
AWS
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Easily add observability with AWS Lambda Powertools for Java

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Agenda

What is Lambda Powertools?

Core utilities (Logging, Tracing, Metrics)

Other utilities

Idempotency

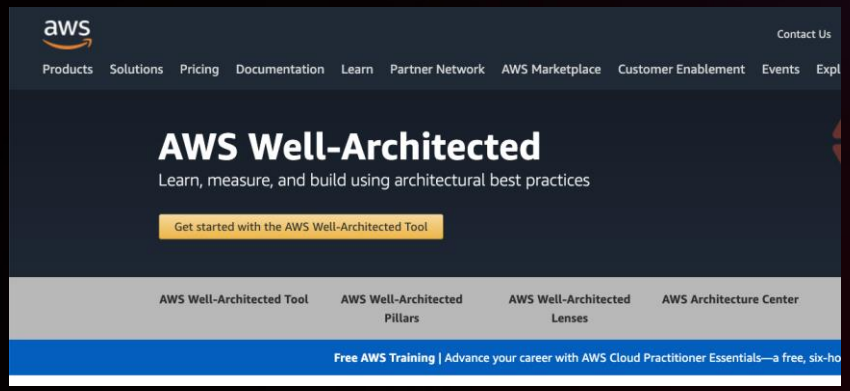
Let’s get started…

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What is AWS Lambda Powertools?

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Well-architected framework is good



Best practices have evolved over time

- Updated capabilities to query structured logging and custom metrics have been introduced
- Deeper insights and tracing help to build better understanding of how the workload performs
- Services such as Secrets Manager and Parameter Store allow developers to improve security and require API calls to be optimized

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AWS Lambda Powertools

A suite of utilities for AWS Lambda functions to ease adopting best practices

Supported runtimes

- Python
- Java
- TypeScript (NodeJS)
- .NET

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Core utilities: logging, tracing, metrics

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1. Logging: key features

- Structured logging in JSON
- Log level
- Capturing key fields from Lambda context
- Append keys
- Sampling rate
- Set correlation IDs

