Guppy

A Scalable Security Data Lake

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Project Name – Guppy

Security Data Lake

Guppy Fish can stay in fresh water lakes adaptively for longer durations

Security Data Lake will also retain security big data for **extended durations**, before **correlation** & **analysis**

This project is named as **Guppy**, a tropical fish that resides in fresh water lakes

Security Data Lake
Code Name
Guppy

Presentation Agenda

- Guppy - Security Data Lake Architecture
- Why Security Data needs a Data Lake nowadays?
- Guppy Security Features
- Take Aways

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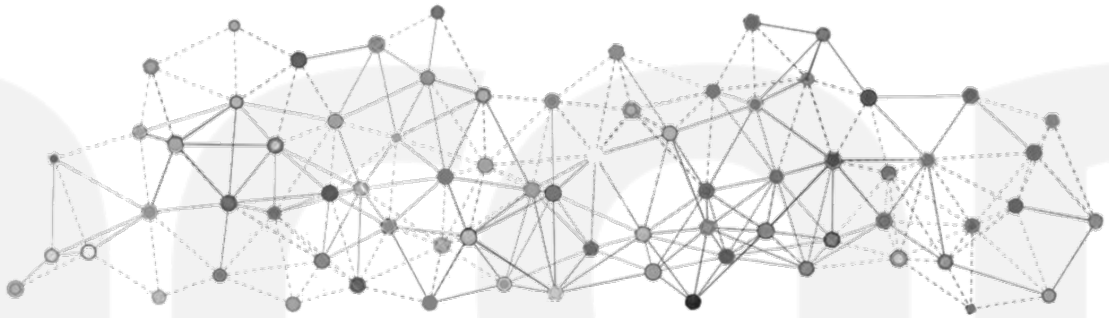
1 Why Security Data Needs a Data Lake?

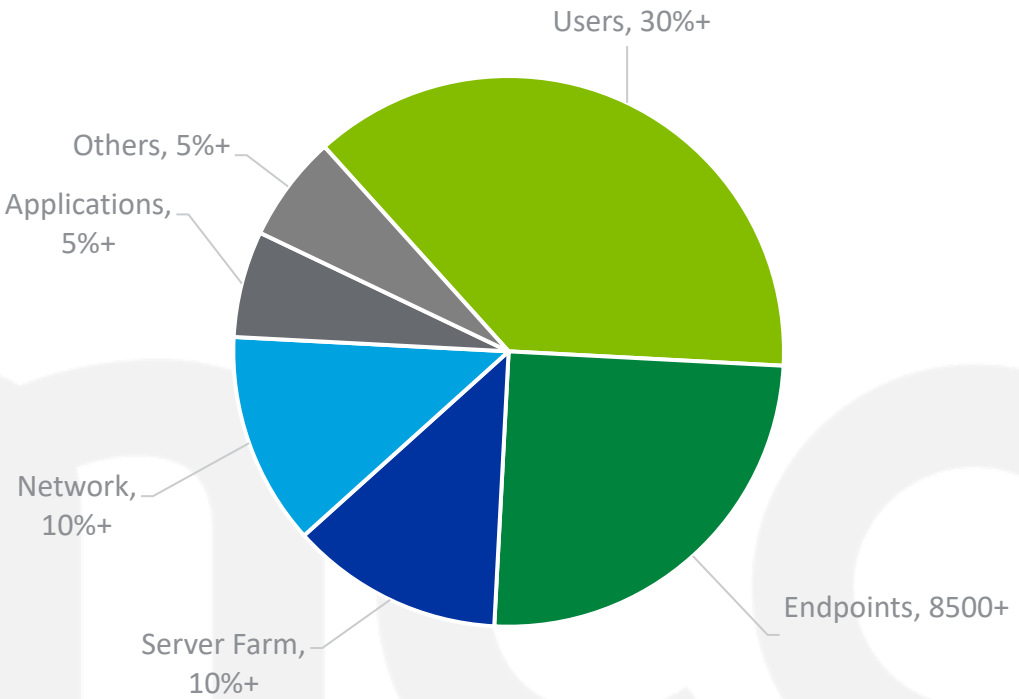
Best Practices & Guidelines

01/11/2023

Why Security Data Needs a Data Lake?

