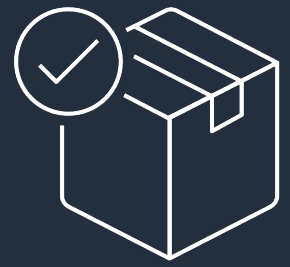
https://docs.aws.amazon.com/lambda/latest/dg/lambda-extensions.html#using-extensions-reg

Packaging

Extensions != Layers

Extension is way to **run companion background processes** in the Lambda execution environment

(Up to 10 extensions per function)



Layer is way to **package** non-function specific **assets** to be shared across multiple functions

(Up to 5 layers per function)

https://docs.aws.amazon.com/lambda/latest/dg/chapter-layers.html

Usecases

Supercharge your functions with Lambda extensions

Observability

Receive fine-grained telemetry direction from Lambda service

Security

Intercept, audit, and access control for requests/responses

Governance

Introduce governing agents and policies into function runtime

Web applications

A programming model to run traditional web applications on Lambda

Configuration

Decouple dynamic secrets and configurations management from application code

Reliability

Graceful shutdown, resource cleanup, circuit breakers

Resiliency

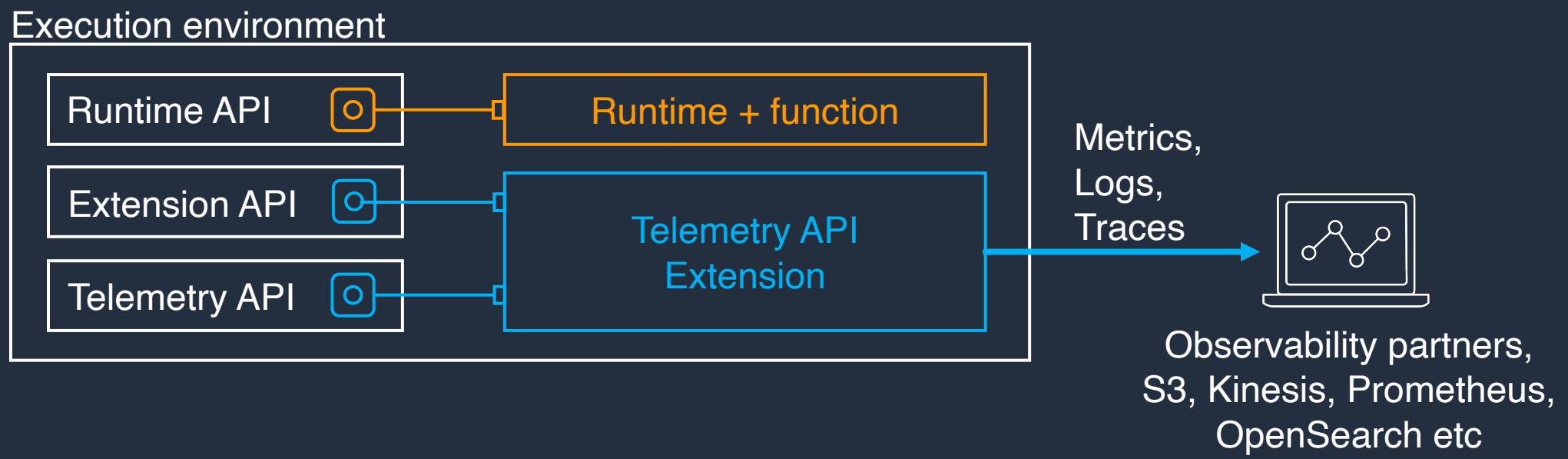
Test system resiliency with runtime-agnostic chaos testing decoupled from application code