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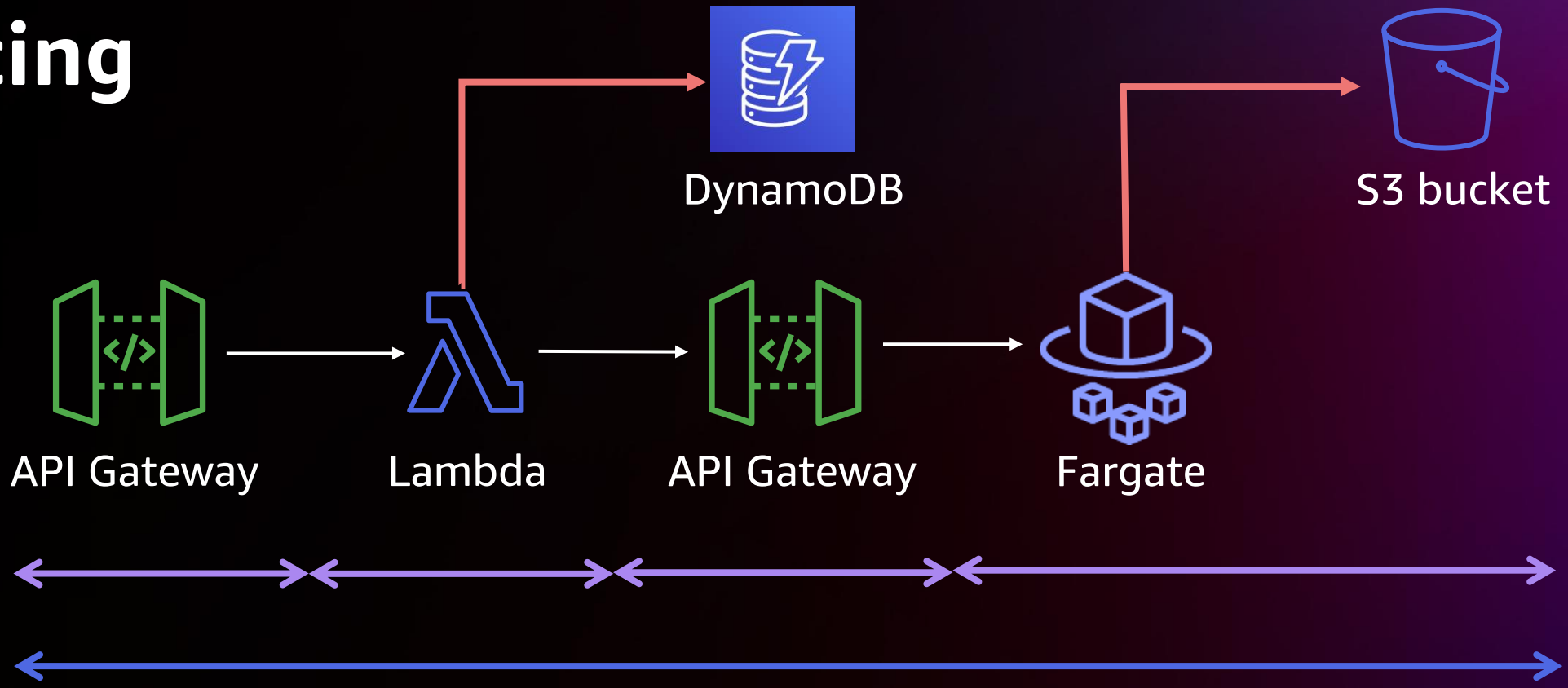
1. Logging: Lambda Powertools

```java
@Logging (logEvent = true, correlationIdPath = CorrelationIdPathConstants.API_GATEWAY_HTTP)
public APIGatewayProxyResponseEvent handleRequest(APIGatewayProxyRequestEvent input, final Context context) {
```


```json
{
    "instant": {
        "epochSecond": 1664979840,
        "nanoOfSecond": 152208000
    },
    "thread": "main",
    "level": "INFO",
    "loggerName": "software.amazonaws.example.dao.DynamoProductDao",
    "message": "Scan returned: 7 item(s)",
    "endOfBatch": false,
    "loggerFqcn": "org.apache.logging.log4j.spi.AbstractLogger",
    "threadId": 1,
    "threadPriority": 5,
    "timestamp": "2022-10-05T14:24:00.152Z[UTC]",
    "coldStart": "true",
    "correlation_id": "7a780fd0-311b-4ed6-afa0-6a2068b30030",
    "functionArn": "arn:aws:lambda:us-east-1:992265960412:function:simpleproducts-ProductsFunction-5yPqU9ldp2EO",
    "functionMemorySize": "1024",
    "functionName": "simpleproducts-ProductsFunction-5yPqU9ldp2EO",
    "functionVersion": "$LATEST",
    "function_request_id": "aa688e08-6a03-48e5-8eca-d30b6cdef011",
    "samplingRate": "0.0",
    "service": "ProductService",
    "xray_trace_id": "1-633d937a-233e65d64e5cacd7373a96c6"
}
```


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2. Tracing



Legend

- Segment
- Sub-segment
- Trace

Trace metadata

Type	Key	Value	Namespace
Annotation	UserId	a1c8k...	
Metadata	Cart	{….}	Checkout

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2. Tracing: key features

- Annotates cold starts/service name
- Adds annotation/metadata such as correlation IDs
- Captures method-level tracing
- Captures AWS SDK client calls

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2. Tracing

```
@Tracing
private APIGatewayProxyResponseEvent processPutEvent(APIGatewayProxyRequestEvent input) {
    logger.info("Processing Put Event");
    TracingUtils.putAnnotation("correlation_id", input.getRequestContext().getRequestId());
```

