Monitoring & Remediation

What are we building in Lab 2?

- Building off of Lab 1 we are going to implement AWS-centric monitoring and build a monitoring and notification system

- This lab is broken up into 2 sections
  1. Enable Logging and Monitoring
  2. Implement Managed Security Solutions and Alerting

You can build the relevant parts of Lab 1 by running CloudFormation script:
https://s3.amazonaws.com/security-compliance-immersion-day/ImmersionDayCF_Module3.json

What are we building in Section 1?

- We will implement the monitoring and centralized logging of the application using AWS services.

- In this lab we want to demonstrate:
  1. How to create an ElasticSearch cluster for log evaluation
  2. Setup CloudWatch and CloudTrail to integrate with ElasticSearch
  3. Evaluate logs in ElasticSearch using Kibana

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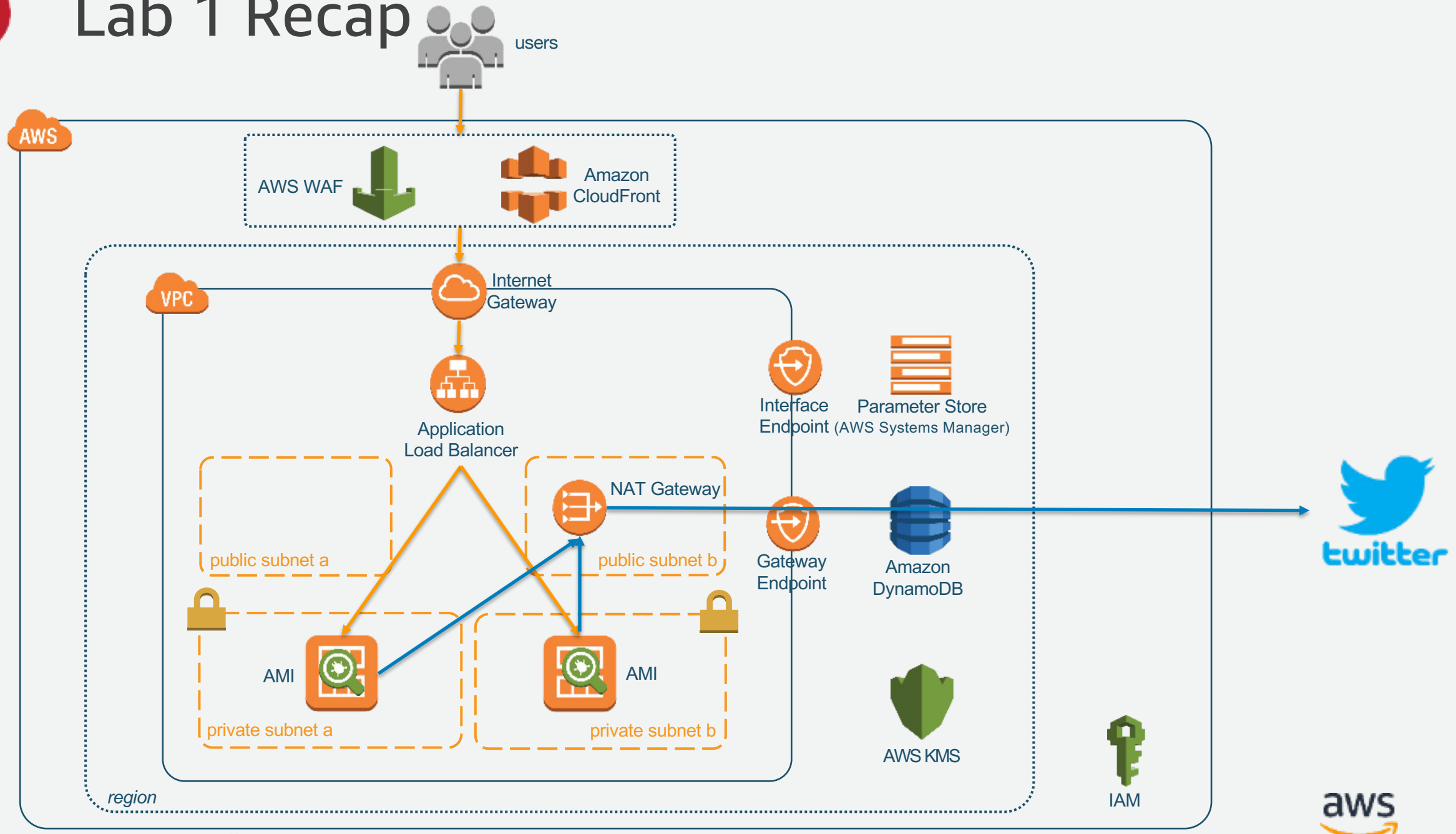
Lab 1 Recap



