X-Ray Terminology

AWS X-Ray Terminology

AWS X-Ray is a service that collects data about requests that your application serves, and provides tools you can use to view, filter, and gain insights into that data to identify issues and opportunities for optimization. For any traced request to your application, you can see detailed information not only about the request and response, but also about calls that your application makes to downstream AWS resources, microservices, databases and HTTP web APIs.
For general information on AWS X-Ray click here:
https://docs.aws.amazon.com/xray/latest/devguide/aws-xray.html

Segments

The compute resources running your application logic send data about their work as segments. A segment provides the resource's name, details about the request, and details about the work done.

Subsegments

A segment can break down the data about the work done into subsegments. Subsegments provide more granular timing information and details about downstream calls that your application made to fulfill the original request. A subsegment can contain additional details about a call to an AWS service, an external HTTP API, or an SQL database. You can even define arbitrary subsegments to instrument specific functions or lines of code in your application.

Service graph

X-Ray uses the data that your application sends to generate a service graph. Each AWS resource that sends data to X-Ray appears as a service in the graph. Edges connect the services that work together to serve requests. Edges connect clients to your application, and your application to the downstream services and resources that it uses.

Traces

A trace ID tracks the path of a request through your application. A trace collects all the segments generated by a single request. That request is typically an HTTP GET or POST request that travels through a load balancer, hits your application code, and generates downstream calls to other AWS services or external web APIs. The first supported service that the HTTP request interacts with adds a trace ID header to the request, and propagates it downstream to track the latency, disposition, and other request data.

Annotations and metadata

When you instrument your application, the X-Ray SDK records information about incoming and outgoing requests, the AWS resources used, and the application itself. You can add other information to the segment document as annotations and metadata. Annotations and metadata are aggregated at the trace level, and can be added to any segment or subsegment.
Annotations are simple key-value pairs that are indexed for use with filter expressions. Use annotations to record data that you want to use to group traces in the console, or when calling the GetTraceSummaries API. X-Ray indexes up to 50 annotations per trace.

Metadata are key-value pairs with values of any type, including objects and lists, but that are not indexed. Use metadata to record data you want to store in the trace but don't need to use for searching traces.

The X-Ray Daemon

The AWS X-Ray daemon is a software application that listens for traffic on UDP port 2000, gathers raw segment data, and relays it to the AWS X-Ray API. The daemon works in conjunction with the AWS X-Ray SDKs and must be running so that data sent by the SDKs can reach the X-Ray service.
When using AWS X-Ray, your code isn’t uploading traced directly to the X-Ray service. Instead, it sends information to the X-Ray Daemon which then uploads the information in batches to the X-Ray service.
If you are running code on AWS Lambda, the X-ray Daemon is installed and managed for you. You can simply just start using the X-Ray SDK. If you are running X-ray outside of Lambda you may need to install and manage the daemon yourself. Read more information about how to install and setup the X-ray Daemon at:
https://docs.aws.amazon.com/xray/latest/devguide/xray-daemon.html

How to use X-Ray in Python Applications

The X-Ray SDK for Python is a library for Python web applications that provides classes and methods for generating and sending trace data to the X-Ray daemon. Trace data includes information about incoming HTTP requests served by the application, and calls that the application makes to downstream services using the AWS SDK, HTTP clients, or an SQL database connector. You can also create segments manually and add debug information in annotations and metadata.
For more information on the AWS X-Ray SDK for Python click here:
https://docs.aws.amazon.com/xray/latest/devguide/xray-sdk-python.html