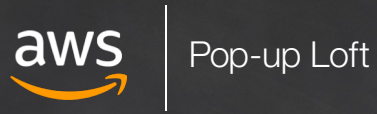
Find All the Threats: AWS Threat Detection and Remediation

Roger Cheeks,
Solutions Architect, Security Specialized



Agenda

- Intro
- Module 1: Environment setup (20 min.)
- Module 2: Attack kickoff (and presentation) (40 min.)
- Module 3: Detect, investigate & respond (45 min.)
- Module 4: Review, questions & cleanup (15 min.)

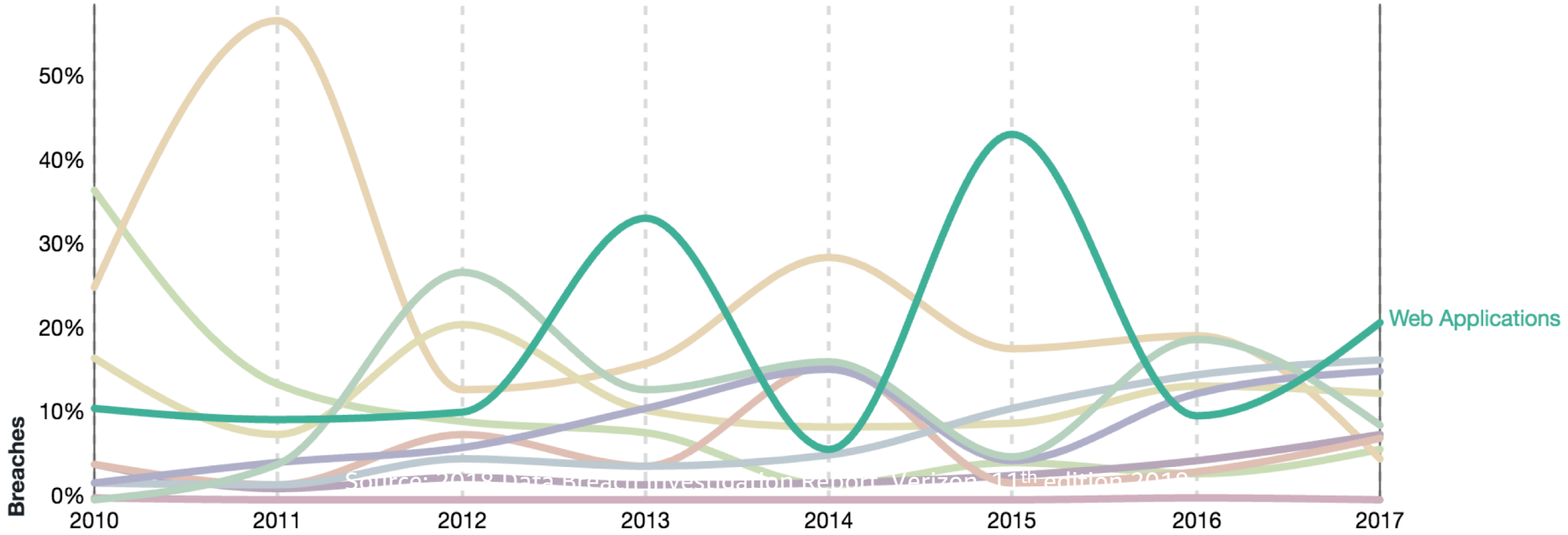
Amazon Web Services (AWS) account housekeeping

- You need an AWS account – please don't use one of your work accounts
- Credits have been provided – the credit form has info on how to enter it
- Please use an AWS Identity and Access Management (IAM) user with administrative access, ***not the root user***
- The facilitators will be walking around to help set up AWS accounts, enter credits, etc.

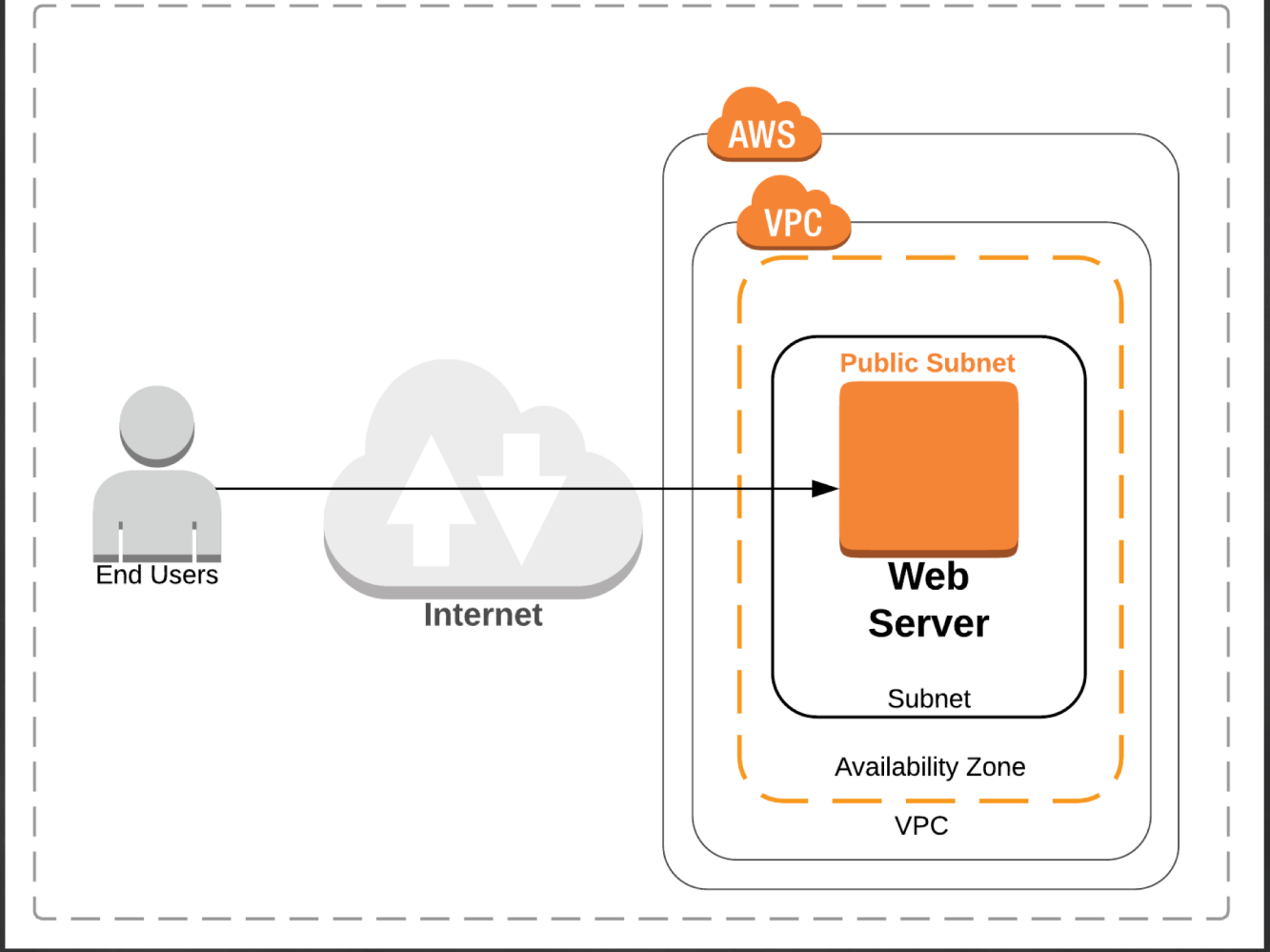
https://awssecworkshops.com/getting-started/

