Cloud Security: Navigating the Security Challenges of Cloud Computing

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About

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Research: Cloud Security, DevSecOps, Cyber Fusion, Security Operations, Leadership and Product Management

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Hobbies: Traveling, Music Shows, Playing Sports

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Objectives & Key takeaways:

Learn about best practices for securing cloud environments.

Discuss strategies for managing cloud security risks.

Review methods for measuring and optimizing cloud security program effectiveness.

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INTRODUCTION

A Brief History of Cloud Computing

By the mid-1970s, many groups of computers had been linked together in networks

In 2002, Amazon introduced its web-based retail services. It was the first major business to think of using only 10% of its capacity as a problem to be solved.

In 2010, companies like AWS, Microsoft, and OpenStack developed private clouds that were fairly functional.

By 2014, cloud computing had developed its basic features, and security had become a major concern.

In 2020, The coronavirus pandemic accelerated the use of the internet for e-commerce and working remotely.

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If 70% of businesses use the cloud, and 90% of data breaches involve cloud services...

What does that mean for your business?

63% will likely experience a breach*

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Why Does Cloud Security, Matter?

1. SaaS is more accessible
2. CSPs have billions of customers
3. Shared resources put us all at risk

The Benefits

Ability to save money

Improve scalability

Access powerful computing resources

Increase competitive edge

The Challenges

Shared responsibility model

Access Control

Data Privacy

Compliance and legal considerations

Data breaches and cyber attacks

The average data breach costs in 2022 is $4.35 million, a 2.6% rise from 2021 amount of $4.24 million.

- Upguard

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Real-world Examples and Case Studies

LastPass, 2022, October

- Compromised developer account (an IAM User)
- Unknown pivot point into a production environment.
- Gained access to data decryption keys
- Internal and customer data broadly compromised, including backups of the MFA database

Capital One, 2019, April

- "Misconfigured WAF" that allowed for a SSRF attack
- Over-privileged EC2 Role
- 100 million credit applications

DataDog, 2016, July

- CI/CD AWS access key and SSH private key leaked
- The attacker attempted to pivot with customer credentials
- 3 EC2 instances and a subset of S3 buckets

Shared Responsibility Model

Who's responsible for what?

Responsibility	On-Prem	IaaS	PaaS	SaaS
Data classification & accountability	Cloud Customer	Cloud Customer	Cloud Customer	Cloud Customer
Client & end-point protection	Cloud Customer	Cloud Customer	Cloud Customer	Cloud Customer / Cloud Provider
Identity & access management	Cloud Customer	Cloud Customer	Cloud Customer / Cloud Provider	Cloud Customer / Cloud Provider
Application level controls	Cloud Customer	Cloud Customer	Cloud Customer / Cloud Provider	Cloud Provider
Network controls	Cloud Customer	Cloud Customer / Cloud Provider	Cloud Provider	Cloud Provider
Host infrastructure	Cloud Customer	Cloud Customer / Cloud Provider	Cloud Provider	Cloud Provider
Physical security	Cloud Customer	Cloud Provider	Cloud Provider	Cloud Provider

