Introduction to OpenSearch and Amazon OpenSearch Service

- OpenSearch는 Apache 2.0 라이선스의 Elasticsearch 7.10.2에서 파생된 커뮤니티 주도의 오픈소스 검색 및 분석 도구
- OpenSearch 프로젝트는 Apache Lucene을 기반으로 한 분산 검색 엔진인 OpenSearch와 데이터 시각화 및 사용자 인터페이스를 제공하는 OpenSearch Dashboards로 구성되어
- OpenSearch는 또한 Open Distro for Elasticsearch에서 이식된 모든 고급 기능들을 포함

How search engines work - interaction

1

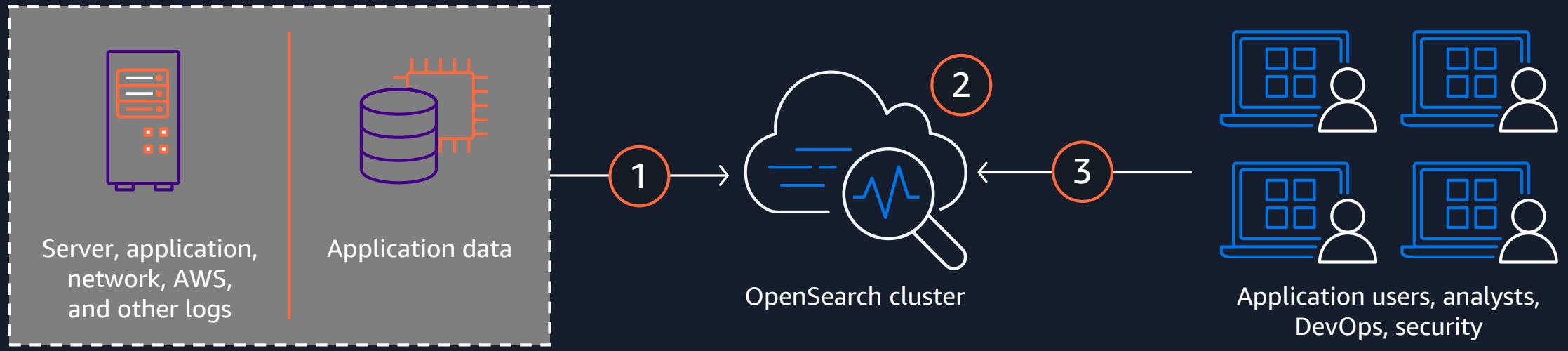
Send data as JSON via REST APIs

2

Data is indexed—all fields searchable, including nested JSON

3

REST APIs, for fielded matching, Boolean expressions, sorting, and analysis



OpenSearch works with structured JSON containing fields and values


```
{
  "id" : "tt0371746",
  "title" : "Iron Man",
  "release_date" : "2008-04-14T00:00:00Z",
  "actors" : [
    "Robert Downey Jr.",
    "Gwyneth Paltrow",
    "Terrence Howard"
  ],
  "directors" : [
    "Jon Favreau"
  ],
  "rating" : 7.9,
  "rank" : 171,
  "running_time_secs" : 7560,
  "genres" : [
    "Action",
    "Adventure",
    "Sci-Fi"
  ],
  "plot" : "When wealthy industrialist Tony Stark is forced to build an armored suit after a life-threatening incident, he ultimately decides to use its technology to fight against evil.",
}
```

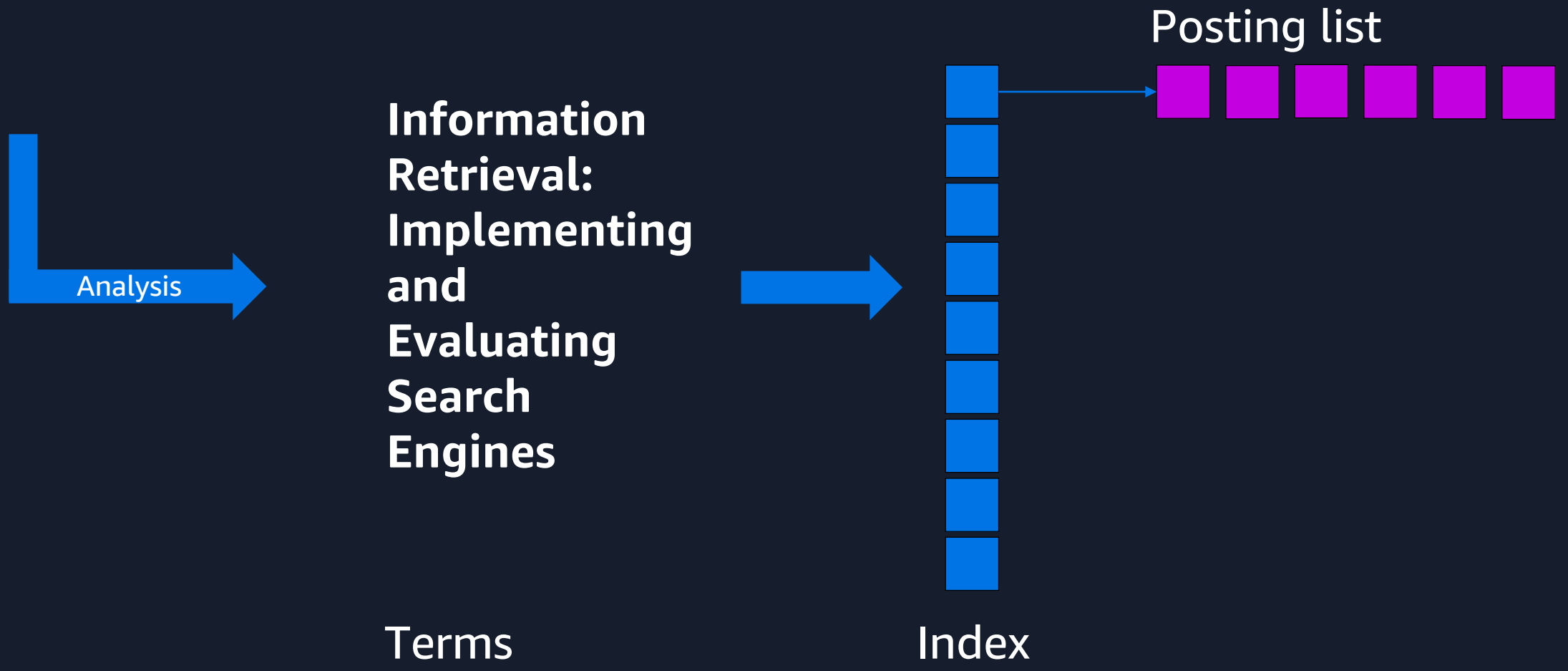
You use the indexing APIs to send data to OpenSearch*