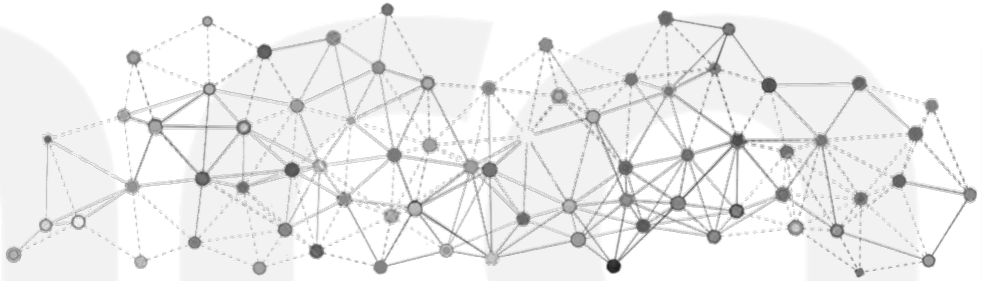
- Any Large Scale SOC currently monitors minimum **10,000+ IT Assets**
- Security Data volume in all larger enterprises is increasing exponentially, currently around **TeraBytes per day**
- Managing such a growing Big Data is a challenge

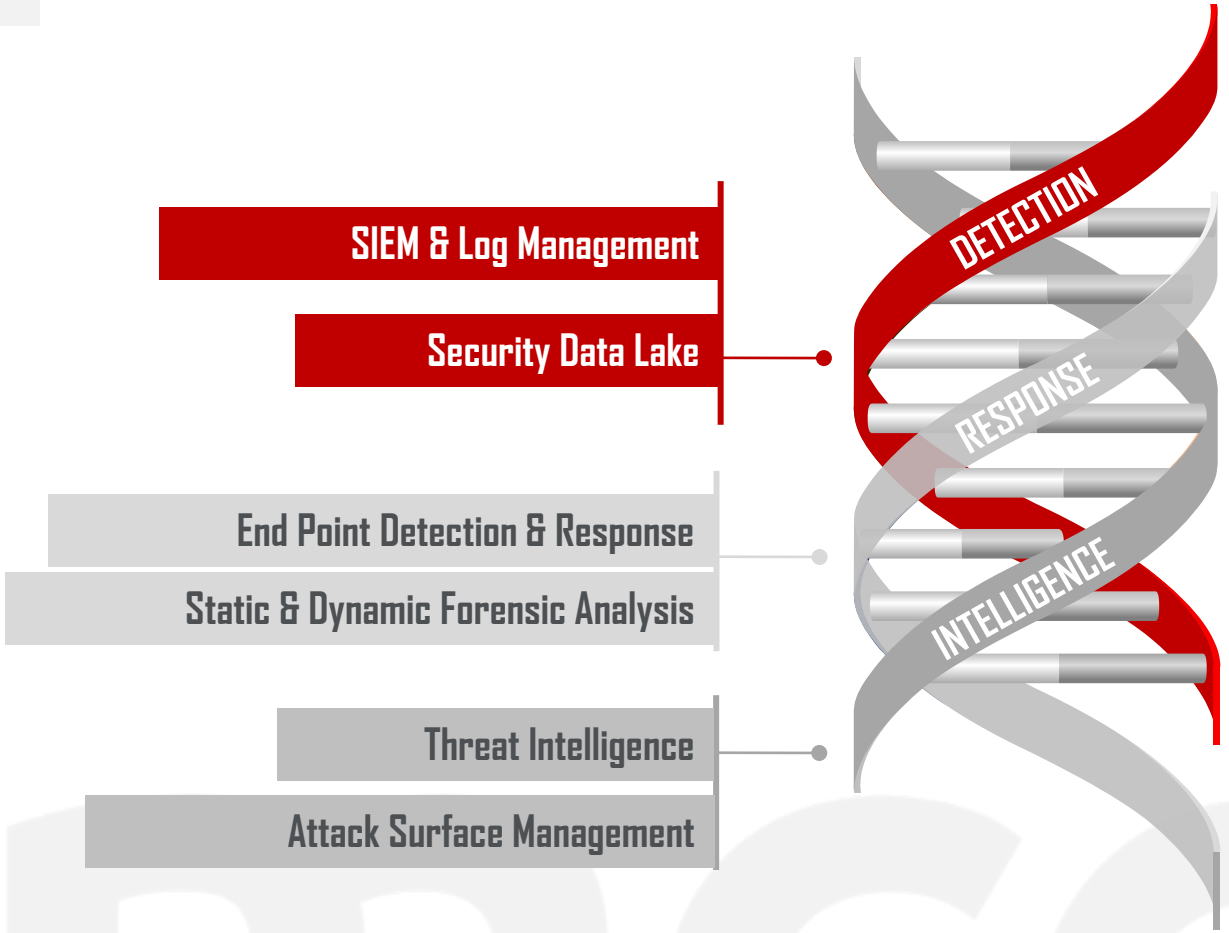




Generic SOC Eco System

- 3 Key SOC Requirements
  Detection, Response & Intelligence