Cloud Customer Cloud Provider

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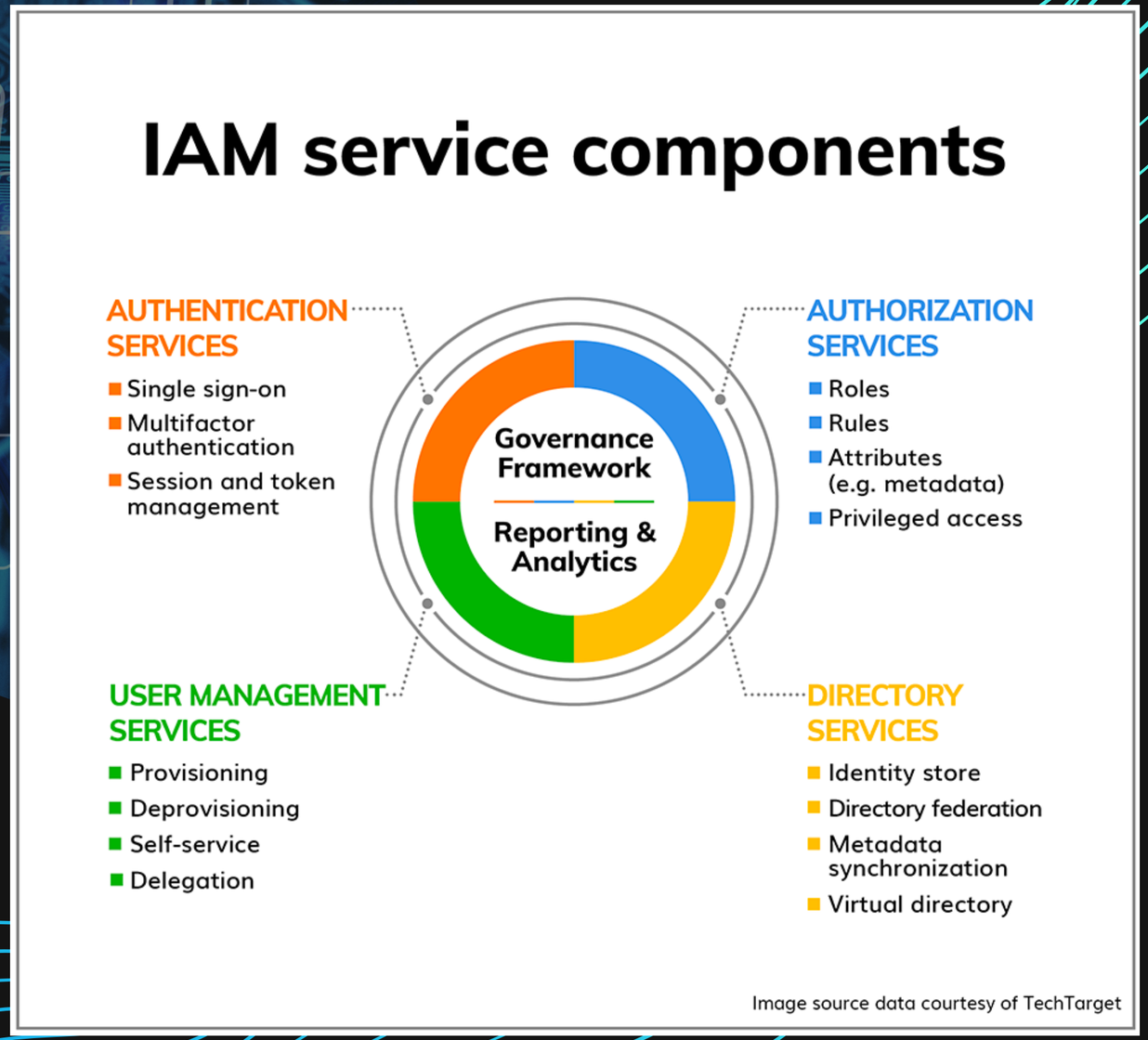
Identity Access Management

Complexity: Who has access to what?