Diagnostics

Capture low-level diagnostics information and live-debugging

Enhanced observability with Telemetry API

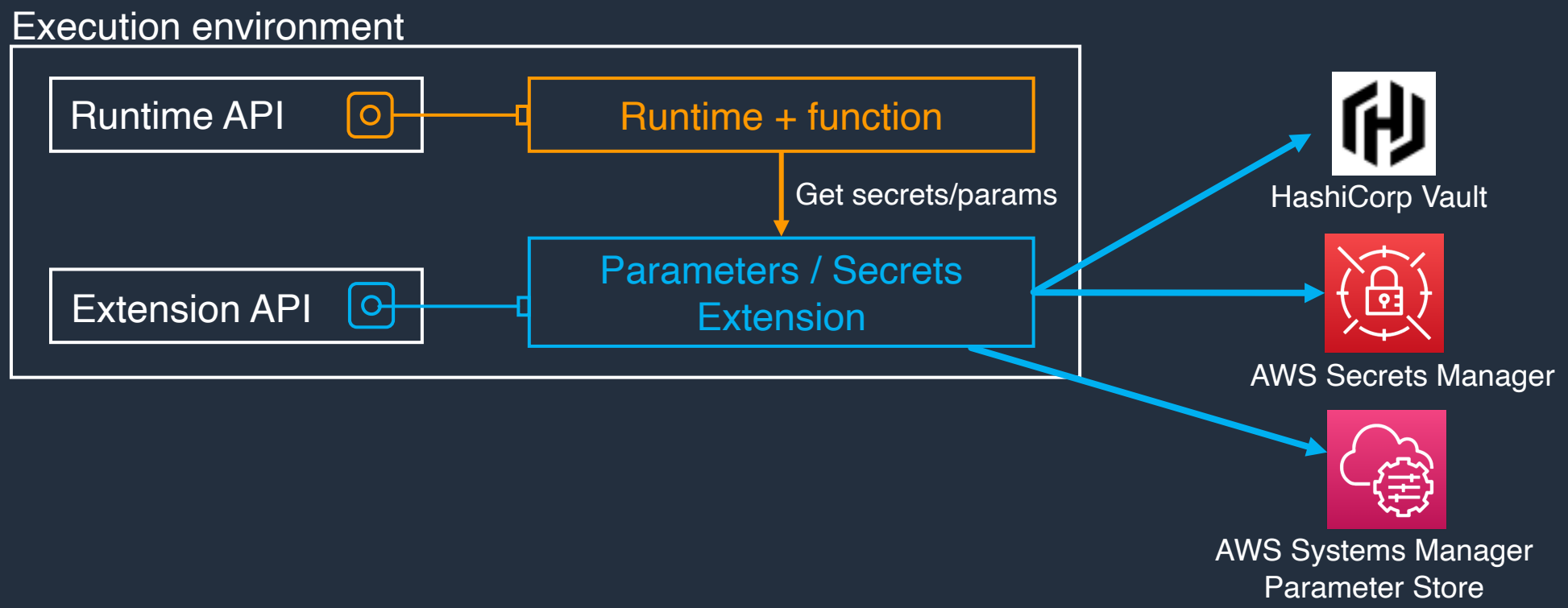
Enables extensions to **receive enhanced telemetry data directly from Lambda** execution environment