- Detection via SIEM is not enough
  Data Lake is the Future
- Data Engineers are a must for SOC
  They are soon replacing SIEM engineers





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2 Security Data Lake Architecture

Project Code Name: **Guppy**

Streaming Ingestion

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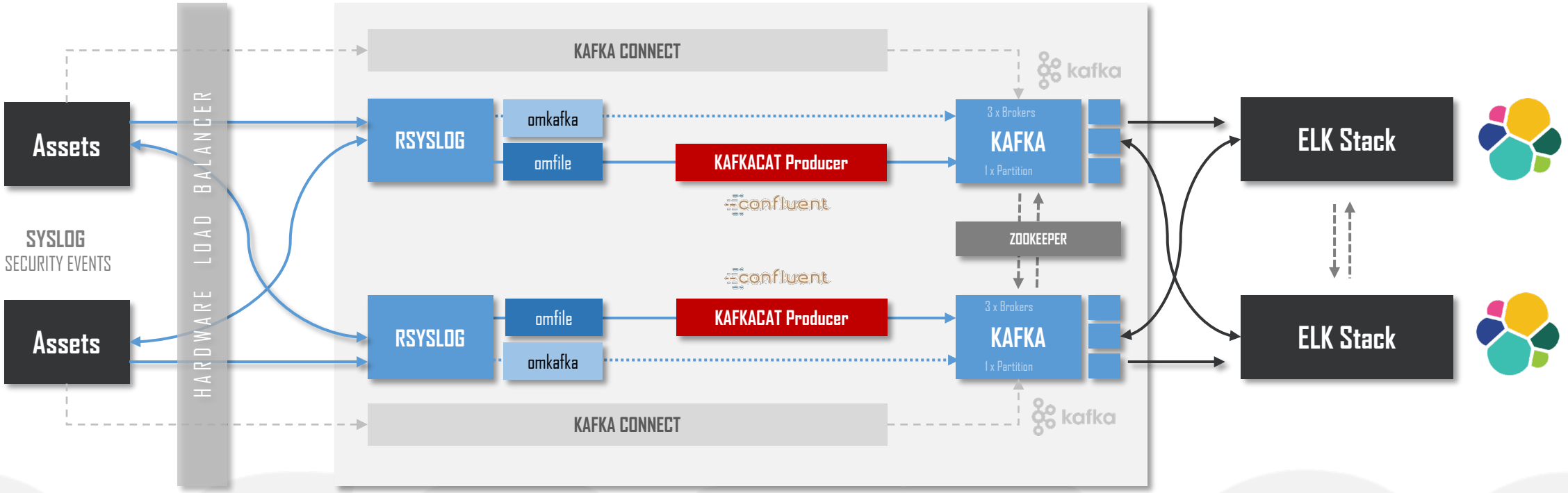