- POST endpoint/index/type/id
- {
- Document
- }

- POST endpoint/index/_bu
- { Command }
- { Document }
- { Command }
- { Document }

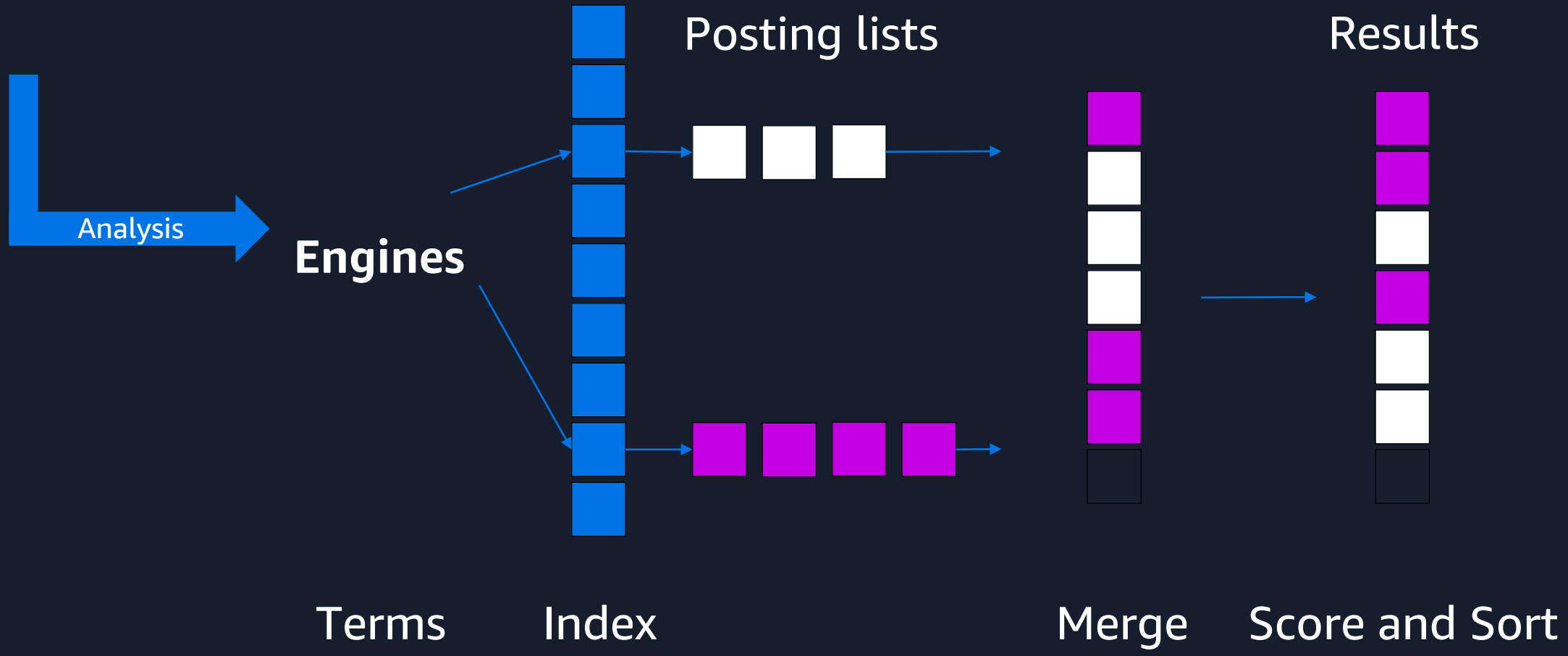
How search engines work - indexing

Source text

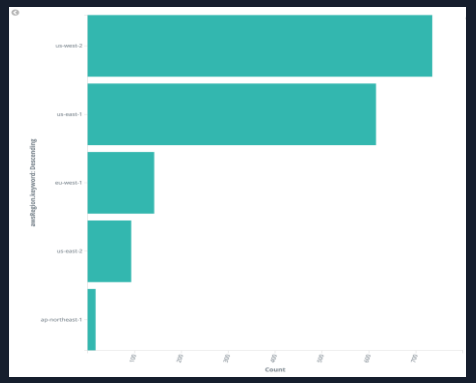


How search engines work – query processing

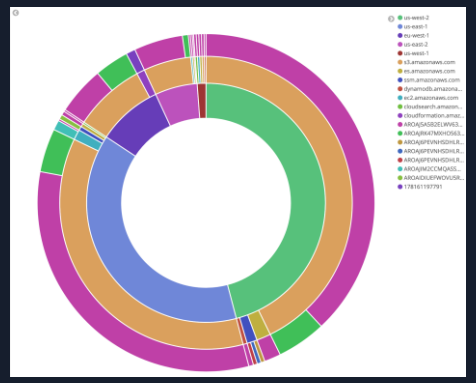
Query text



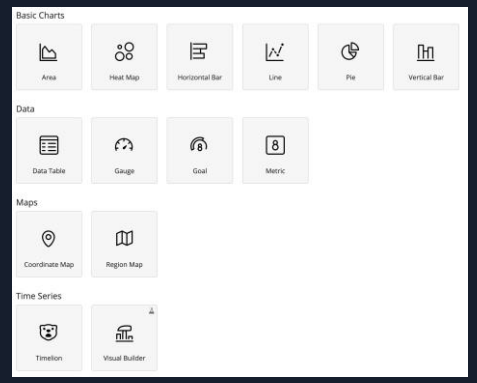
How search engines work - analytics



용어(terms), 날짜, 범위, 히스토그램 등에 대한 집계를 할 수 있으며, 파이프라인 집계를 통해 여러 집계를 연결할 수 있음



중첩 집계를 사용하면 여러 차원에서 데이터를 분석할 수 있음 - 예를 들어, 요청 URL별 응답 코드와 같은 분석이 가능함



OpenSearch Dashboards는 차트, 게이지, 지도, 시계열 등 다양한 시각화 기능을 제공함

Filtering – host = “199.120*” or “burger*”

Host	Timestamp	Verb	Request	Http	Status	Size
199.72.81.55	[01/Jul/1995:00:00:01	GET	/history/apollo/	HTTP/1.0	200	6245
unicomp6.unicomp.net	[01/Jul/1995:00:00:06	GET	/shuttle/countdown/	HTTP/1.0	200	3985
199.120.110.21	[01/Jul/1995:00:00:09	GET	/shuttle/missions/sts-73/mission-sts-73.html	HTTP/1.0	200	4085
burger.letters.com	[01/Jul/1995:00:00:11	GET	/shuttle/countdown/liftoff.html	HTTP/1.0	304	0
199.120.110.21	[01/Jul/1995:00:00:11	GET	/shuttle/missions/sts-73/sts-73-patch-small.gif	HTTP/1.0	200	4179
burger.letters.com	[01/Jul/1995:00:00:12	GET	/images/NASA-logosmall.gif	HTTP/1.0	304	0
burger.letters.com	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/video/livevideo.gif	HTTP/1.0	200	0
205.212.115.106	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/countdown.html	HTTP/1.0	200	3985