Verizon 2018 Data Breach Investigations Report

Data Breach Patterns



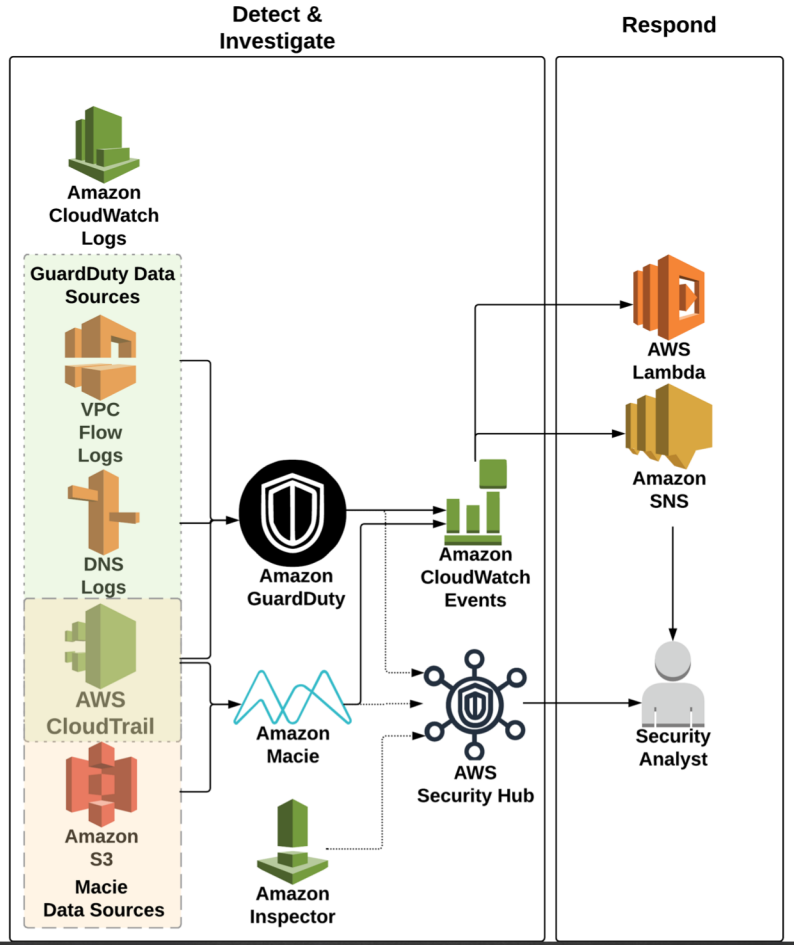
Workshop scenario



Module 1 Agenda

- Run the AWS CloudFormation template (~5 min.)
- Manual setup steps (~15 min.)

Module 1 setup



Start module 1

Use: US West (Oregon)
us-west-2

https://tinyurl.com/ybgjrykt
https://awssecworkshops.com/workshops/threat-detection-remediation/

Directions:

Browse to https://tinyurl.com/ybgjrykt

- Read through the workshop scenario
- Click on Module 1: **Environment Build** in the outline on the left
- Complete the module (~15 min.) and then stop

Module 2 Agenda

- Run the CloudFormation template (~5 min.)
- Threat detection and response presentation (~30 min.)
- Workshop walk-through (~5 min.)

Start module 2

Use: US West (Oregon)
us-west-2

https://tinyurl.com/ybgjrykt
https://awssecworkshops.com/workshops/threat-detection-remediation/

Directions:

Browse to **https://tinyurl.com/ybgjrykt**

- Click on **Attack Simulation** in the outline on the left
- Complete the module (~5 min.) then stop (we will do a presentation next)

Threat Detection & Response Intro

Why is threat detection so hard?