Security: Which point of entry is the priority?

Compliance: Who governs access?



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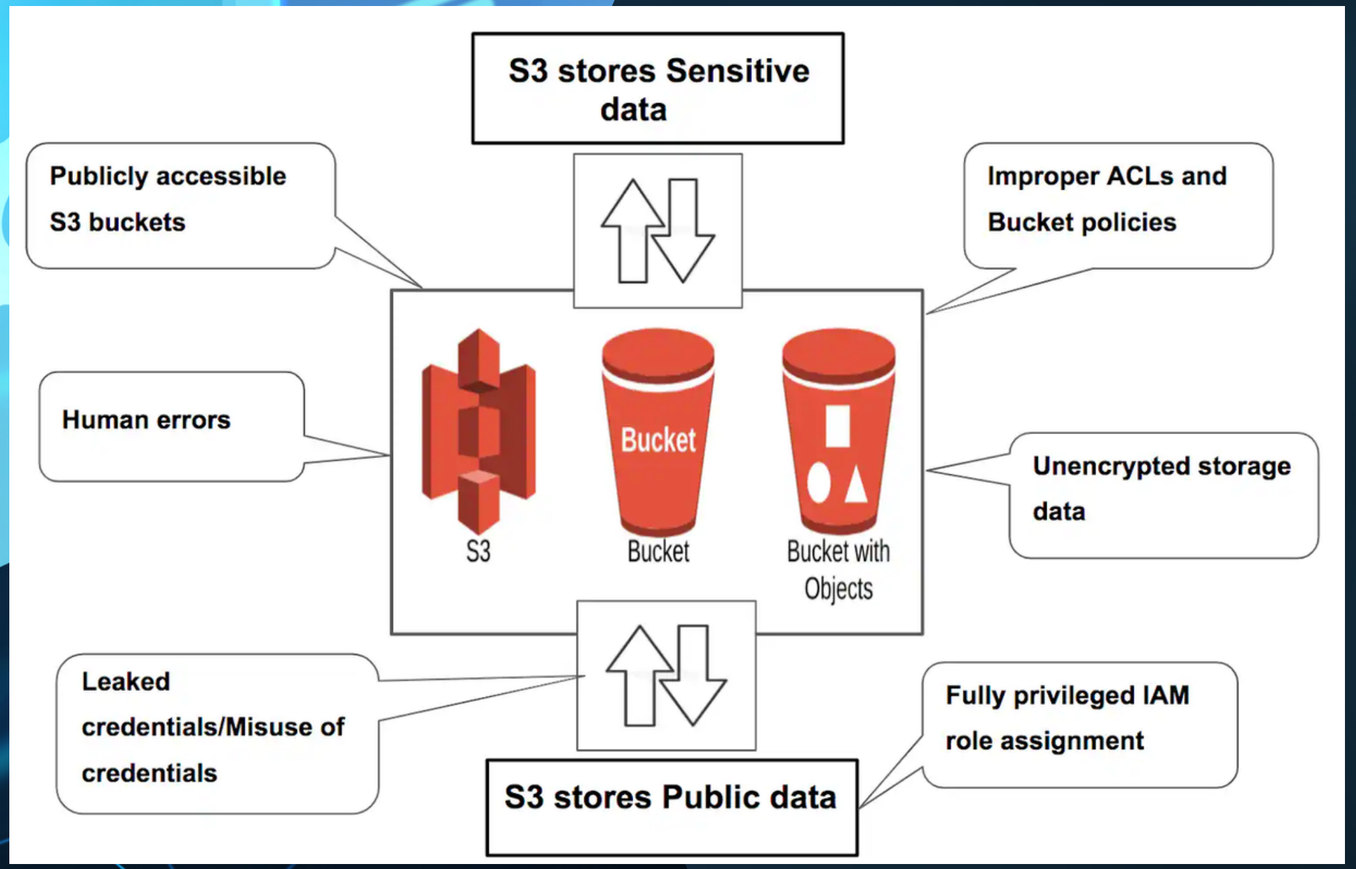
Data Protection