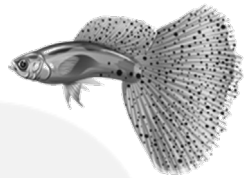
Log Ingestion Middleware

RSYSLOG
Fast | In-Memory Queues | QoS | TLS | Kafka Compatible

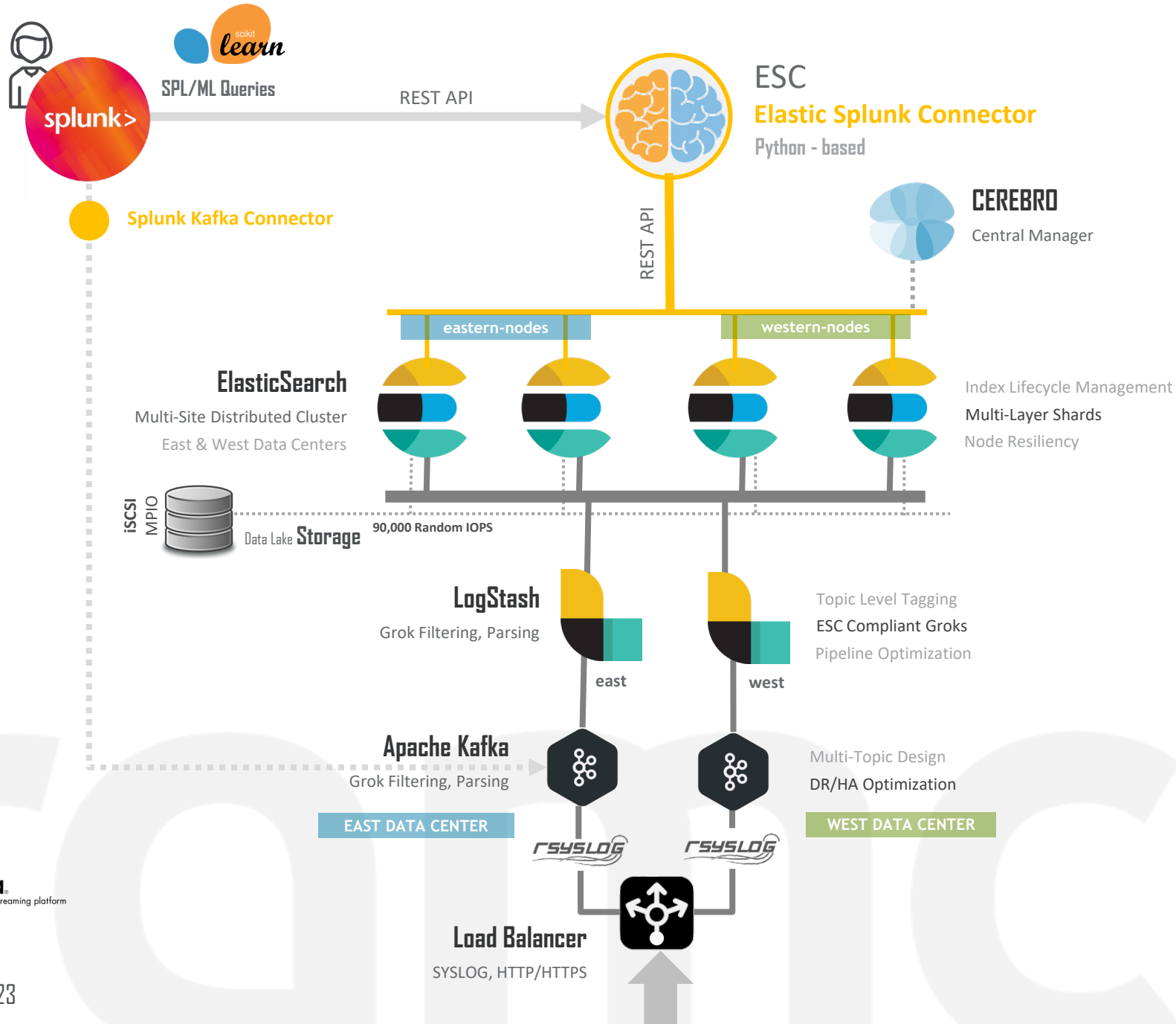
KAFKACAT
KAKFA Debugger | Producer | Consumer | Query Topics

ZOOKEEPER
Central Coordinator | Synchronization | Cluster Management

Guppy
Data Lake Architecture



GUPPY
A Scalable
Security Data Lake



Analytics
Processing
Streaming Ingestion

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2 Guppy Security Features

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Elastic - Splunk Connector ESC