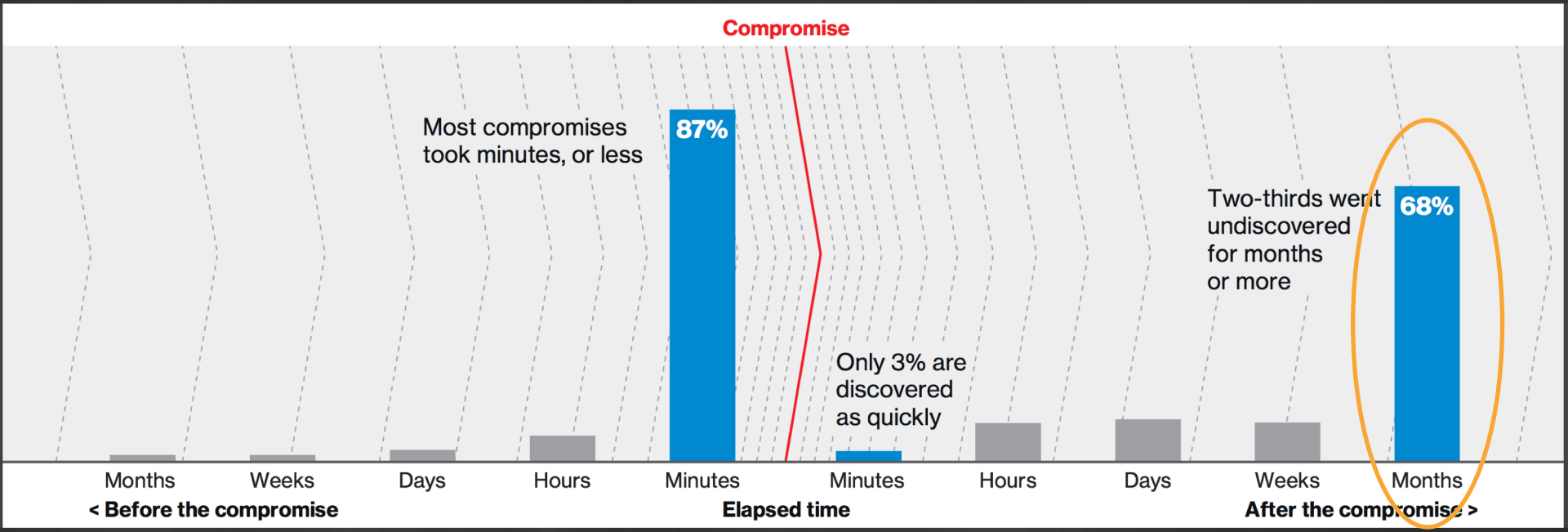
Large datasets

Signal to noise

Skills shortage

aws

Detecting breaches



Source: 2018 Data Breach Investigation Report, Verizon, 11th edition 2018

AWS Security Solutions

https://www.nist.gov/cyberframework

Identify	Protect	Detect	Respond	Recover
AWS Systems Manager	AWS Systems Manager	AWS CloudTrail	AWS Config Rules	AWS Disaster Recovery and Backup Solutions
AWS Config	Amazon Inspector	AWS Config Rules	AWS Lambda	
	VPC	Amazon CloudWatch Logs	AWS Systems Manager	
	AWS KMS	AWS Security Hub	Amazon CloudWatch Events	
	AWS CloudHSM	Amazon GuardDuty	Pro Services AERO	
	IAM	Amazon VPC Flow Logs		
	AWS Organizations	Amazon Macie		
	AWS Cognito	AWS Shield		
	AWS Directory Service	AWS WAF		
	AWS Single Sign-On			
	AWS Certificate Manager			
	Amazon Inspector			

Threat Detection Services

Threat Detection: Log Data Inputs

CloudTrail

Track user activity and API usage

VPC Flow Logs

IP traffic to/from network interfaces in a VPC

CloudWatch Logs

Monitor apps using log data, store & access log files

DNS Logs

Log of DNS queries in a VPC when using the VPC DNS resolver

aws

Threat Detection: Machine Learning

Amazon GuardDuty

Intelligent threat detection and continuous monitoring to protect your AWS accounts and workloads

Amazon Macie

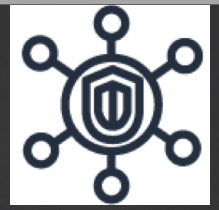
Machine learning-powered security service to discover, classify & protect sensitive data

aws

Introducing AWS Security Hub – In Preview

Insights & Standards

- Comprehensive view of your security and compliance state within AWS
- Aggregates security findings generated by other AWS security services and partners
- Analyze security trends and identify the highest-priority security issues