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Governance, Risk and Compliance

Non-compliance can lead to financial penalties, regulatory fines, and reputational damage.

Meta Technologies

$17 M

SolarWinds

$35 M

Morgan Stanley

$26M

$35 M

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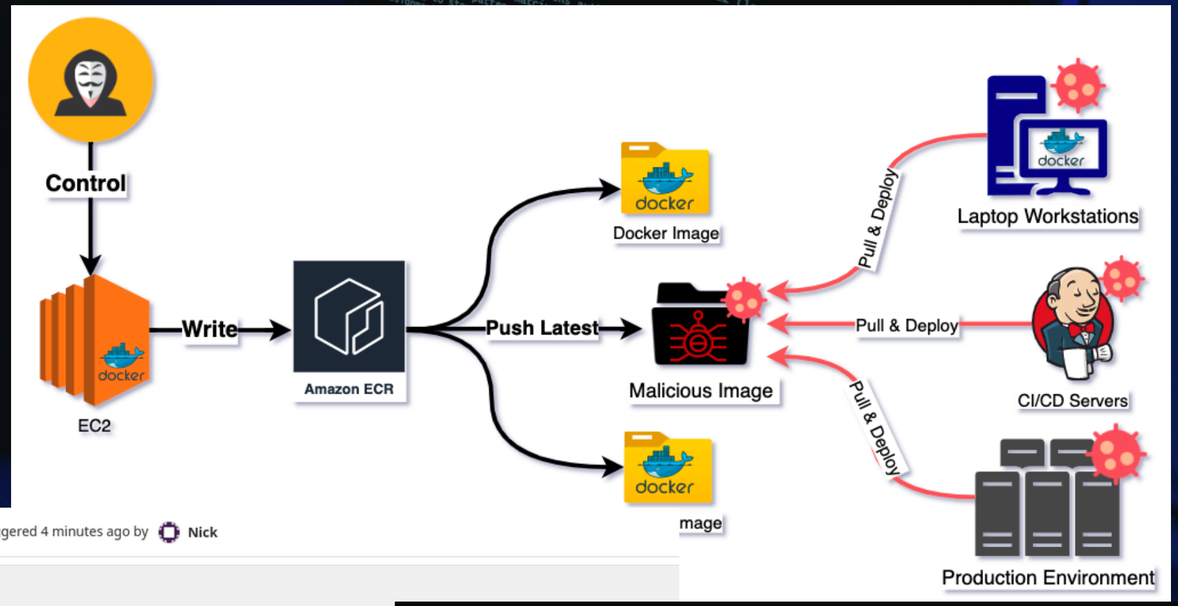
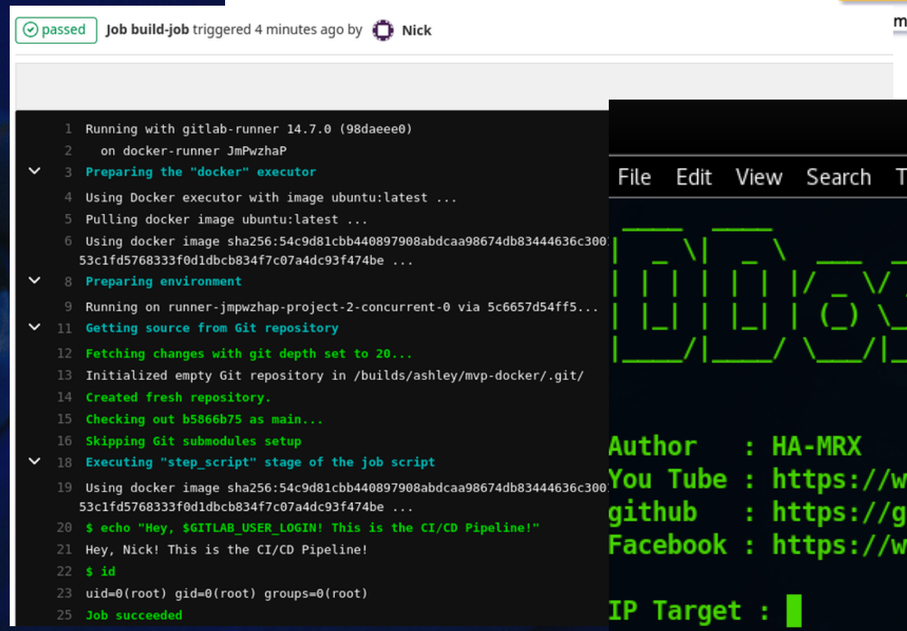
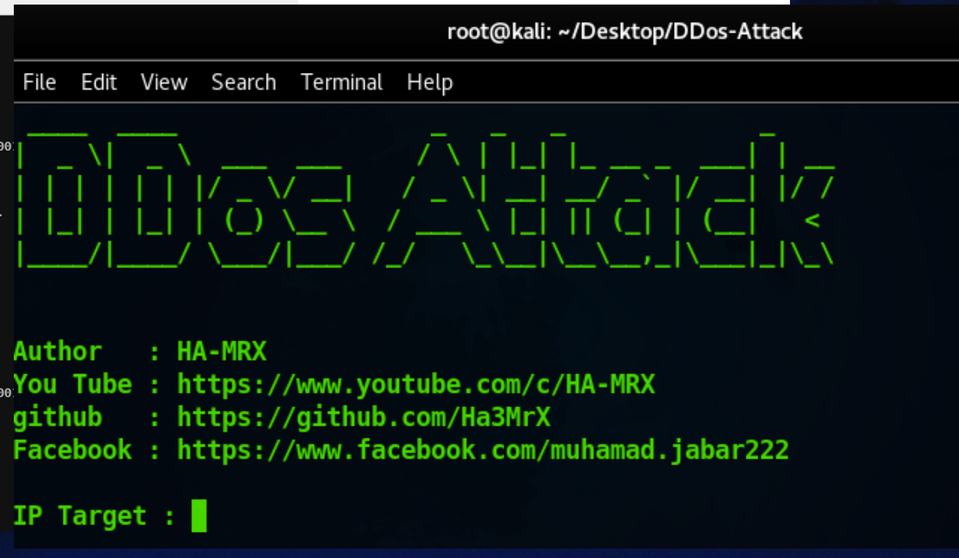
Data breaches and cyber attacks

The number of cloud security incidents increased by 600% between 2019 and 2021.