AWS ElasticSearch

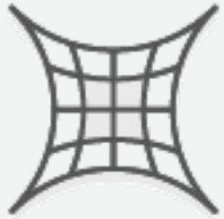
Deploy, secure, operate, and scale Elasticsearch for log analytics, full text search, and application monitoring.

- Analyze un-structured and semi-structured logs
- Capture, pre-process, and load log data using Amazon Kinesis Firehose, Logstash, or Amazon CloudWatch Logs
- Search, explore, and visualize the data using Kibana and the Elasticsearch query DSL

Easy to Use

Supports Open-Source APIs and Tools

Secure



Easily Scalable

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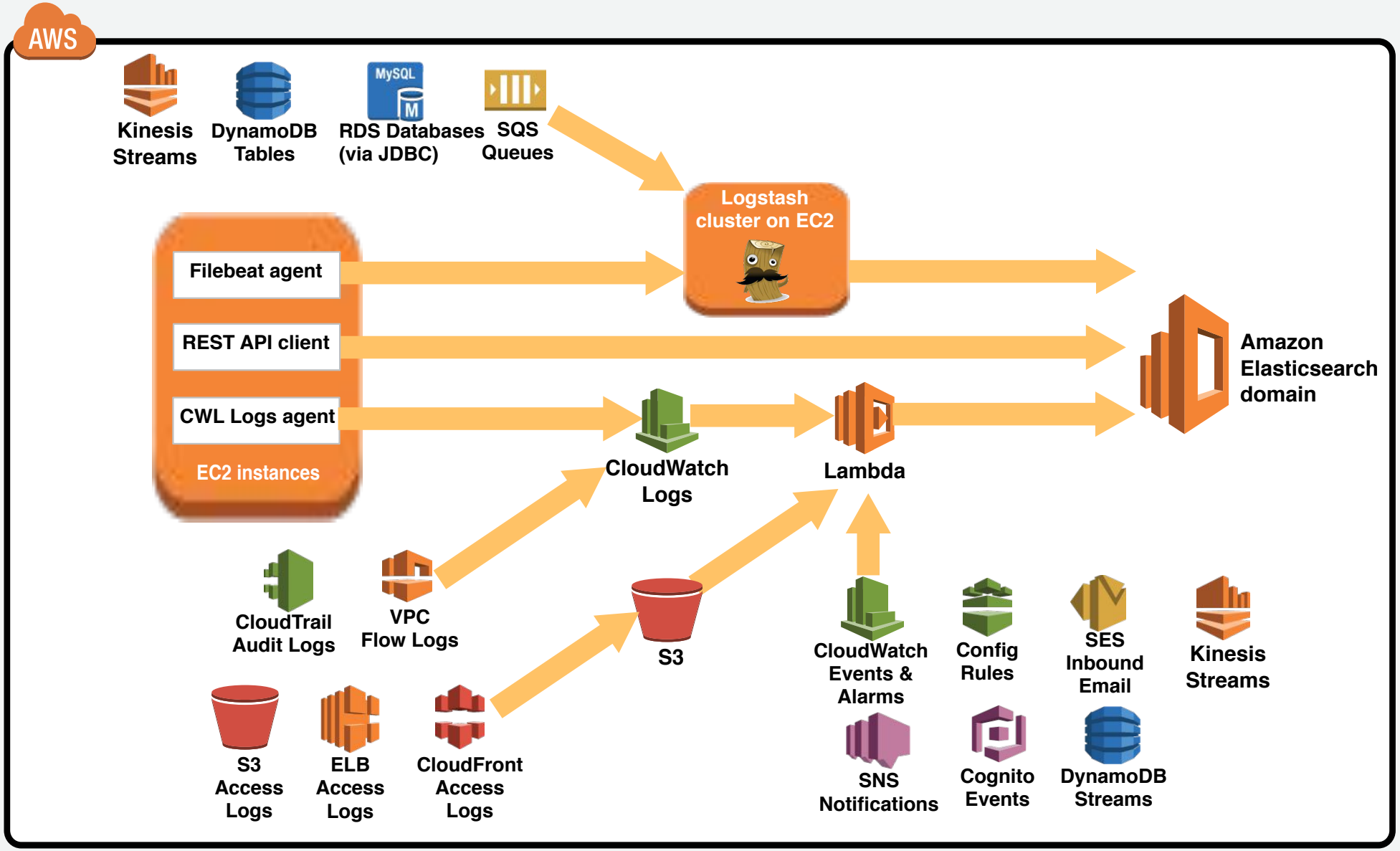
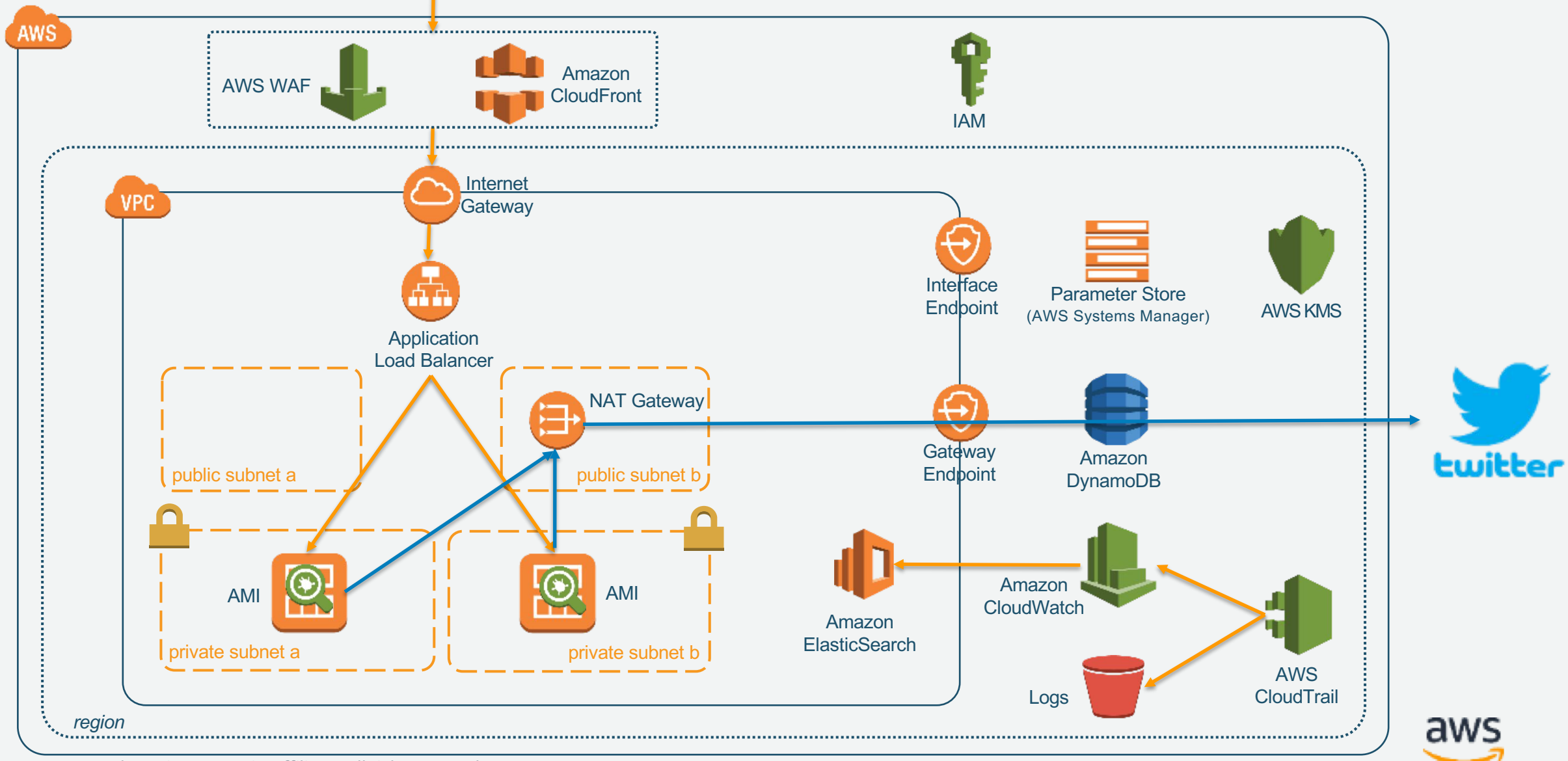
AWS ElasticSearch