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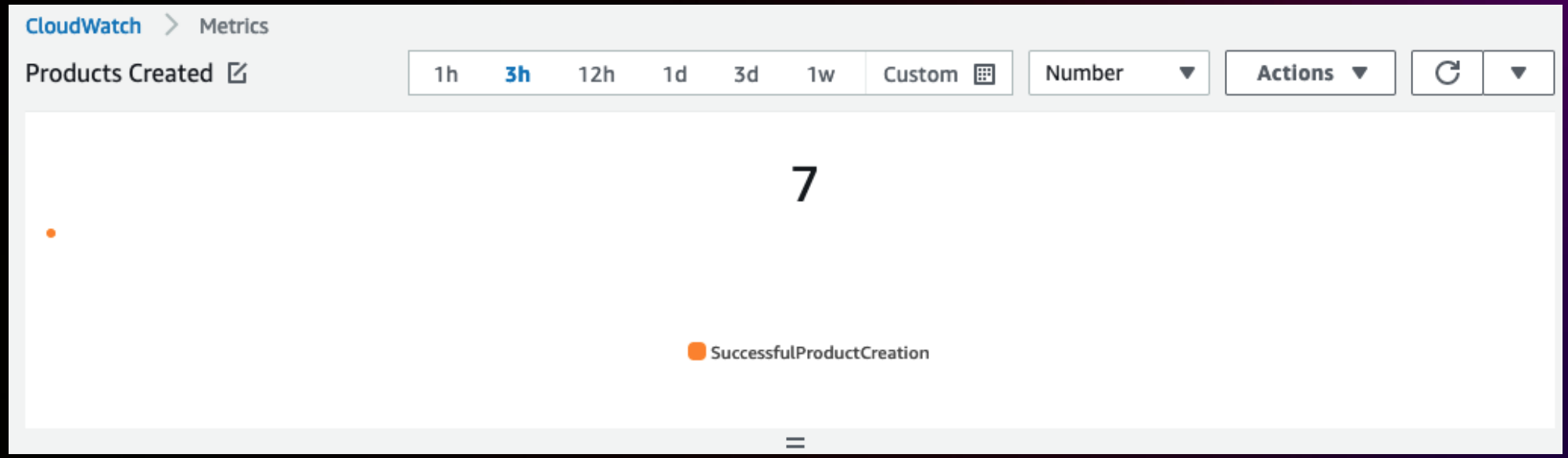
3. Metrics: key features

- Uses the Amazon CloudWatch embedded metric format (EMF)
- Simplifies EMF requests for dimensions and metrics
- Captures metadata, such as correlation IDs, and metrics
- Simplifies the capturing of metrics by automatically sending metrics to CloudWatch before your function ends with no penalty to performance

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3. Metrics

```
@Metrics
private APIGatewayProxyResponseEvent processPostEvent(APIGatewayProxyRequestEvent input) {
    metricsLogger.putMetric("SuccessfulProductCreation", 1, Unit.COUNT);
```



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Lambda Powertools: other utilities

- Idempotency – allows safe retries for your function
- Parameters – retrieves values from Parameter Store or Secrets Manager
- SQS large message handling – handles SQS messages with payloads in S3
- SQS batch processing – handles partial failures when processing SQS batches
- Validation – JSON schema validation for payloads
- Serialization utilities – manipulates JSON data in your functions

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4. Idempotency

- Applications should produce the same result when called over and over.
- What happens when an application receives duplicate requests?

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4. Idempotency: key features

- Add idempotency at
  - Handler level
  - Function level
- Return stored result in subsequent requests
- Specify time window of the key to consider event as duplicate
- Use subset of event object with JMESPath as the key
- Bring your own persistent layer

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4. Idempotency

```
public ProductHandler() {
    this.productDao = new DynamoProductDao();
    this.objectMapper = new ObjectMapper();

    Idempotency.config()
            .withConfig(
                    IdempotencyConfig.builder()
                            .withEventKeyJMESPath("powertools_json(body).[name,price]")
                            .withExpiration(Duration.of(5, ChronoUnit.MINUTES))
                            .build())
            .withPersistenceStore(
                    DynamoDBPersistenceStore.builder()
                            .withTableName(System.getenv("IDEMPOTENCY_TABLE"))
                            .withKeyAttr("PK")
                            .withExpiryAttr("ttl")
                            .build())
            .configure();
}
```

```
@Idempotent
private APIGatewayProxyResponseEvent processPostEvent(AP
```

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Additional resources

AWS Lambda Powertools for Java Documentation
https://awslabs.github.io/aws-lambda-powertools-java