Cloud Security Alliance







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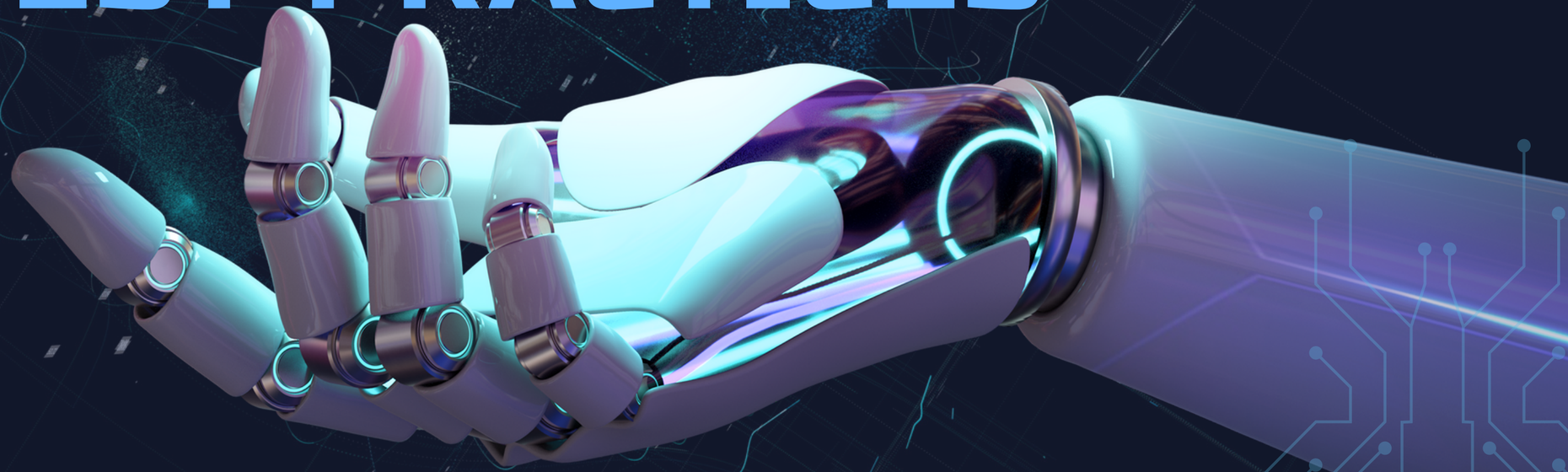
CLOUD SECURITY BEST PRACTICES



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Identity Access Management

- Identity Privileged Access Management
- Dedicated Cloud IAM
- Never Trust, Always Verfiy

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Data Protection

- Encryption
- Data Governance
- Employee Training

82% of data breaches included human- elements, social attacks, mistakes, and abuse.
- Gartner

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Security Baselining

- Organizational Standards + Industry Frameworks
- Holistic Cloud Security Solution(s)
- Declarative Resource Management

Managing Cloud Security Risk

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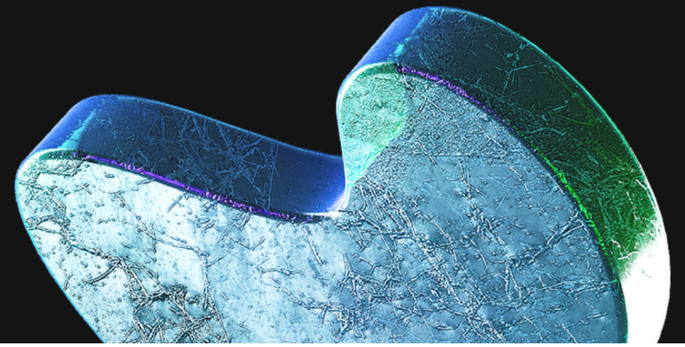
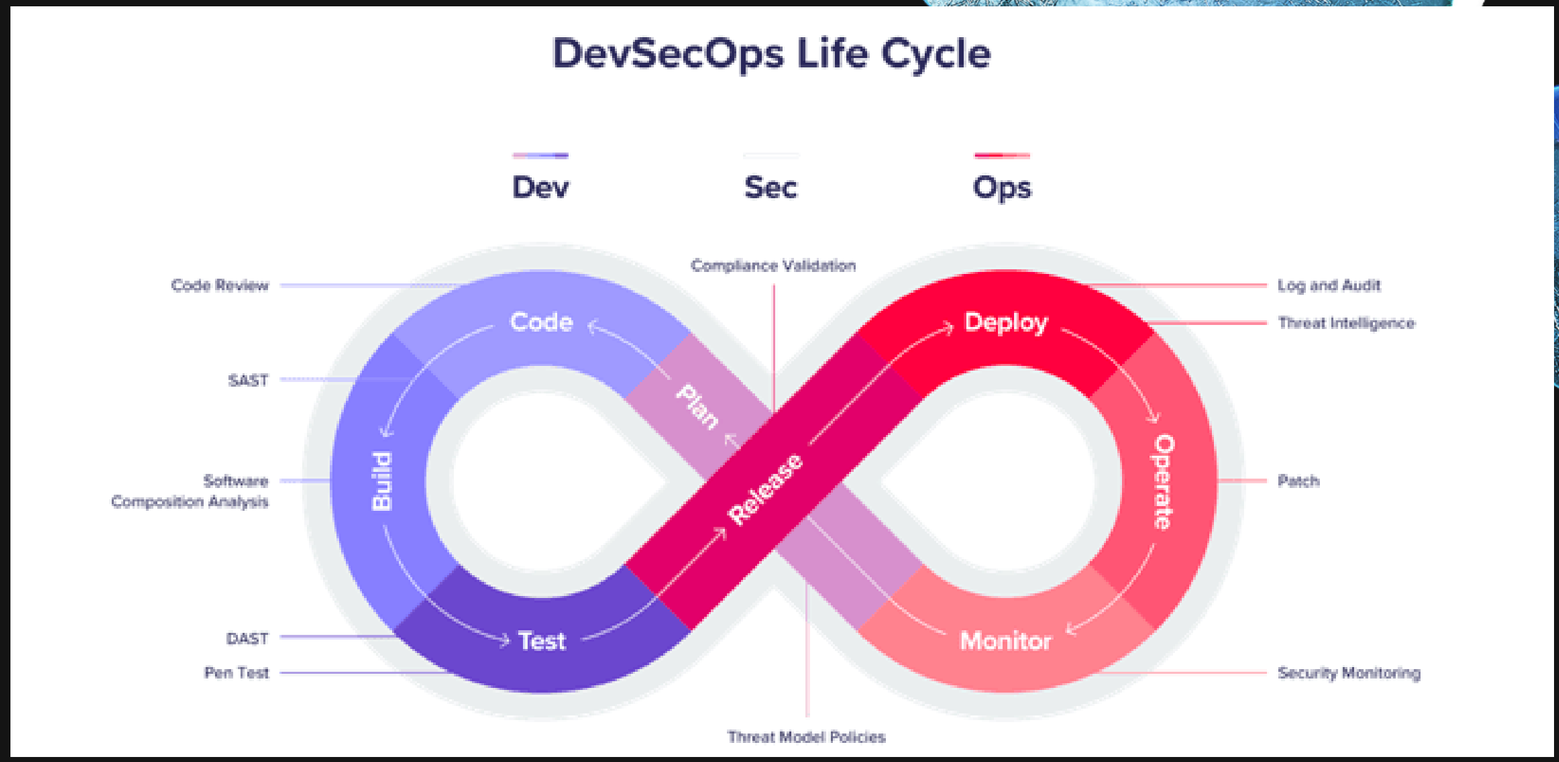
Shift Left Security