d104.aa.net	[01/Jul/1995:00:00:13	GET	/shuttle/countdown/	HTTP/1.0	200	3985
129.94.144.152	[01/Jul/1995:00:00:13	GET	/	HTTP/1.0	200	7074

Aggregation – status histogram

Host	Timestamp	Verb	Request	Http	Status	Size
199.72.81.55	[01/Jul/1995:00:00:01	GET	/history/apollo/	HTTP/1.0	200	6245
unicomp6.unicomp.net	[01/Jul/1995:00:00:06	GET	/shuttle/countdown/	HTTP/1.0	200	3985
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199.120.110.21	[01/Jul/1995:00:00:11	GET	/shuttle/missions/sts-73/sts-73-patch-small.gif	HTTP/1.0	200	4179
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205.212.115.106	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/countdown.html	HTTP/1.0	200	3985
d104.aa.net	[01/Jul/1995:00:00:13	GET	/shuttle/countdown/	HTTP/1.0	200	3985
129.94.144.152	[01/Jul/1995:00:00:13	GET	/	HTTP/1.0	200	7074

Aggregation – sum of bytes

Host	Timestamp	Verb	Request	Http	Status	Size
199.72.81.55	[01/Jul/1995:00:00:01	GET	/history/apollo/	HTTP/1.0	200	6245
unicomp6.unicomp.net	[01/Jul/1995:00:00:06	GET	/shuttle/countdown/	HTTP/1.0	200	3985
199.120.110.21	[01/Jul/1995:00:00:09	GET	/shuttle/missions/sts-73/mission-sts-73.html	HTTP/1.0	200	4085
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burger.letters.com	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/video/livevideo.gif	HTTP/1.0	200	0
205.212.115.106	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/countdown.html	HTTP/1.0	200	3985
d104.aa.net	[01/Jul/1995:00:00:13	GET	/shuttle/countdown/	HTTP/1.0	200	3985
129.94.144.152	[01/Jul/1995:00:00:13	GET	/	HTTP/1.0	200	7074