AWS Security Hub

Findings

Security findings providers

Amazon Inspector

Amazon GuardDuty

Amazon Macie

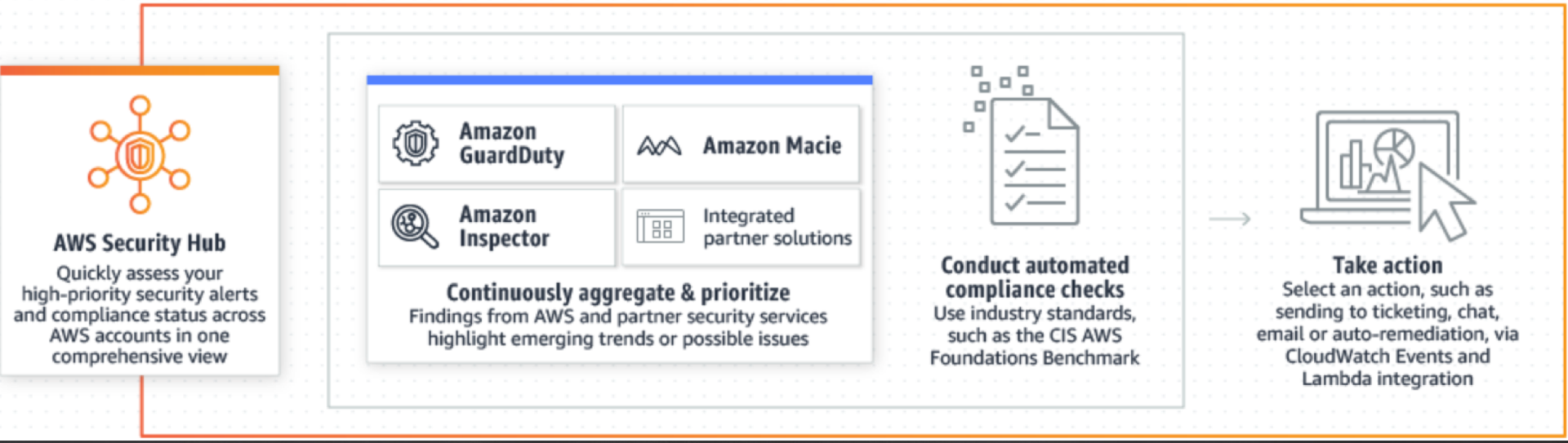
AWS Config

Partner Solutions

Other

aws

Introducing AWS Security Hub – In Preview



Live Role Playing Demo

Threat Detection: Evocations/Triggers

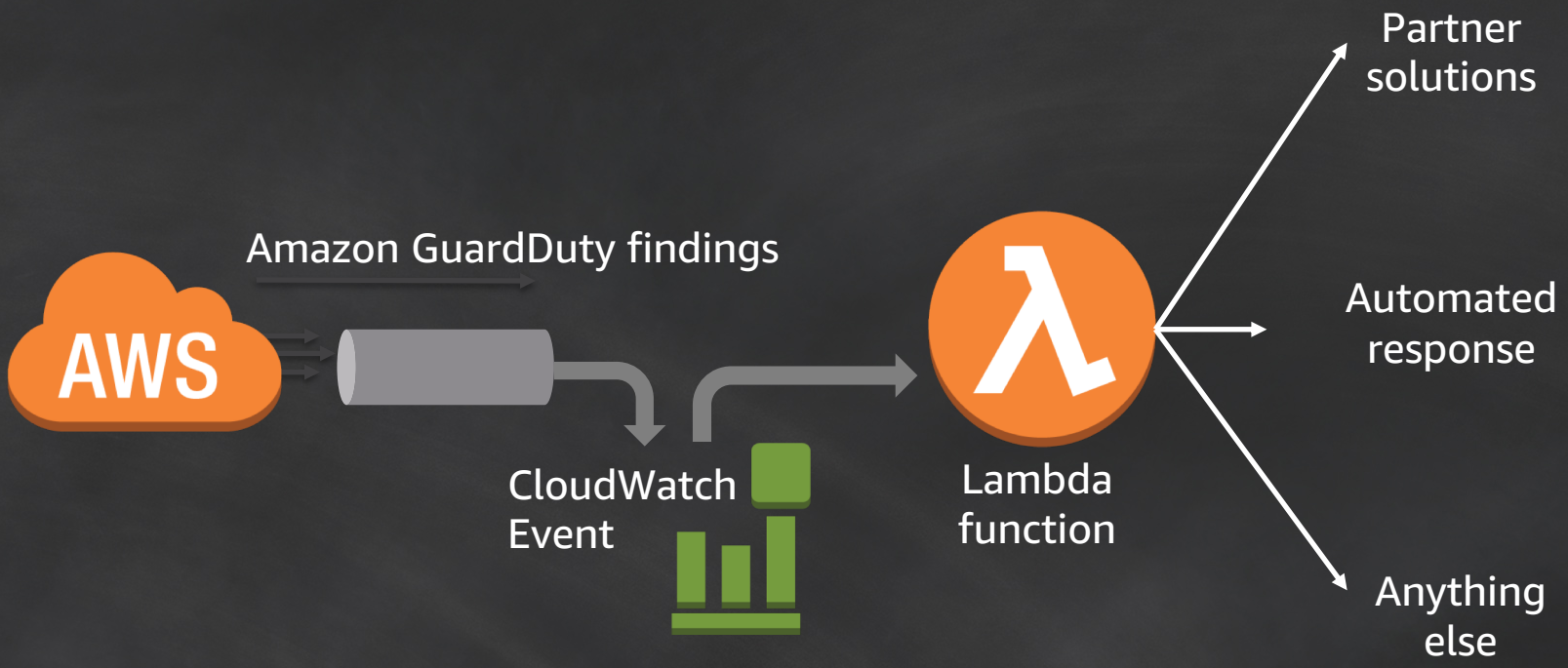
AWS Config

Continuously tracks your resource configuration changes and if they violate any of the conditions in your rules

Amazon CloudWatch events

Delivers a near real-time stream of system events that describe changes in AWS resources

Amazon CloudWatch Events



Respond

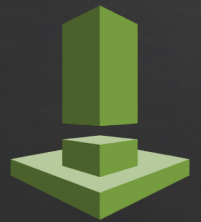
Threat Response

AWS Lambda

Run code for virtually any kind of application or backend service – zero administration

AWS Systems Manager

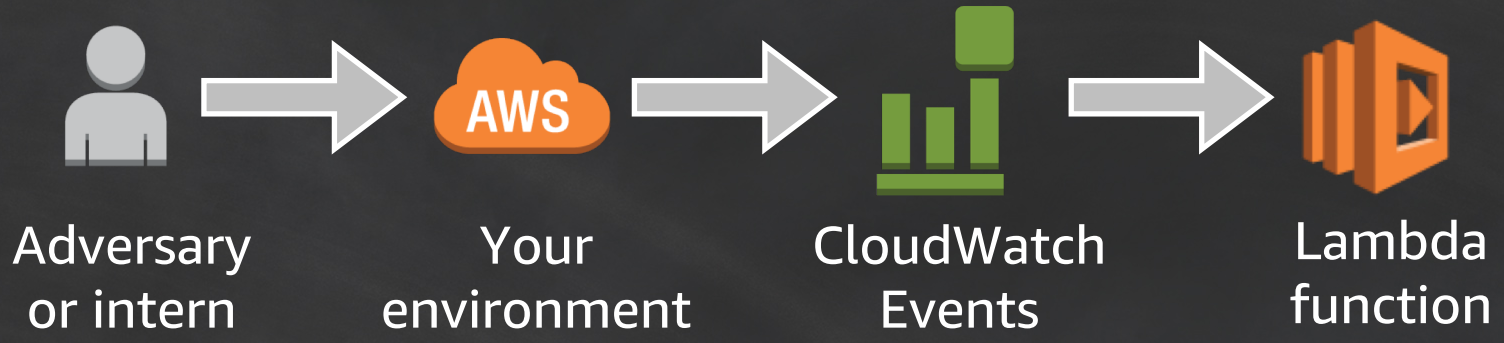
Gain operational insights and take action on AWS resources