Embed security into the earliest phases of the software development lifecycle.



- Build security into new application development
- Integrate application and container security into the DevOps toolchain
- Combine scans to improve visibility and prioritization



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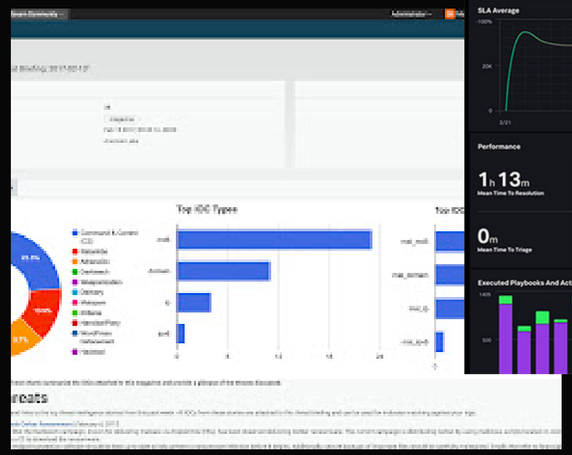
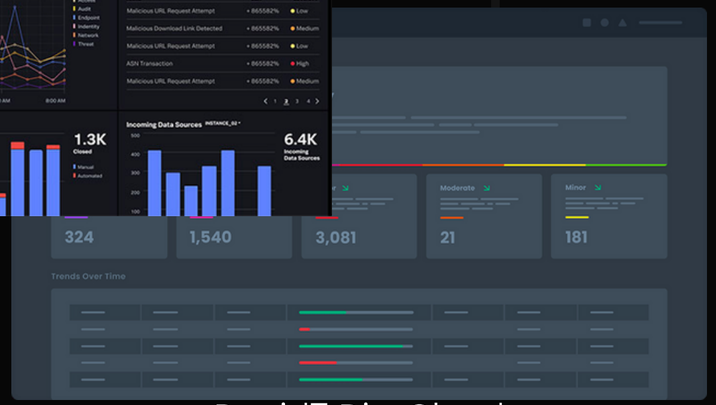
Continuous Monitoring and Threat Detection

Security Signals that are Context-Driven and Risk-Based

Splunk Cloud



Anomali ThreatStream



Rapid7 DivyCloud

Proactive Threat Intelligence

Stay ahead of threats and protect their data from attacks

SIEM & SOAR

Increase visibility and automate repetitive triage tasks

Posture Management & Workload Protection

Improve security posture and protect their data from attack.