Arrow direction indicates general direction of data flow

Section 1

Logging



Step 1 – ElasticSearch setup

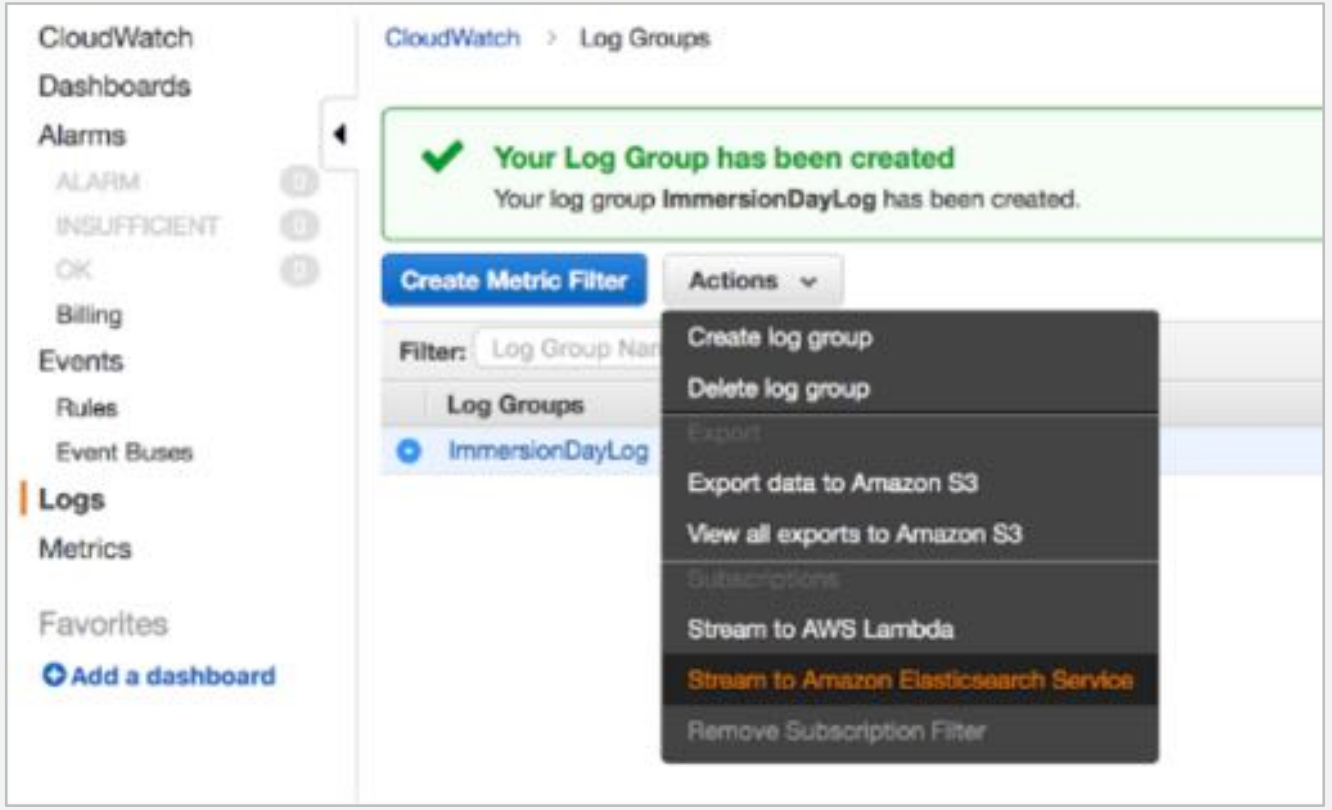
- Create ElasticSearch cluster in a private subnet of our VPC.
- Use the following access policy:

```
{
        "Version": "2012-10-17",
        "Statement": [
        {
                "Effect": "Allow",
                "Principal": { "AWS": "*" },
                "Action": "es:*",
                "Resource": "*"
        }
        ]
}
```

- Note: it takes about 20 mins to create the cluster.

Step 2 – CloudWatch setup

- Create CloudWatch log group (CloudWatch -> Logs -> Create Log Group)
- Send all logs from this group to the previously created ElasticSearch cluster. Log format is CloudTrail and a new IAM role needs to be created for streaming to be successful.