Aggregation – bucketing terms

Host	Timestamp	Verb	Request	Http	Status	Size
199.72.81.55	[01/Jul/1995:00:00:01	GET	/history/apollo/	HTTP/1.0	200	6245
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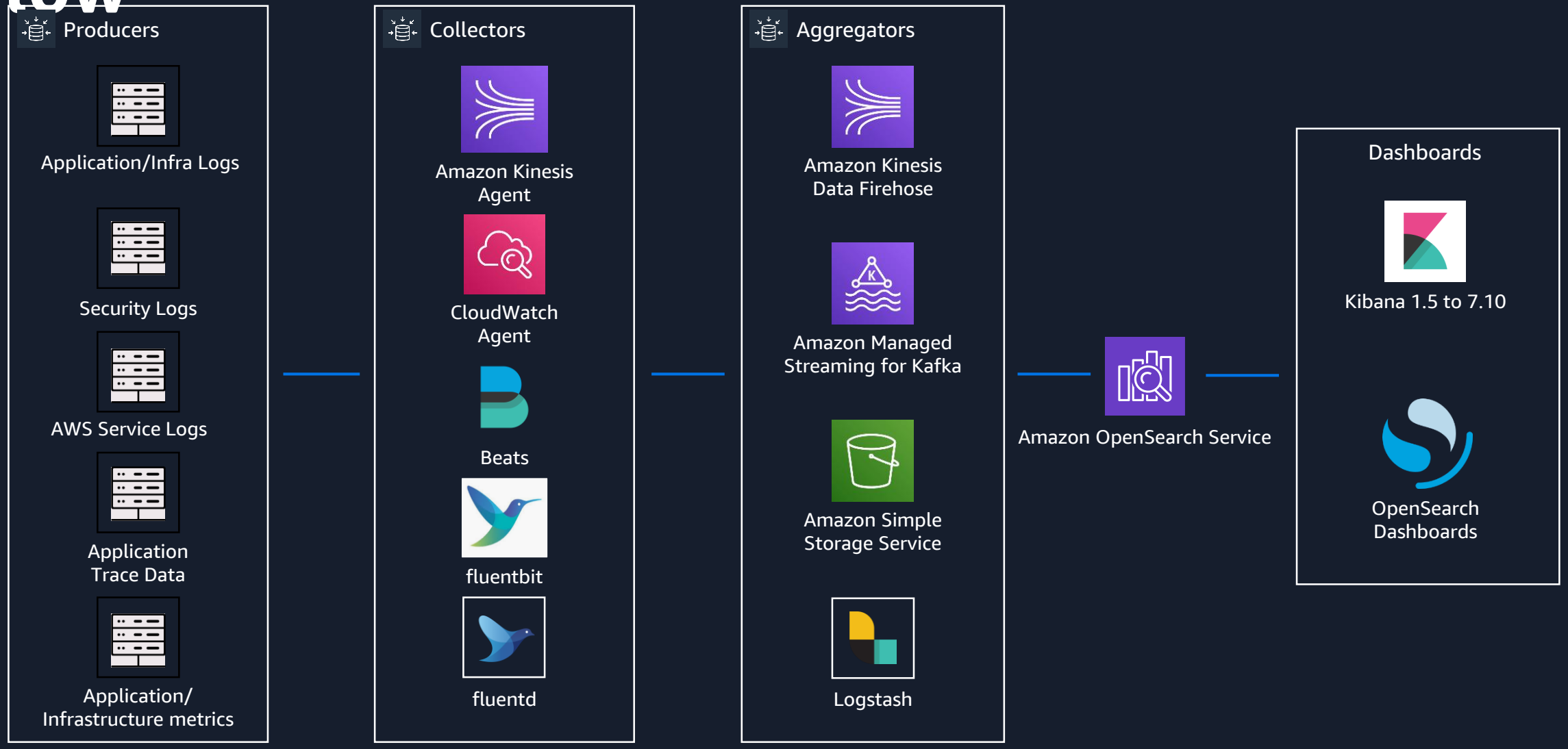
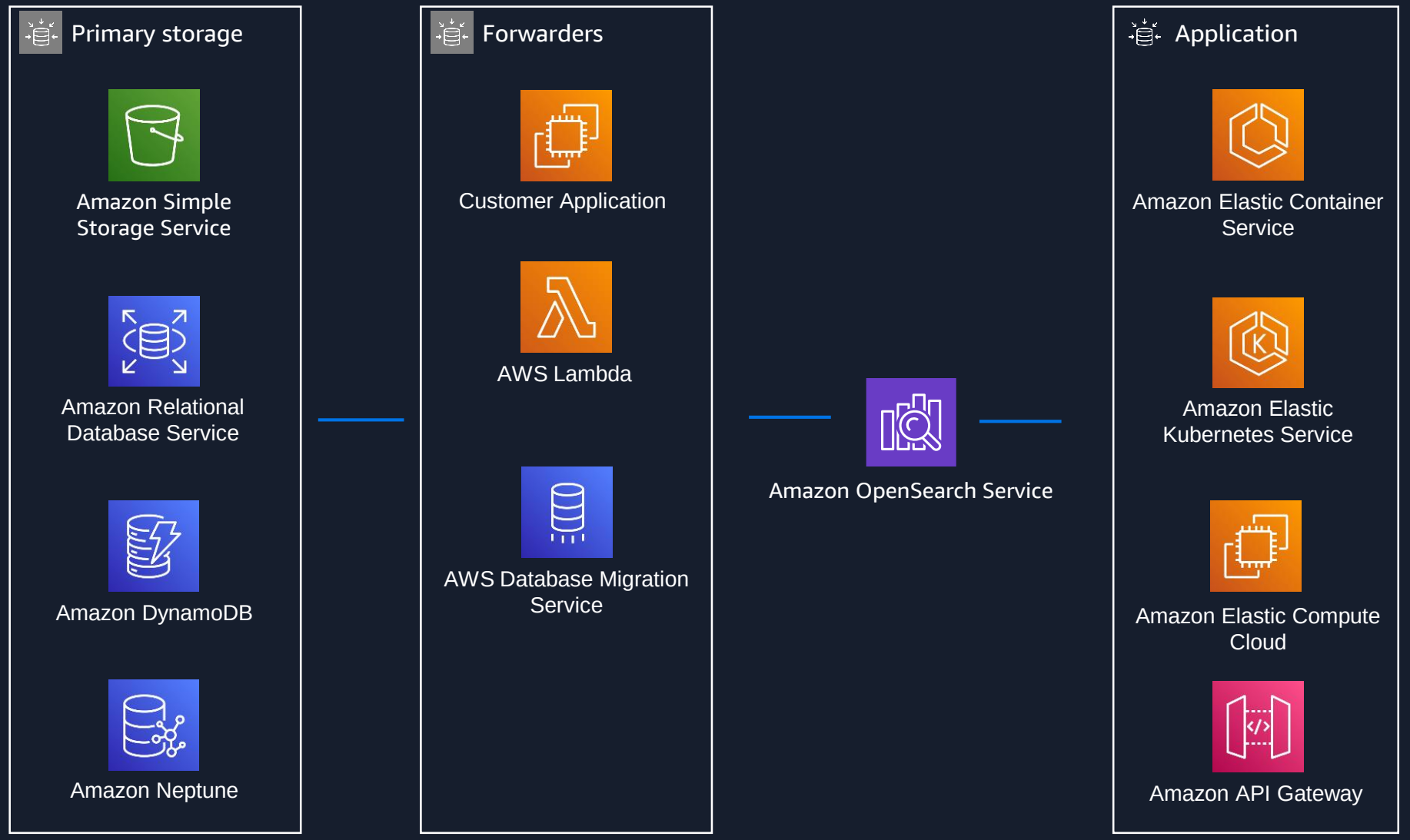
199.120.110.21	[01/Jul/1995:00:00:09	GET	/shuttle/missions/sts-73/mission-sts-73.html	HTTP/1.0	200	4085
burger.letters.com	[01/Jul/1995:00:00:11	GET	/shuttle/countdown/liftoff.html	HTTP/1.0	304	0
199.120.110.21	[01/Jul/1995:00:00:11	GET	/shuttle/missions/sts-73/sts-73-patch-small.gif	HTTP/1.0	200	4179
burger.letters.com	[01/Jul/1995:00:00:12	GET	/images/NASA-logosmall.gif	HTTP/1.0	304	0
burger.letters.com	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/video/livevideo.gif	HTTP/1.0	200	0
205.212.115.106	[01/Jul/1995:00:00:12	GET	/shuttle/countdown/countdown.html	HTTP/1.0	200	3985
d104.aa.net	[01/Jul/1995:00:00:13	GET	/shuttle/countdown/	HTTP/1.0	200	3985
129.94.144.152	[01/Jul/1995:00:00:13	GET	/	HTTP/1.0	200	7074