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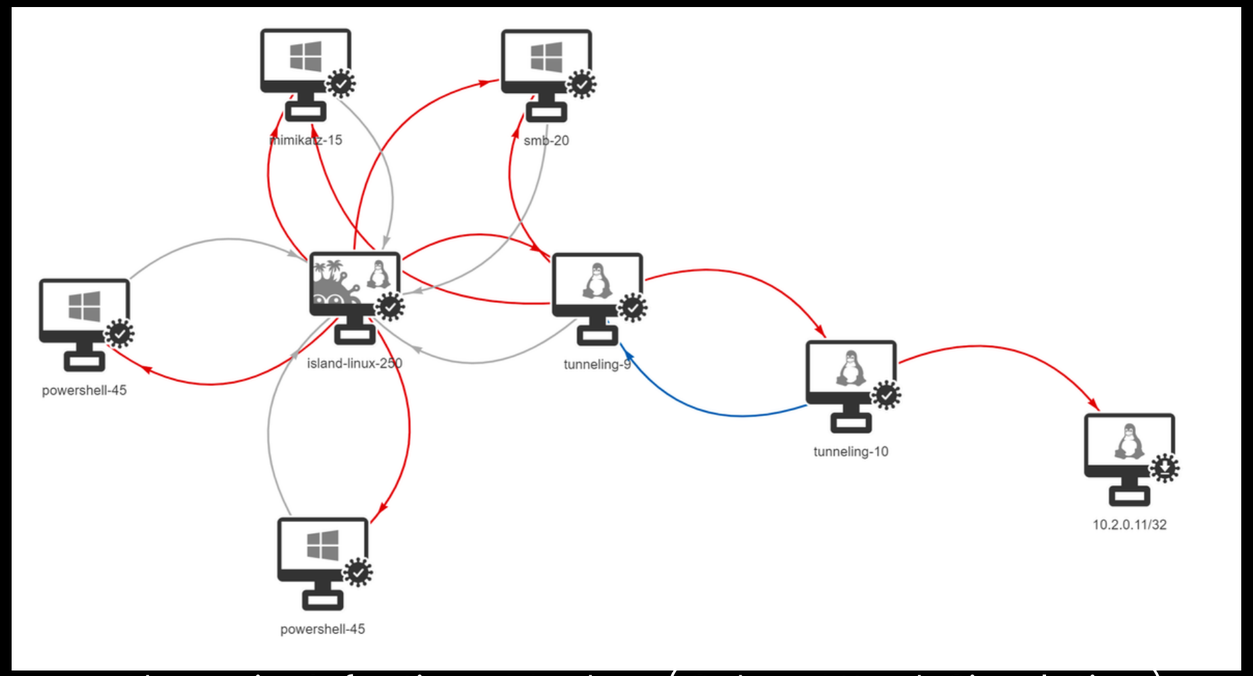
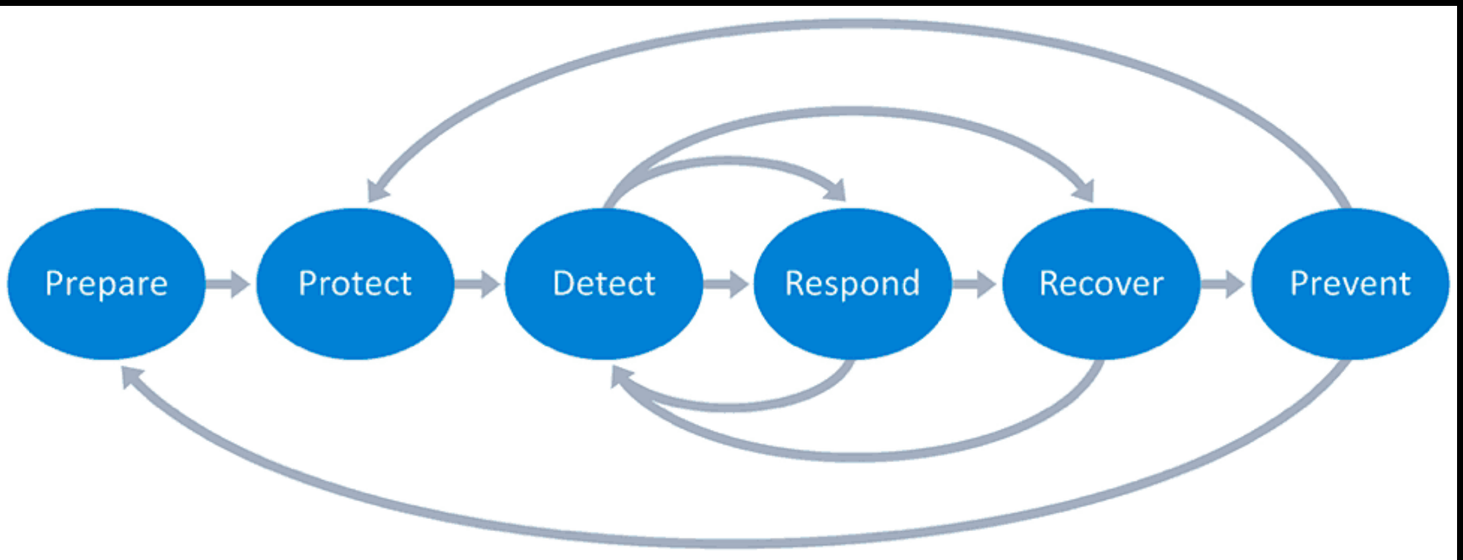
Incident Response and Recovery