Step 3 – CloudTrail setup

- Create a new CloudTrail trail.
- Configure your destination S3 bucket where the logs will be stored.
- Send all CloudTrail logs to previously created CloudWatch log group.

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Step 4 – Confirm logs

- Go to the website a few times using the CloudFront URL then wait
- Get the Kibana link from the console
- In Kibana create a query for the last 10 minutes of logs
- Find the logs your traffic generated

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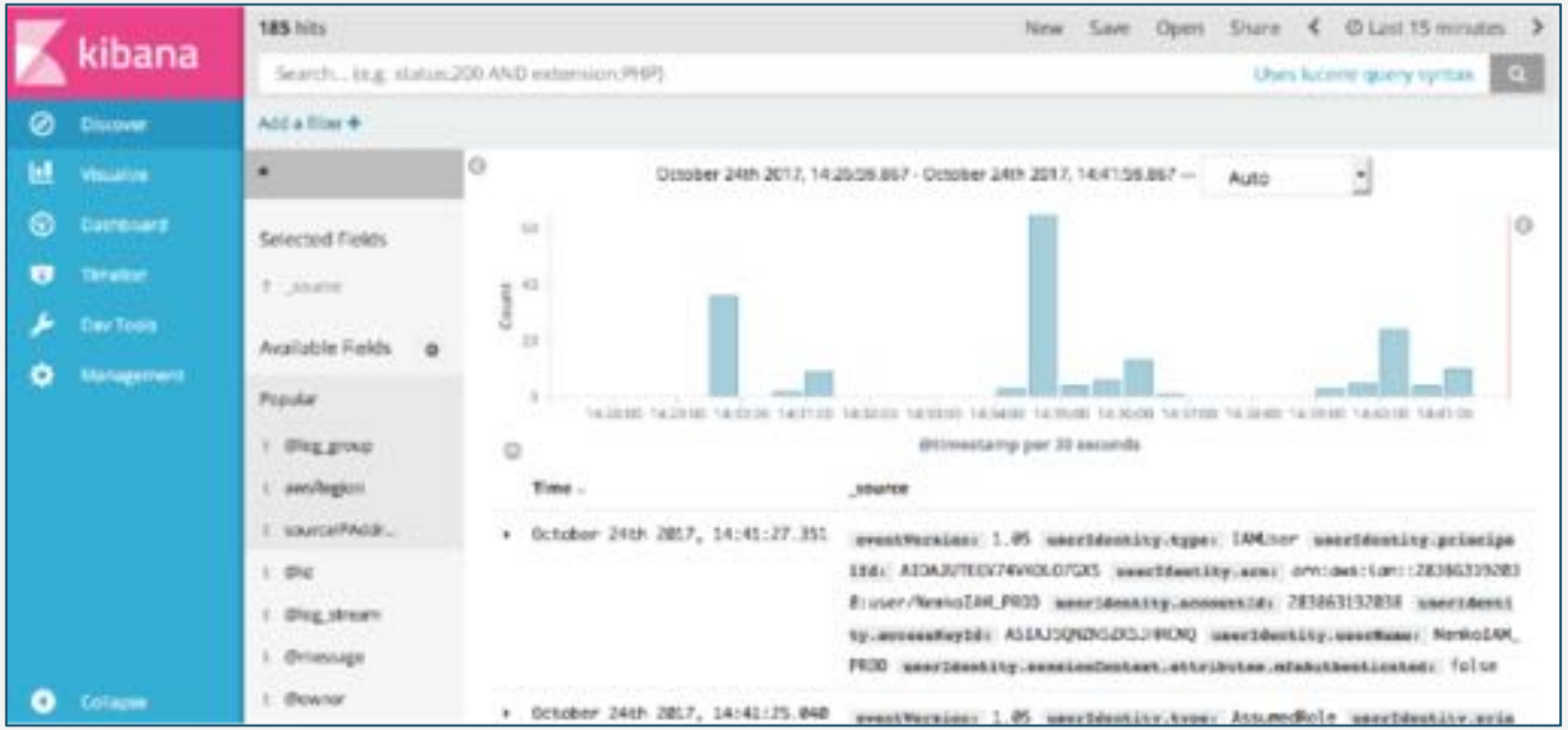
What have we achieved?