https://aws.amazon.com/blogs/compute/introducing-the-aws-lambda-telemetry-api

Decouple secrets and parameters management

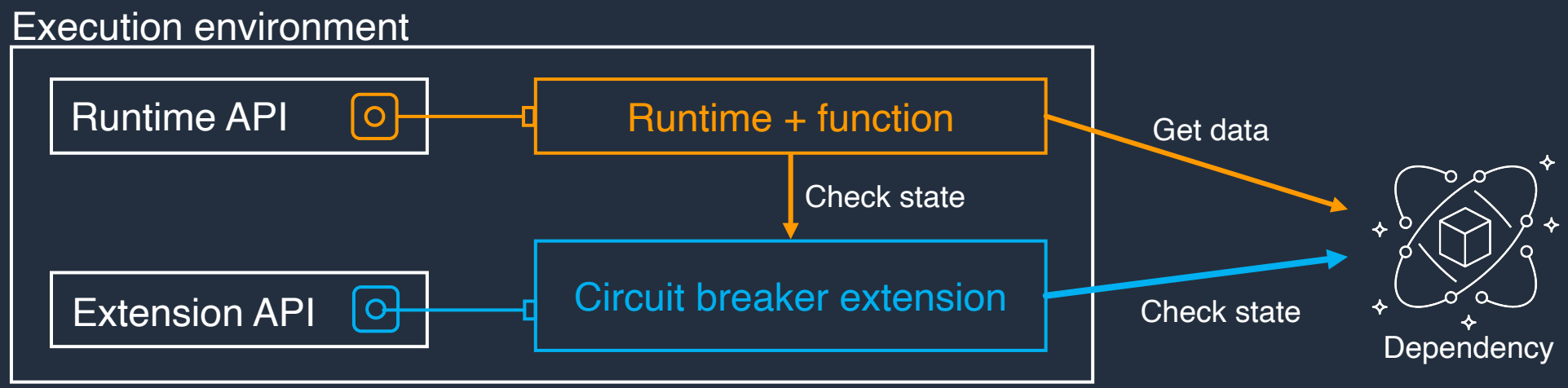
Offload **retrieval and caching of secrets and parameters**
to an AWS-provided extension



https://aws.amazon.com/blogs/compute/using-the-aws-parameter-and-secrets-lambda-extension-to-cache-parameters-and-secrets/

Improve resiliency with circuit-breakers

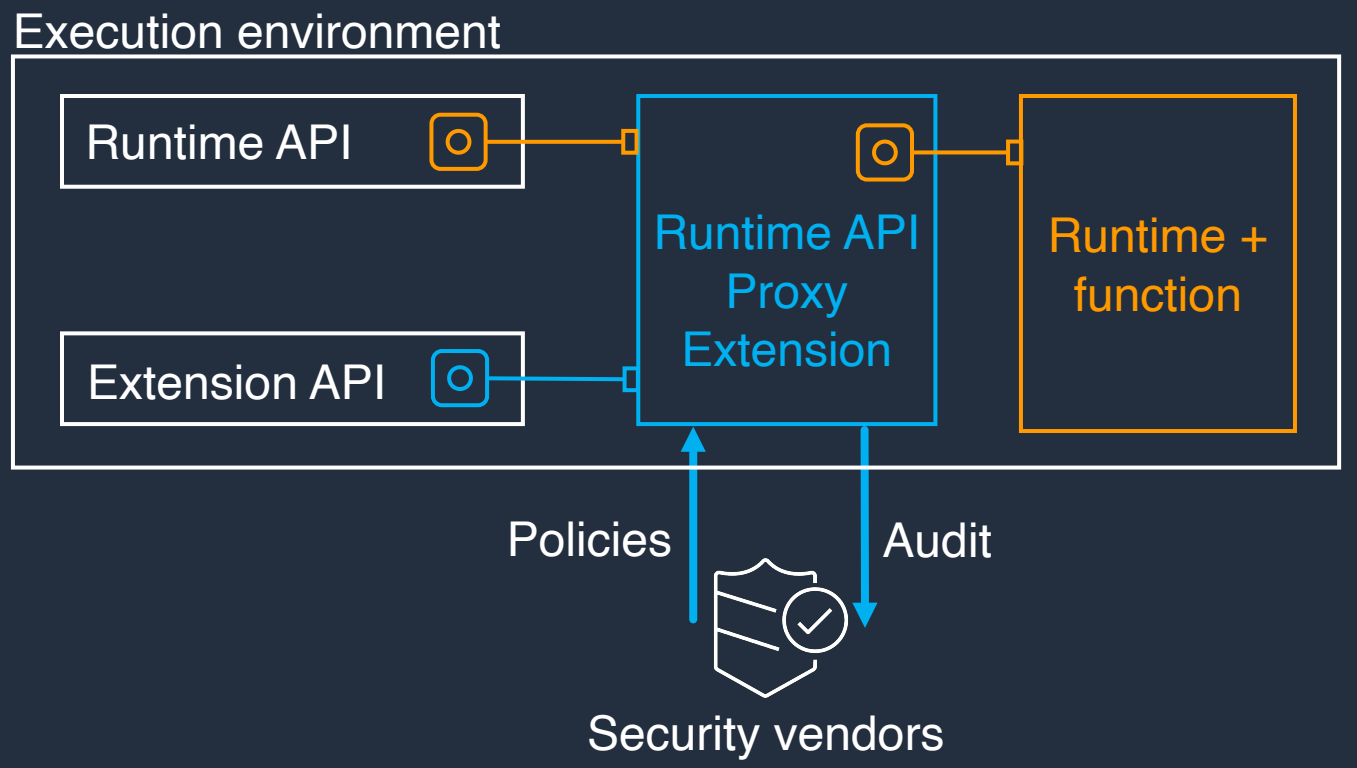
Introduce circuit-breakers into your Lambda functions
in a runtime-agnostic way with zero code changes