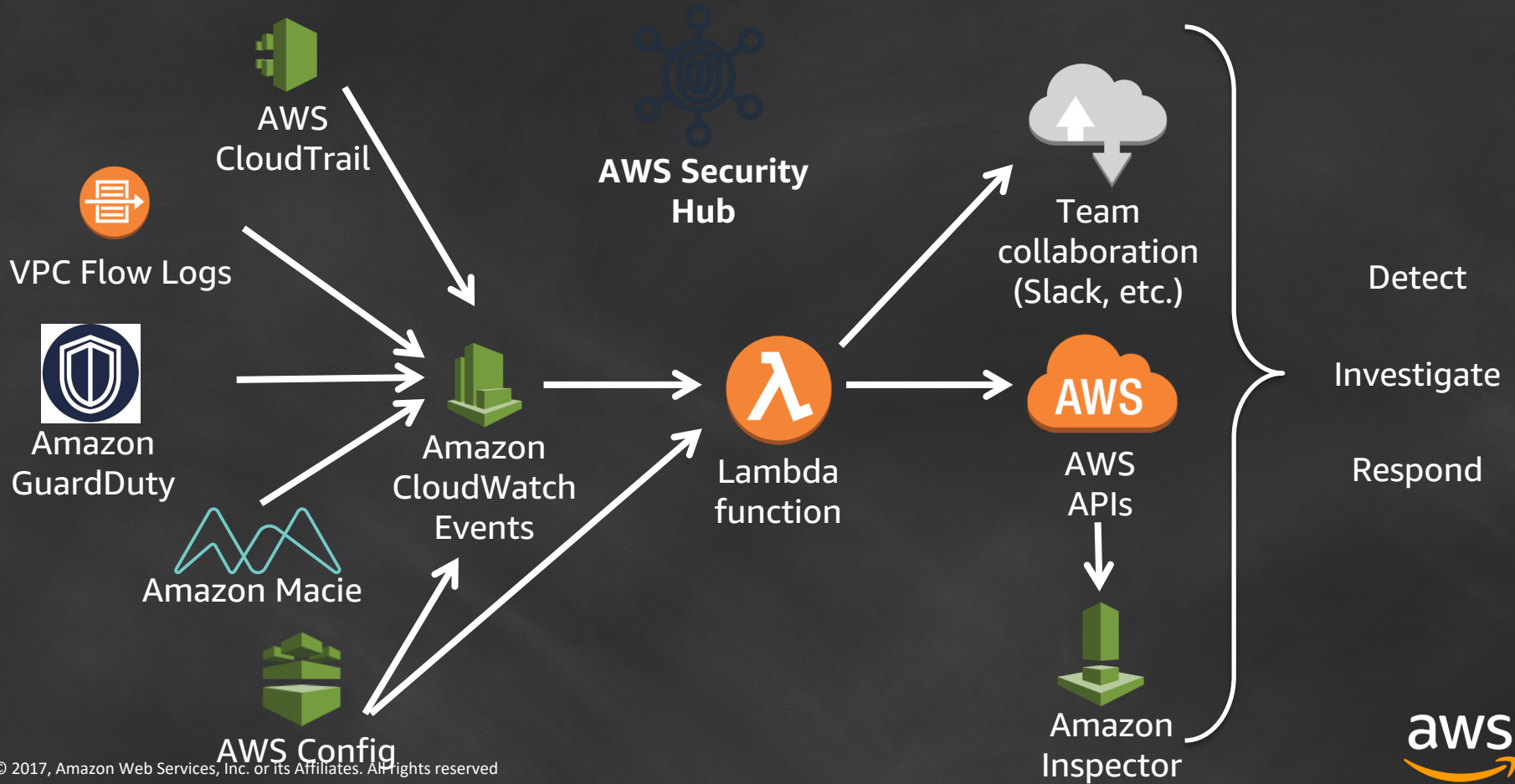
Amazon Inspector

Automate security assessments of Amazon EC2 instances

High-Level Playbook



Detailed Playbook

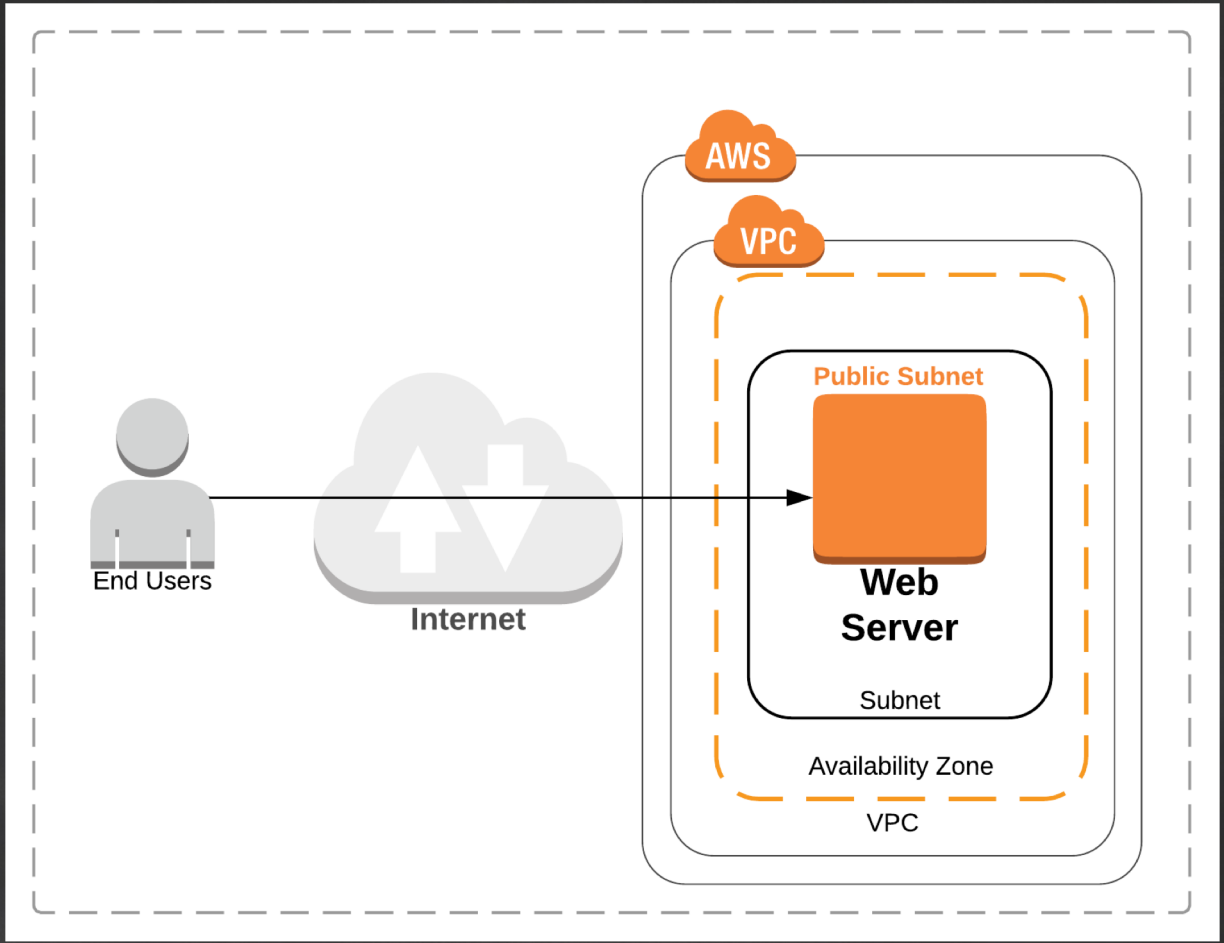


Review Questions

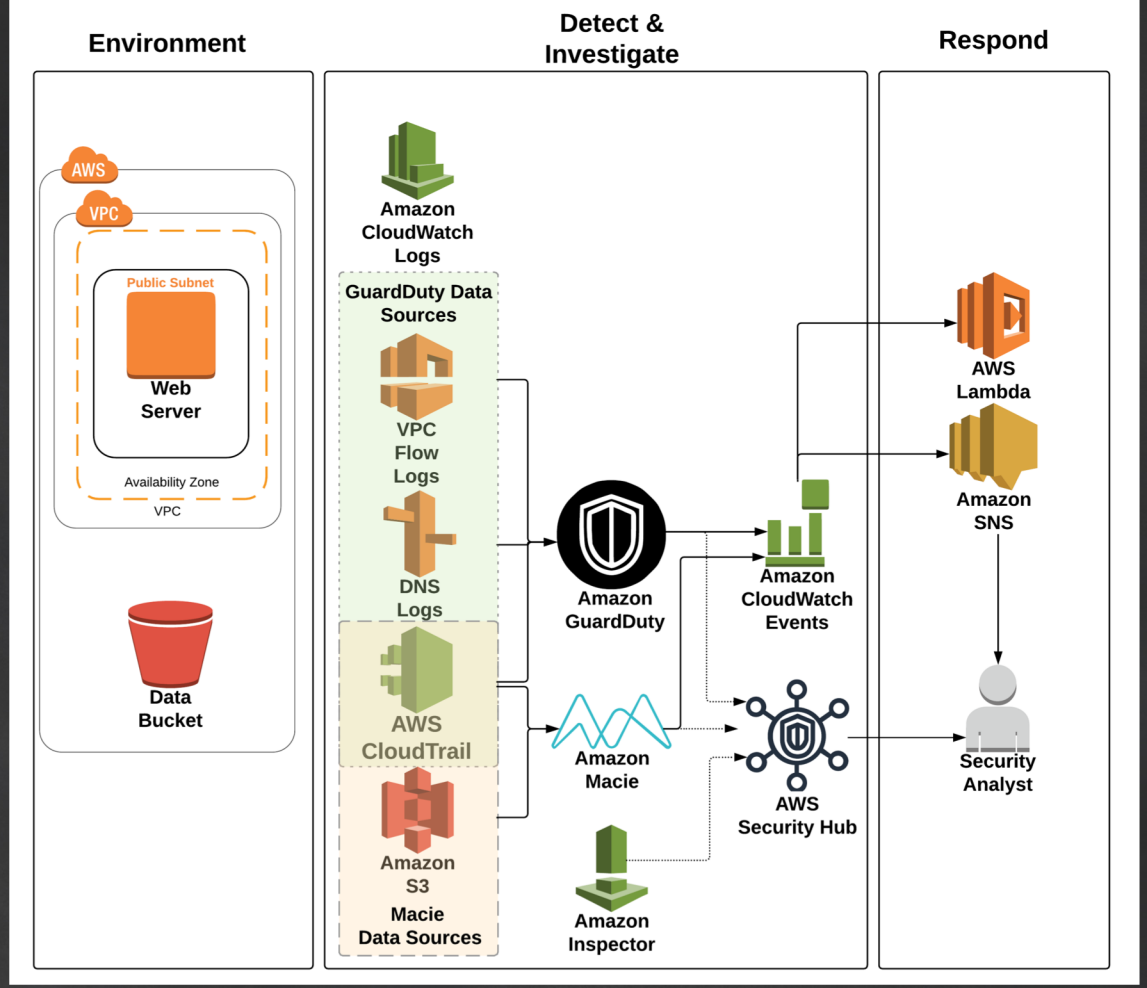
- Which threat detection services automatically send findings to AWS Security Hub?
- What services are important for the automation of responses?
- What performance impact does GuardDuty have on your account if you have more than 100 VPCs?
- Which of the services discussed have direct access to your Amazon EC2 instances?