- We can now see all activity in our account that is recorded by CloudTrail.
- That activity is stored in S3 and streamed via CloudWatch to ElasticSearch.
- Logs in ElasticSearch can be examined by using Kibana (for Index Pattern enter just star *)



What are we building in Section 2?

- We will use native AWS Security services to provide active monitoring of our resources.

- In this lab we want to demonstrate:
  1. How to enable and configure GuardDuty
  2. How to enable and configure Inspector
  3. How to enable and configure Macie
  4. How to configure email alerts based on specific findings

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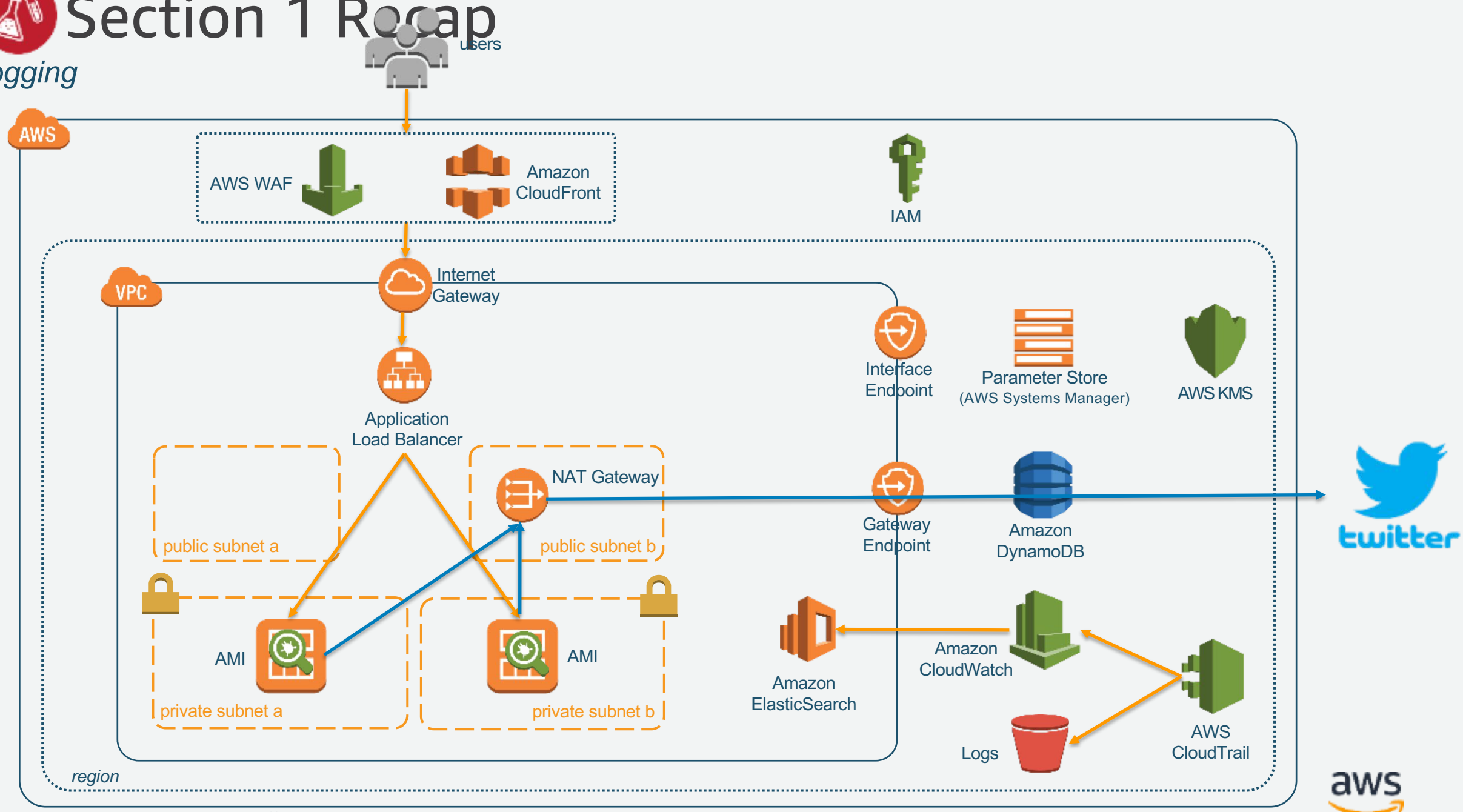
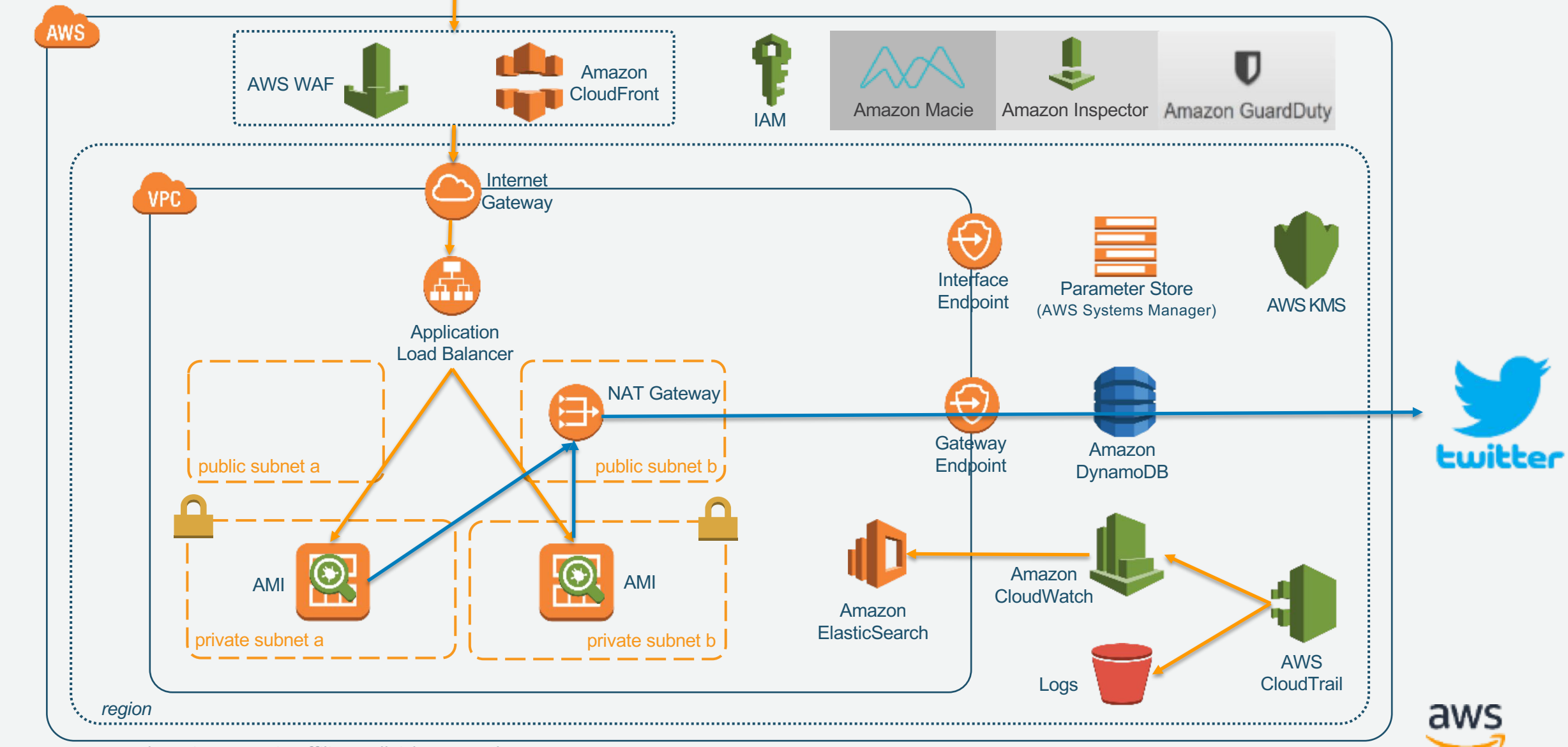
Section 1 Recap