Amazon OpenSearch Service log ingestion flow



Amazon OpenSearch Service log ingestion flow



Amazon OpenSearch Service

Amazon OpenSearch Service

- Amazon OpenSearch Service makes it easy for you to perform interactive log analytics, real-time application monitoring, website search, and more.
- OpenSearch is an open source, distributed search and analytics suite derived from Elasticsearch. Amazon OpenSearch Service offers the latest versions of OpenSearch, support for 19 versions of Elasticsearch (1.5 to 7.10 versions), and visualization capabilities powered by OpenSearch Dashboards and Kibana (1.5 to 7.10 versions).

Self-managed vs. Amazon OpenSearch Service

On-Premises	Amazon EC2	Amazon OpenSearch Service
App Dev/ Optimization	App Dev/ Optimization	App Dev/ Optimization
Hot/Warm storage tiers	Hot/Warm storage tiers	UltraWarm & Cold Storage Tiers
Plugins (additional cost)*	Plugins (additional cost)*	Plugins*
24x7 monitoring & repair	24x7 monitoring & repair	24x7 monitoring & repair
In-place upgrades / patches	In-place upgrades / patches	In-place upgrades / patches
Cluster scaling	Cluster scaling	Cluster scaling
Cross AZ data transfer cost	Cross AZ data transfer cost	No cross AZ data transfer cost
Backups	Backups	Hourly backups
High Availability	High Availability	High Availability
Security (FGAC, Auth)	Security (FGAC, Auth)	Security (FGAC, Auth)
Hardware & OS Maintenance	Hardware & OS Maintenance	Hardware & OS Maintenance
Hardware Lifecycle	Hardware Lifecycle	Hardware Lifecycle
Power/ Network/ HVAC	Power/ Network/ HVAC	Power/ Network/ HVAC

Moving from self-managing open-source solutions to Amazon OpenSearch Service

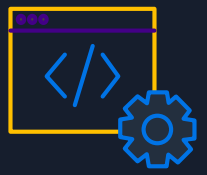
- 관리 및 확장을 위해서는 전문적인 지식이 필요하며, 이는 총 소유 비용을 증가시킴
- 고객들은 고급 보안, 알림 및 기타 기능을 직접 구축하거나 비용을 지불해야 함
- 고객들은 자체 인프라를 구매하고 관리해야 함

Moving from licensed solutions to Amazon OpenSearch Service

- 다른 패키지형 솔루션들은 데이터 용량이 증가함에 따라 과도한 비용을 발생시킬 수 있음
- 데이터베이스 솔루션과 일부 패키지형 솔루션들은 용량 제한이 낮고 지연 시간이 더 긺
- Amazon OpenSearch Service는 애플리케이션 데이터뿐만 아니라 로깅 데이터에 대한 검색도 지원하는 매우 유연한 도구임
- 이를 통해 많은 고객들이 문제 디버깅 및 수정을 위해 Amazon OpenSearch Service를 사용할 수 있음

Benefits of Amazon OpenSearch Service

커뮤니티 주도의 오픈소스 소프트웨어의 주요 기여자와 함께 OpenSearch를 운영화함



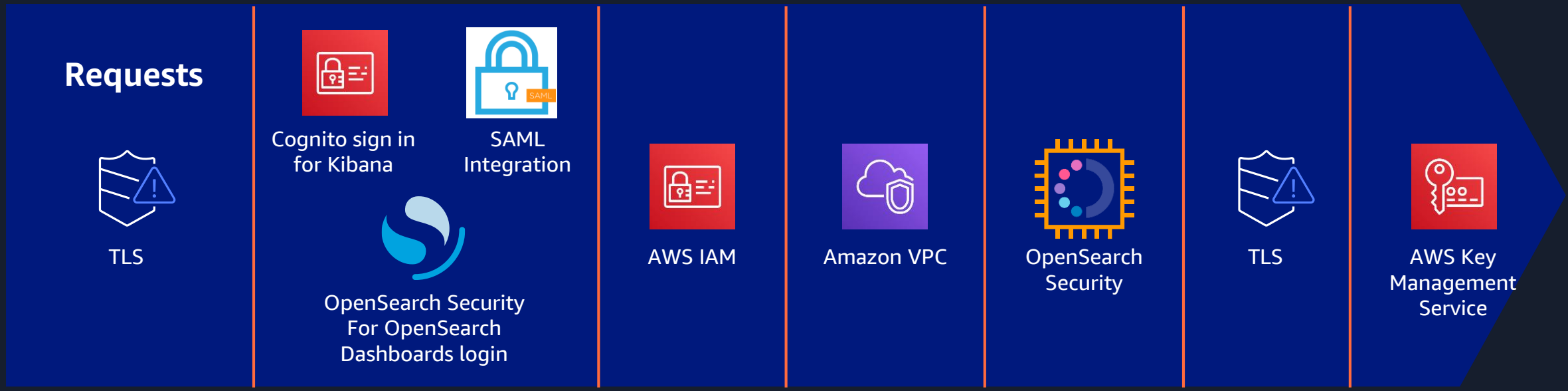
비정형 및 반정형 데이터를 신속하게 검색하고 분석하여 필요한 내용을 쉽게 찾을 수 있음