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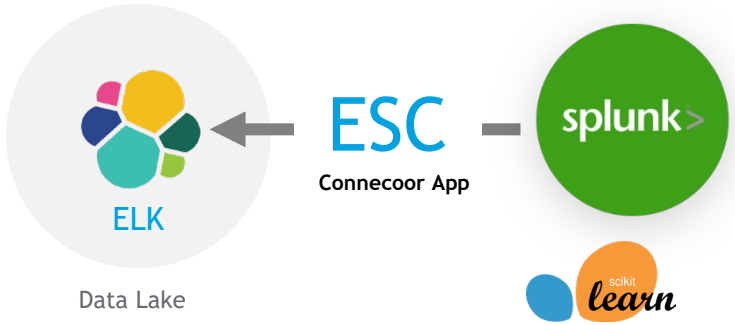
- A custom connector, that queries **ElasticSearch** Data using **Splunk GUI**
- Much **easier** to search for SOC analyst
- No **Licensing** Overheads on Splunk
- Splunk **Machine Learning** capabilities can be applied on Data Lake events



Splunk ESC Query

```
| esc `ELK` action=search index=smtp.2022.12
latest=now earliest=now-1m query="message:*email*"
include_raw=true include_es=true
| stats count by message
| vader textfield=message full_output=true
```

Machine Learning Capabilities

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Prediction | Numeric
Linear Regression
LASSO
Ridge, Kernel Ridge
ElasticNet
DecisionTree Regressor
RandomreForenst Regressor
Stochastic Gradient Descent

Clustering | Numerical
KMeans / Xmeans
DBSCAN
BIRCH
Spectral Clustering

Prediction | Categorical
Logistic Regression
Support Vector Machines
Bernoulli Naïve Bayes
Guassian Naïve Bayes
SGDClassifier
DecisionTree Classifier
RadomForenst Classifier

Feature Extraction
FieldSelector
PCA
Kernel PCA
TFIDF

Outliers | Categorical
OneClass SVM
AnomalyDetection (command)

Outliers | Numerical
OneClass SVM
Median, Mean, P25, P75

Preprocessing
StandardScalaer
AnalyzeFields (command)

Forecast | Time Series
ARIMA
Kalman Filter

Access to over 300
Open-Source Algorithms

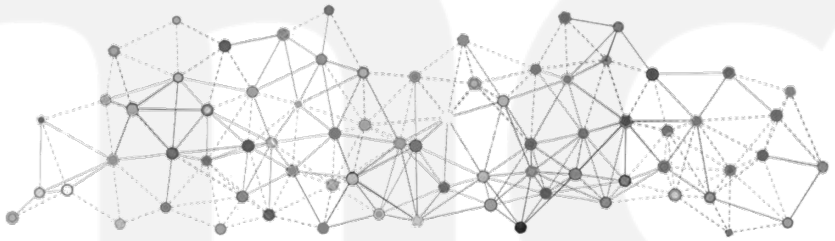
Elastic Common Schema (ECS)

- **Elastic Common Schema (ECS)** defines a standard naming convention for data ingested into Elasticsearch, helping you correlate data from diverse vendors and technologies

github.com/elastic/ecs

Without ECS	With ECS
src: 10.42.42.42 client_ip: 10.42.42.42 src_addr: 10.42.42.42	source.ip: 10.42.42.42

NORMALIZATION



Event Query Language (EQL)

- **Event Query Language (EQL)** for threat hunting and real-time detection with a simple syntax that helps SOC Analysts for writing complex queries
- Supports functions like join, unique, filter, head, sort, tail

```
network
| filter total_out_bytes > 100000000
| sort total_out_bytes
| tail 5
```

- Used for development of threat cases / correlation alerts

```
GET /my-data-stream/_eql/search
{ "query": """ library where process.name == "regsvr32.exe"
   and dll.name == "scrobj.dll" """ }
```

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2 Take Aways

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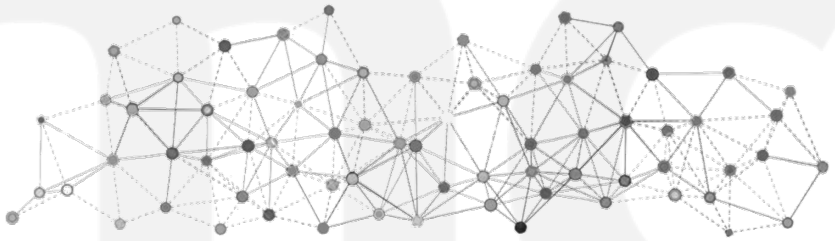
Take Aways

- SOC require Security Data Lakes for **better visibility**
- Data Lake may be built, using **Open Source products**
- Data Lake should be utilized to keep **nice-to-have** security data
  i.e. Cloud API, Application Debug, OS System Logs
- Data Retention can be achieved through **low-cost storage**
- It will enable **Machine** & **Deep Learning** analysis of security data