https://aws.amazon.com/blogs/compute/using-the-circuit-breaker-pattern-with-aws-lambda-extensions-and-amazon-dynamodb/

Application Security with Runtime API Proxy

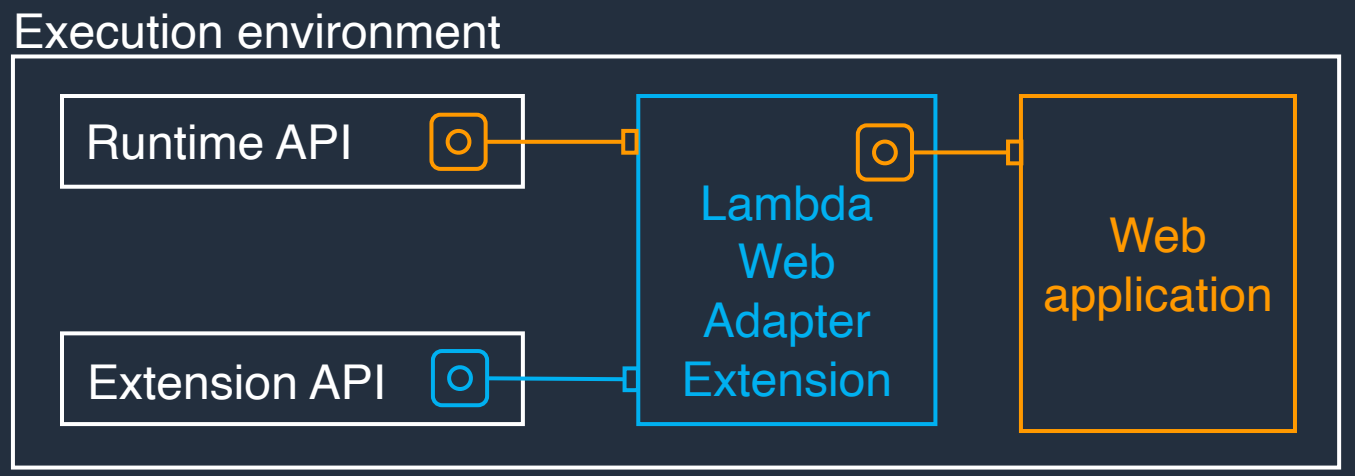
Enables extensions to **intercept, audit, modify, and access control** inbound requests and outbound responses



https://aws.amazon.com/blogs/compute/enhancing-runtime-security-and-governance-with-the-aws-lambda-runtime-api-proxy-extension/