머신 러닝을 사용하여 실시간으로 이상을 감지하고, 클러스터를 자동 조정하며, 검색 결과를 개인화할 수 있음.

자동화된 프로비저닝, 소프트웨어 설치, 패치, 스토리지 계층화 등을 통해 운영 부담을 제거하고 비용을 절감할 수 있음

Key Features

Multi-layer security with Amazon ES



Encrypted from end to end—in flight with Transport Layer Security (TLS), at rest with Key Management Security (KMS).

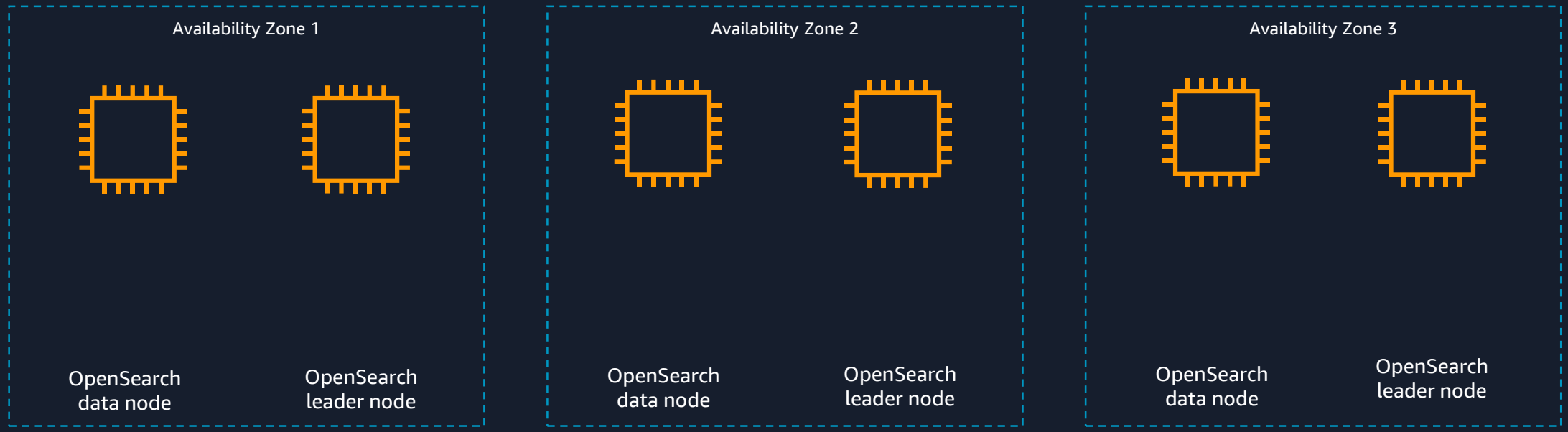
Use a private endpoint to deploy into your VPC and security groups for traffic control.

Includes Kibana login via Cognito integration, or native with Open Distro Security.

Coarse-grained access control with Identity and Access Management (IAM) policies.

Fine-grained access control for tighter control over your data.