Workshop Walk-thru

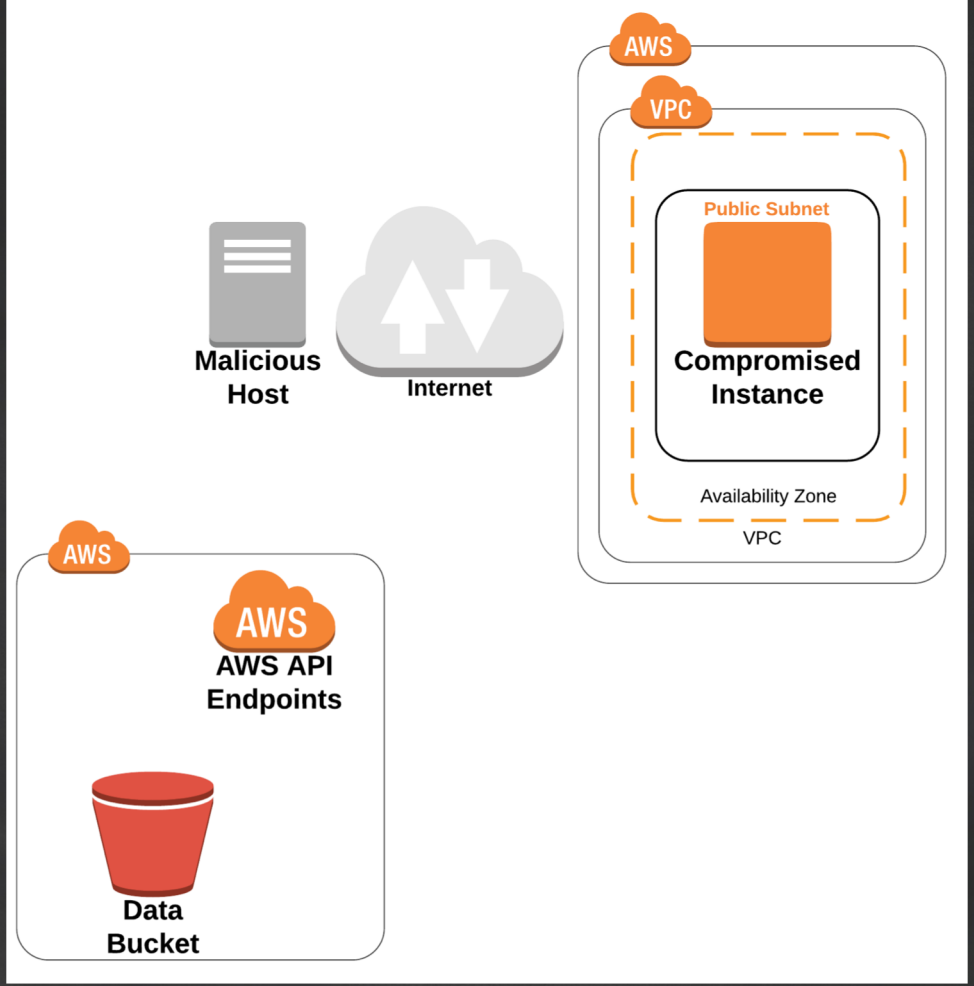
Attack Target



Module 2 setup



The Attack



Start module 3

Use: US West (Oregon)
us-west-2

https://tinyurl.com/ybgjrykt
https://awssecworkshops.com/workshops/threat-detection-remediation/

Directions:

Browse to https://tinyurl.com/ybgjrykt

- Click on **Detect & Respond** in the outline on the left
- Run through the module (~45 min.)

Review, Questions, and Cleanup

Module 4 Agenda

- Review (5 min.)
- Questions (10 min.)
- Cleanup

Start module 4

https://tinyurl.com/ybgjrykt
https://awssecworkshops.com/workshops/threat-detection-remediation/

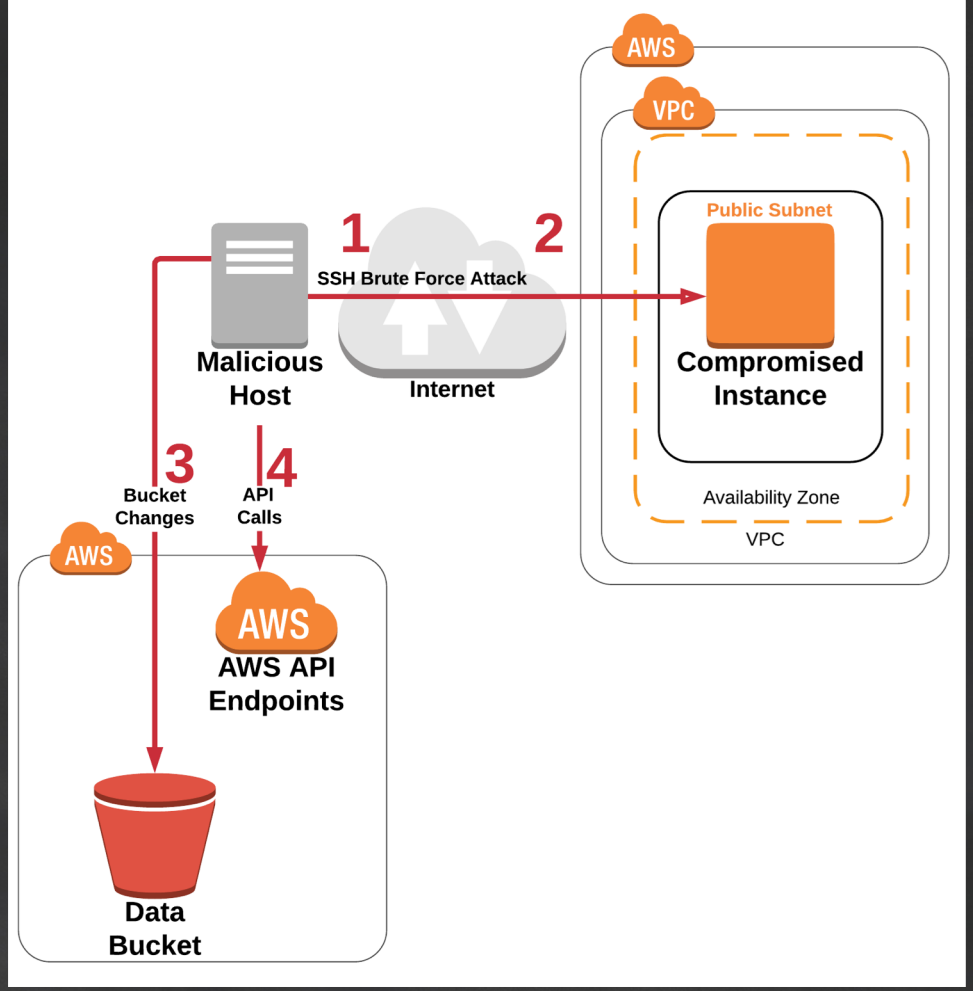
Directions:

Browse to https://tinyurl.com/ybgjrykt or click on the link at the end of Module 3