Run web applications on Lambda

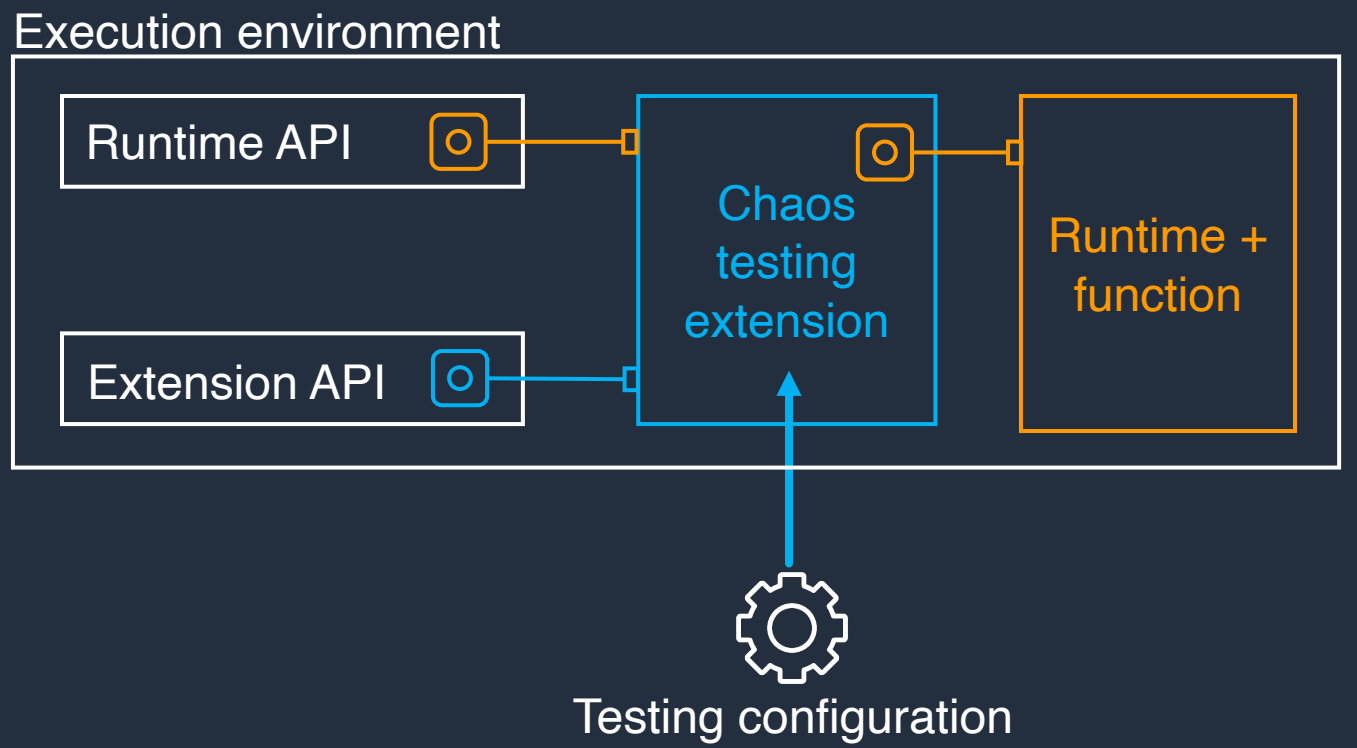
Allows to run traditional web applications on AWS Lambda,
both as ZIP and Container images