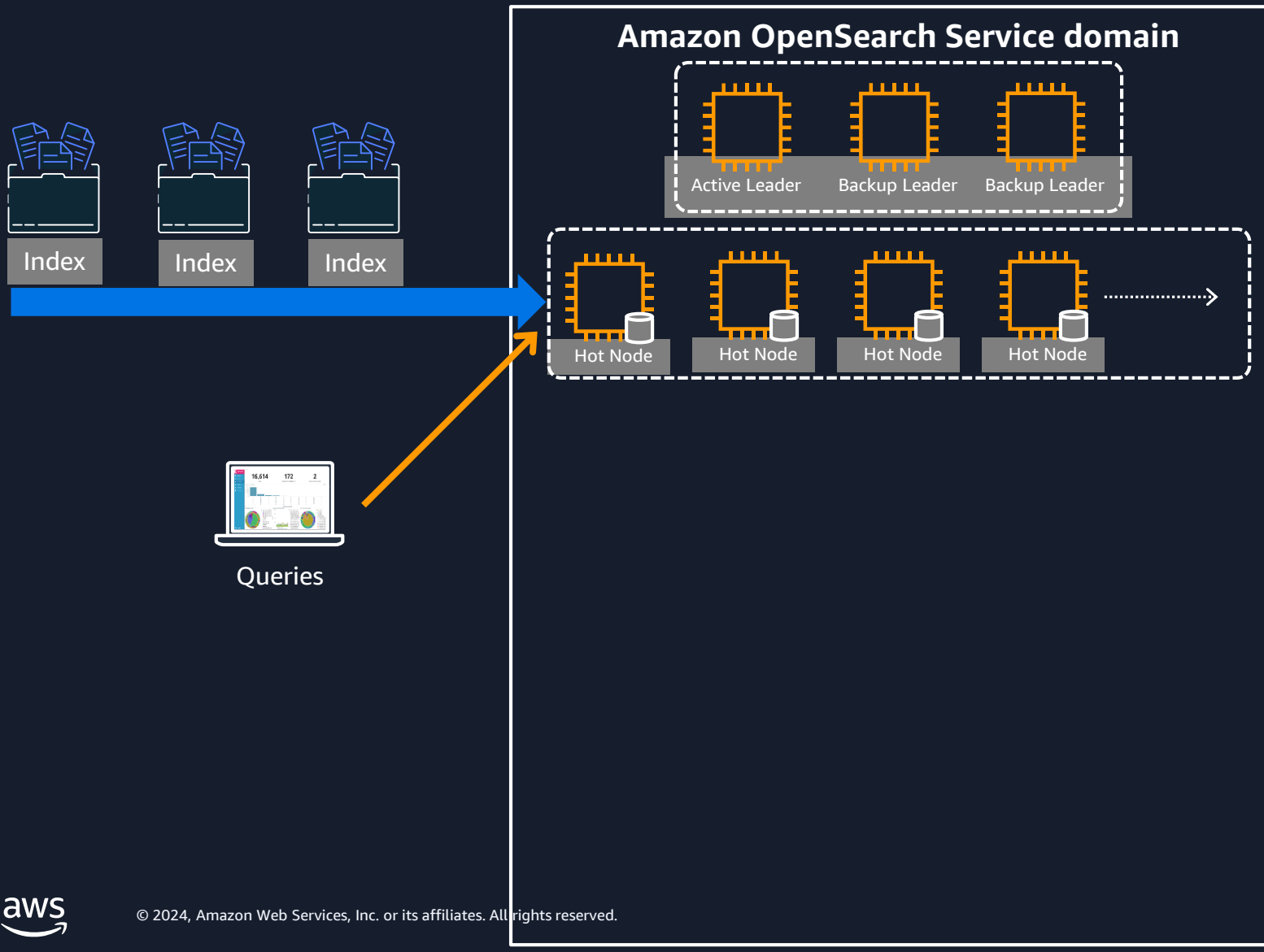
Zone awareness – 3 zones for higher availability



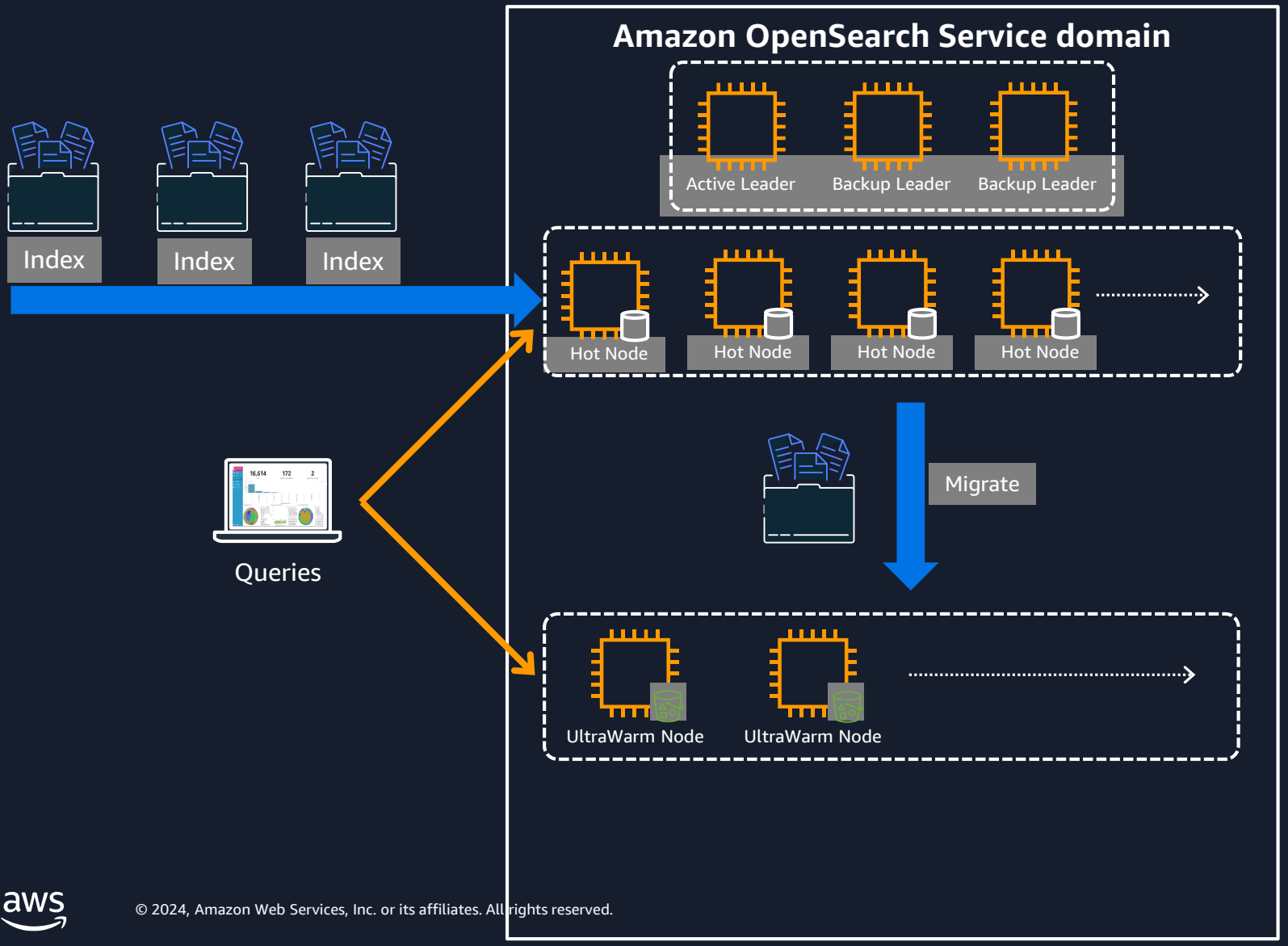
3개의 가용 영역(AZ) 배포는 위험을 더욱 제한하고 더 나은 가용성을 제공함