AWS Lambda Powertools for Java Github Repo
https://github.com/awslabs/aws-lambda-powertools-java

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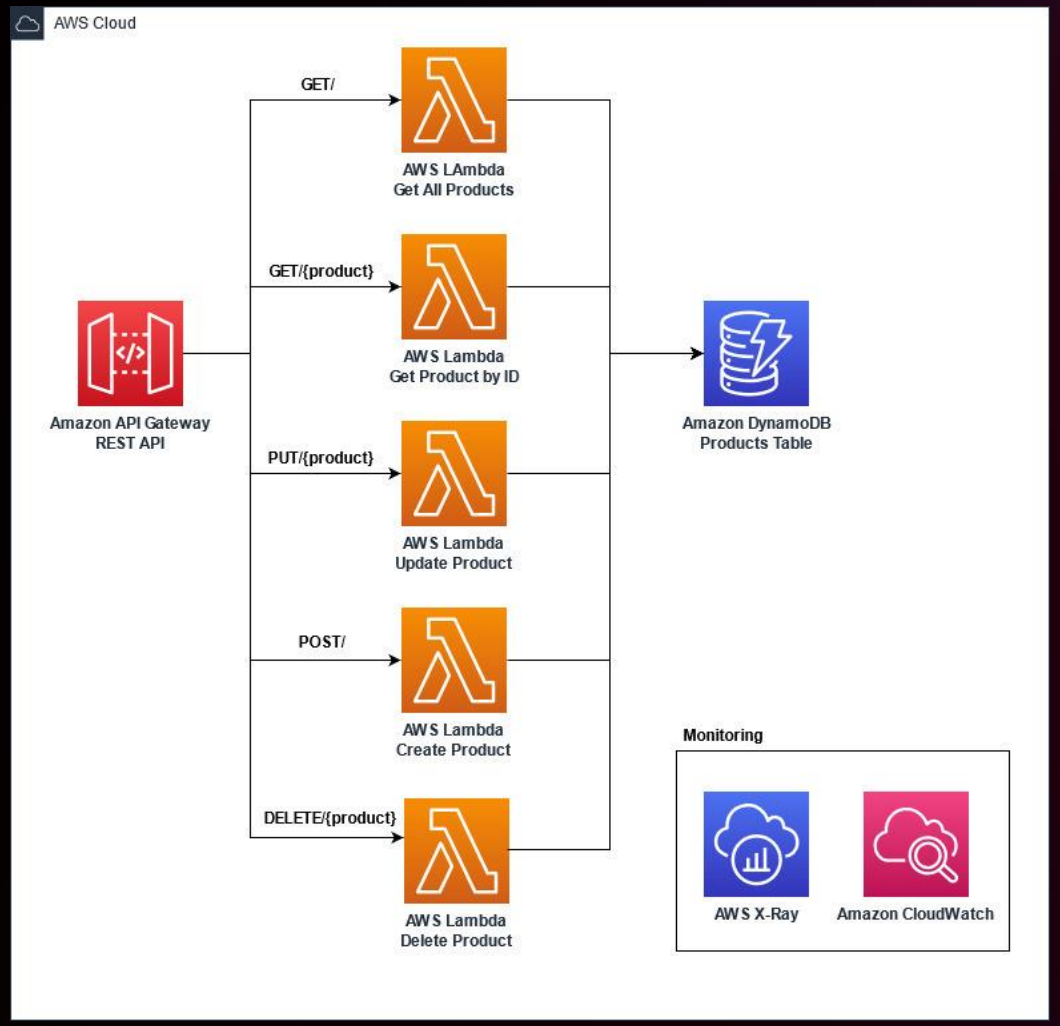
Go build…

https://s12d.com/lambda-powertools-java



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Architecture diagram



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Related sessions

ID	Title	Type	Schedule
SVS303	Building real-world serverless applications with AWS SAM	Breakout	Wednesday, 6:15 PM
SVS308	AWS serverless developer experience: A day in the life of a developer	Workshop	Wednesday, 11:30 AM
SVS310	From serverful to serverless Java with AWS Lambda	Workshop	Tuesday, 2:00 PM

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Thank you!

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