https://github.com/awslabs/aws-lambda-web-adapter

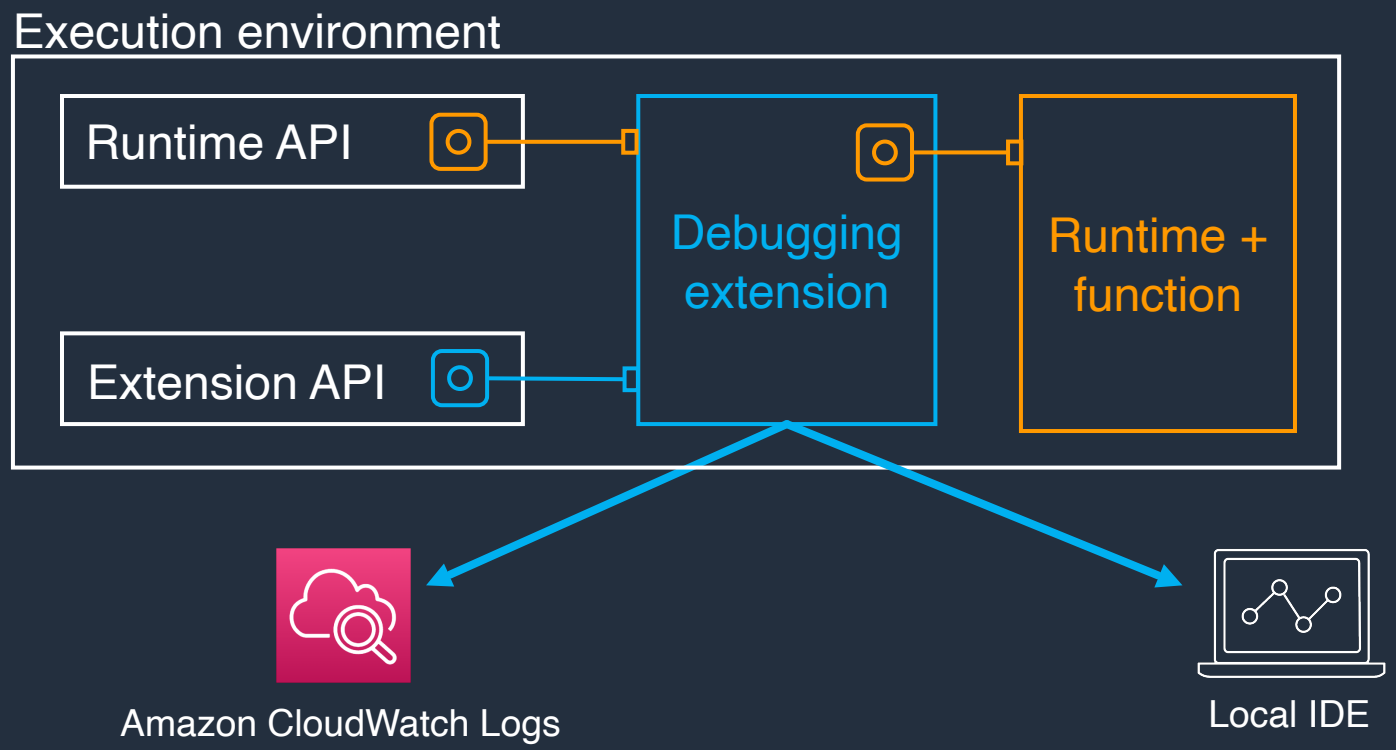
Improve resiliency with chaos testing

Introduce chaos engineering into your Lambda functions in a runtime-agnostic way with zero code changes



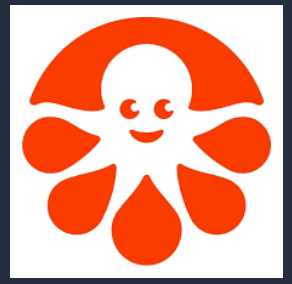
https://aws.amazon.com/blogs/compute/automating-chaos-experiments-with-aws-fault-injection-service-and-aws-lambda/

Debugging Lambda functions



What customers and partners are saying

“Using Lambda Extensions Runtime API proxy is a game-changing approach for us. It enables us to support multiple Lambda runtimes with a single implementation, provides comprehensive visibility into Lambda execution environment, and allows to detect attackers targeting serverless applications"
- Julio Guerra, Engineering Manager, Application Security Management, Datadog



Thanks to the Lambda Web Adapter, I have more reasons than ever to make AWS Lambda my compute platform of choice for containerized, full-stack, web application frameworks such as Rails. I promise you, this is going to be huge. I’ve never been more happy to delete custom integration code. Thanks AWS!”
- Ken Collins Principal Engineer, CustomInk

Join AWS Lambda Partners Program today!

AWS Lambda Partners Program

Lambda Extensions documentation

Lambda Extensions deep dive video series

Building Lambda Extensions workshop

Lambda Extensions sample implementations

https://aws.amazon.com/lambda/partners

Thank you and Q&A

Anton Aleksandrov
Pr. Solutions Architect
Serverless, AWS