Logging



Section 5

Managed Security Services

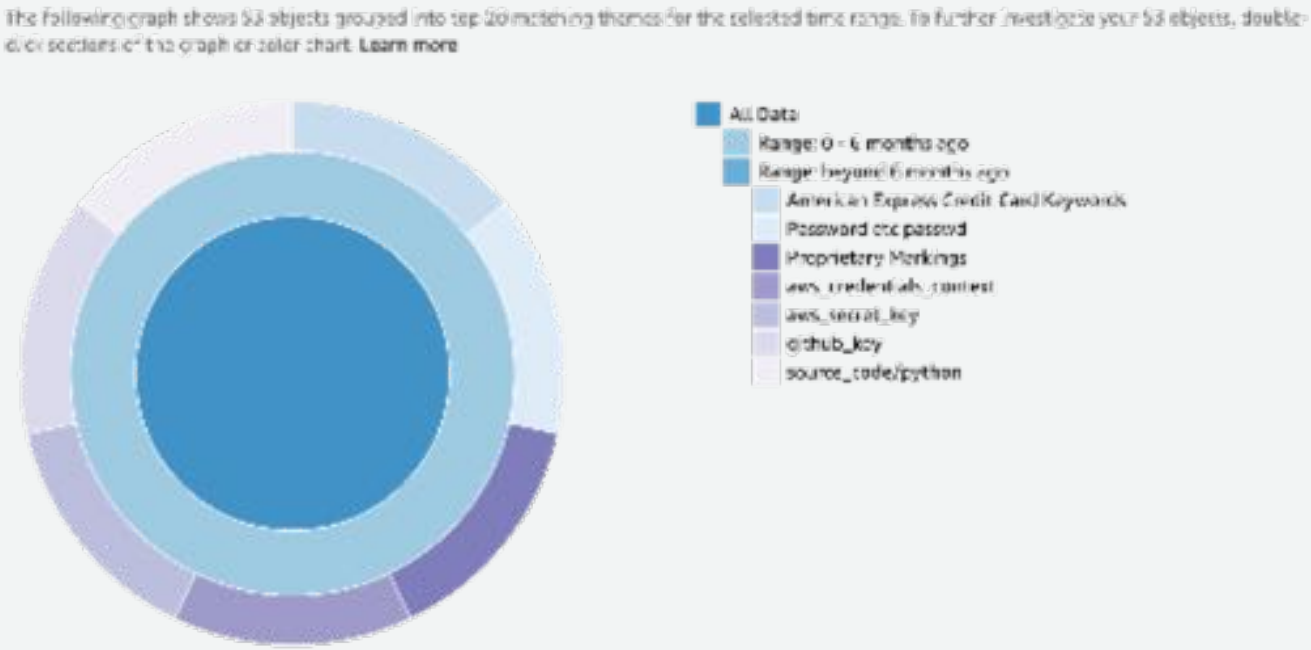


Step 1 – GuardDuty activation

- Enable GuardDuty for your account
- The results won’t be shown immediately, it takes some time for GuardDuty to run.
- GuardDuty finding can be something like this:

Step 2 - Amazon Macie activation

- Enable Macie for your account
- Point Macie ONLY at the S3 buckets created for this lab
- The results won't be shown immediately, it takes some time for Macie to run.
- Macie finding can be something like this:



Step 3 – Create CloudWatch email notifications

- Go to the **Simple Notification Service**
- Create a **Topic**
- Create an **email subscription** using your email address
- Open the **CloudWatch console**
- Create a **Rule for GuardDuty** that uses your newly created **SNS Topic** as a **Target**
- Create a 2nd Rule for **Macie** using the same SNS Topic

Step 4 – Amazon Inspector activation

- Amazon Inspector is using an agent that is already packaged with our AMI.
- Create Assessment Targets – those will be our EC2 instances in private subnets.
- The assessments targets are identified by tags. For Key enter “instance” and for Value enter “immersionday” as these are the tags we used for our EC2 instances.
- Create Assessment Template where you can select those two EC2 instances and select rules to run for a certain duration period.

Amazon Inspector findings

- After running “Assessment Runs” for our template, we should get first results within an hour.

- The results might have findings such as:

Rules package	Common Vulnerabilities and Exposures-1.1
AWS agent ID	i-0b3c824618cf3271b
Finding	Instance i-0b3c824618cf3271b is vulnerable to CVE-2018-1000021
Severity	High
Description	GIT version 2.15.1 and earlier contains a Input Validation Error vulnerability in Client that can result in problems including messing up terminal configuration to RCE. This attack appear to be exploitable via The user must interact with a malicious git server, (or have their traffic modified in a MITM attack).
Recommendation	Use your Operating System's update feature to update package git-1:2.7.4-0ubuntu1.3. For more information see https://cve.mitre.org/cgi-bin/cvename.cgi?name=CVE-2018-1000021