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Security Data Lake

Questions & Answers

Using Data to Defend

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Security Data Lake

Information is the oxygen of the modern age. It seeps through the walls topped by barbed wire, it wafts across the electrified borders

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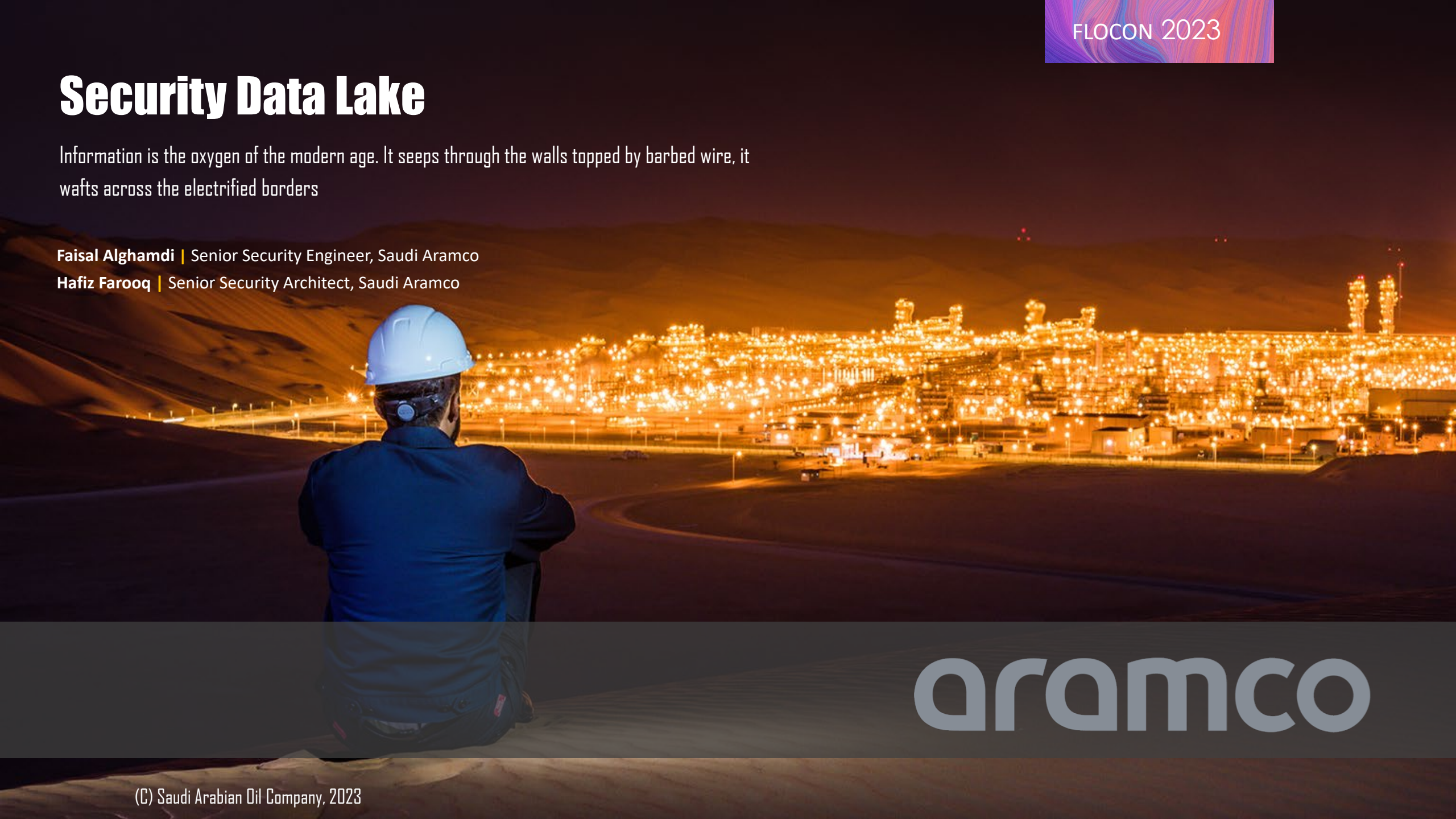

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