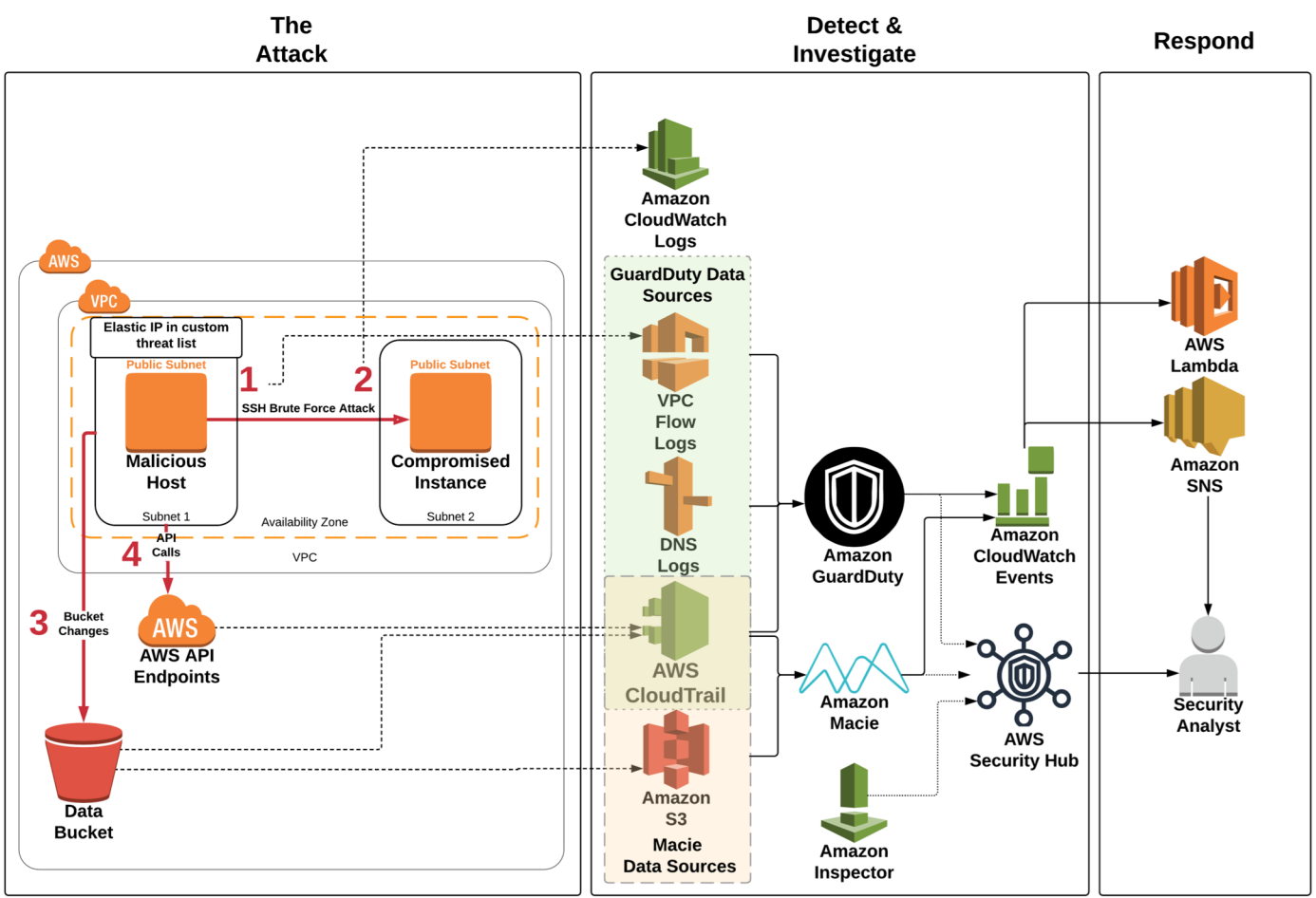
- Click on **Discussion** in the outline on the left
- We will do a summary of the workshop then questions
- Account cleanup instructions are toward the end of the page

Scenario Discussion

The Attack



What really happened?



Questions

Workshop question – Automation

- For the manual remediations in the workshop, which would be safe to automate?
- What information would you need before you would be willing to automate revoking the IAM temp credentials?
- In general, how do you determine what should be automated vs. what should require manual investigation?

Workshop questions – Amazon EC2 & GuardDuty

- Why did the API calls from the “malicious host” generate GuardDuty findings?
- The lab mentions you can ignore the high-severity SSH brute force attack finding. Why?
- How does that differ from the low severity SSH brute force finding we investigated? What does this say about the types of threats GuardDuty prioritizes?
- What key remediation step was missed regarding the SSH brute force attack? How would you remediate it?

aws

Workshop questions – AWS Security Hub

- We use AWS Security Hub to investigate the threat. Is AWS Security Hub a detect or response service (or both – or other)?

https://www.nist.gov/cyberframework

 Identify	 Protect	 Detect	 Respond	 Recover
AWS Systems Manager AWS Config	AWS Systems Manager Amazon Inspector VPC AWS KMS AWS CloudHSM IAM	AWS CloudTrail AWS Config Rules Amazon Macie Amazon GuardDuty	AWS Config Rules AWS Lambda AWS Systems Manager Amazon CloudWatch Events Pro Services AERO	AWS Disaster Recovery and Backup Solutions

Workshop questions – Amazon Simple Storage Service (Amazon S3) & Macie

- Macie had an alert for “S3 Bucket IAM policy grants global read rights.” We investigated that bucket in the workshop. Were the objects in the bucket actually publicly accessible?

- What remediation step did we miss for the data Amazon S3 bucket?

Workshop question – Amazon S3 & Encryption

- What type of server-side encryption was originally used to encrypt the objects in the data bucket?
- Would Macie be able to classify the objects in the data bucket if they were encrypted using AWS Key Management Service (AWS KMS) server-side encryption?
- If the bucket had a bucket policy that allowed global read access, would the encrypted objects be accessible?

Cleanup

Useful links

- https://aws.amazon.com/security/
- https://www.verizonenterprise.com/resources/reports/rp_DBIR_2018_Report_en_xg.pdf
- https://www.nist.gov/cyberframework
- https://d0.awsstatic.com/whitepapers/AWS_CAF_Security_Perspective.pdf

Pop-up Loft

Everything and Anything Startups Need to Get Started on AWS

aws.amazon.com/activate