드물게 가용 영역을 사용할 수 없는 경우, 이 경우 컴퓨팅 및 JVM 용량의 1/3만 영향을 받음

Tiered Storage for Amazon OpenSearch Service



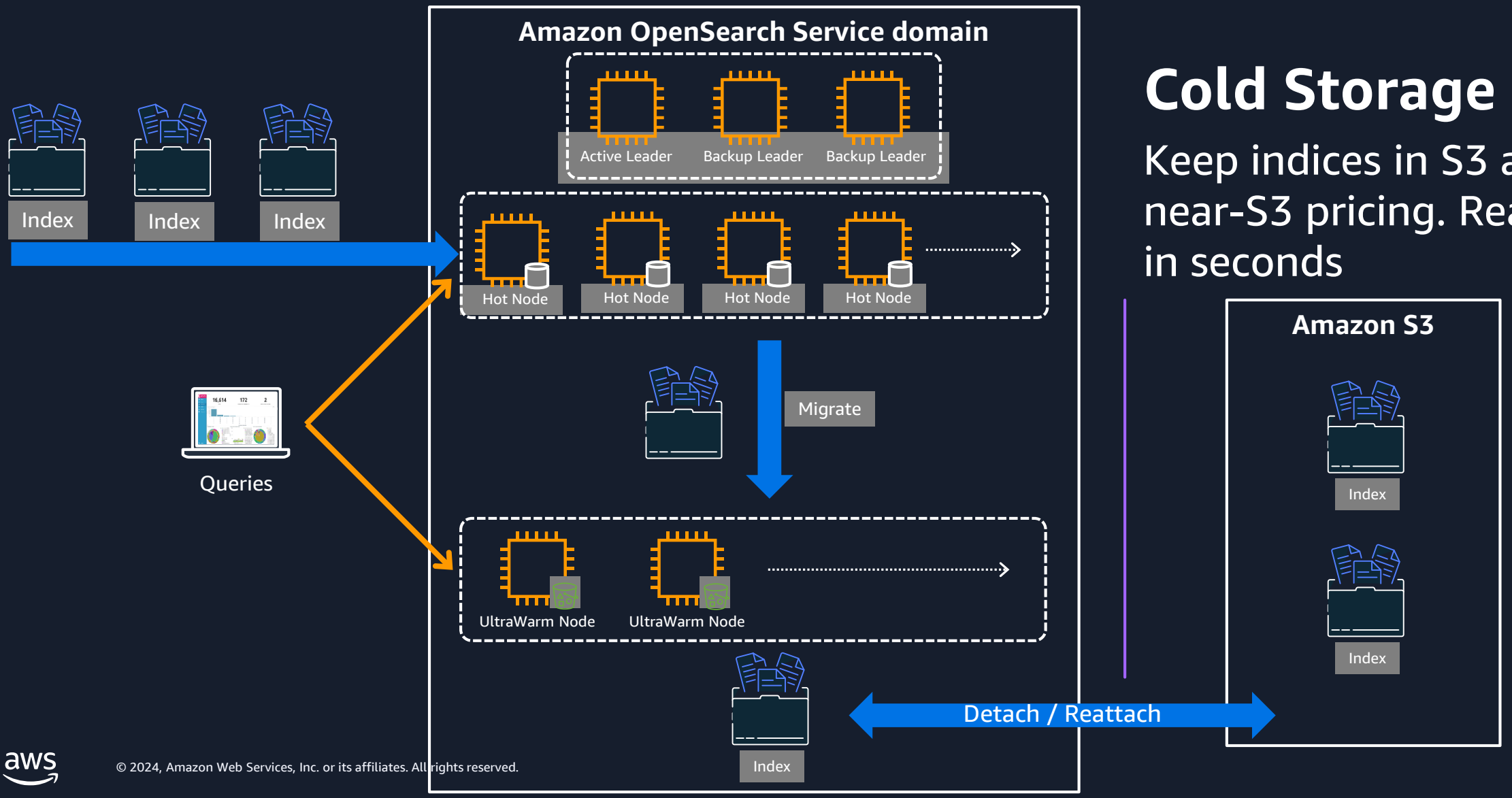
Tiered Storage for Amazon OpenSearch Service



UltraWarm

- 핫 스토리지 티어 대비 일반적으로 약 40% 비용 절감
- 도메인당 최대 3 PB까지 확장 가능
- 대화형 로그 분석 및 시각화 가능
- OS Hot/Warm/Cold 아키텍처 대비 2배 향상된 성능

Tiered Storage for Amazon OpenSearch Service



Cold Storage

Keep indices in S3 at near-S3 pricing. Reattach in seconds

Getting started

Resources

Amazon OpenSearch Service Immersion Days

Provides a deep dive into Amazon OpenSearch Service through a mix of online trainings and hands-on labs led by AWS Solutions Architects. You will learn all the key concepts to leverage the service along with the operational best practices.

Interested in scheduling Immersion Days?

Contact us

searchservices-ww-gtm@amazon.com

New releases

What's New

Documentation

Developer Guide

Blogs

Moving to managed: The case for the Amazon OpenSearch Service

Best practices for configuring your Amazon OpenSearch Service domain

Simple to get started...

1

Create an AWS Free Tier account

2

Launch an Amazon OpenSearch Service Cluster in minutes

3

Follow the Getting Started Tutorial to build a log analytics solution

Thank you!