Minimize the Impact of a Security Incident and Protect sensitive data.



Akamai - Infectious Monkey (Cyber Attack Simulation)



- Roles and Responsibilities
- Communication protocols
- Escalation procedures

Don't forget about Disaster Recovery and Business Continuity

Practical Tips and Recommendations

Shift Left

How can you enable engineers by embedding security into the SDLC? Is this a security feature or a business blocker?

Scan Regularly

Are findings and recommendations up to date with the current infrastructure?
Has new risk been introduced into the environment?

Threat Model & Table Top

Where are threats being identified for remediation?
Is your plan effective? What could be improved?

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Measuring a Cloud Security Program

How do we know if we are on the right track?

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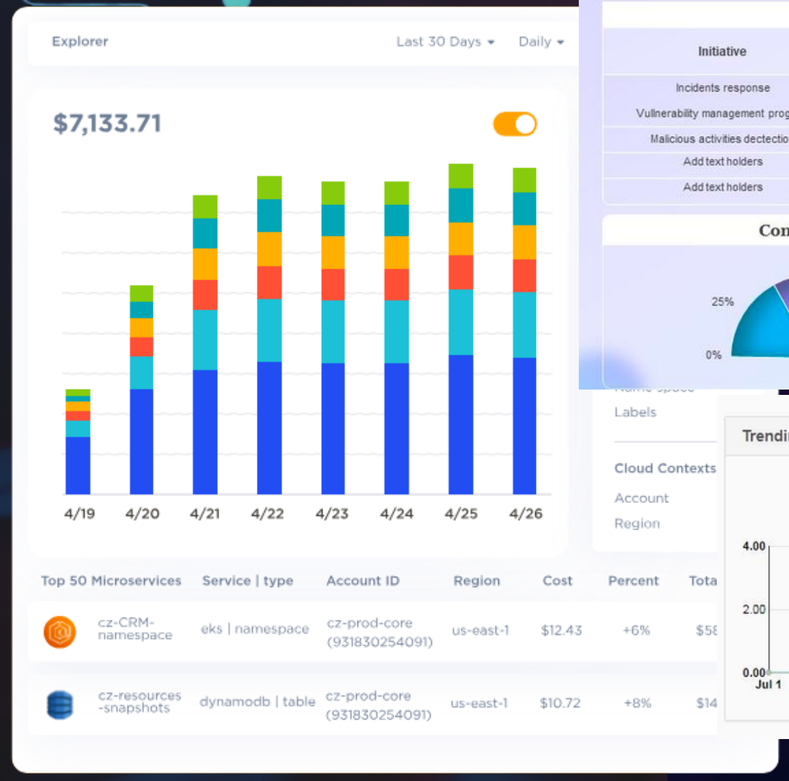
Choose the right metrics

Relevant
Accurate
Feasible
Timely



"Not all metrics are created equal"

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Key Metrics and Indicators

Performance & Posture

"Data is like garbage. You'd better know what you are going to do with it before you collect it."

Mark Twain

MTTD & MTTR
SLA Compliance (%)
Secure Score*
Budget

# of Incidents
# of Privileged Accounts
# of Sensitive Data Exposures
# of WAF Deny/Blocks
# of Outdated SSL Certificates
# of long-running VM instances

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Optimizing a Cloud Security Program

Rule #1: Don't try to boil the ocean

SET CLEAR GOALS AND OBJECTIVES

What do you want to achieve with your security program?

MEASURE THE RIGHT METRICS

Identify areas where you are doing well and areas where you can improve.

Focus on metrics that are relevant to your goals and objectives.

EVALUATE YOUR RESULTS

Make changes to your program based on the results of your measurements.

CONTINUOUSLY MONITOR AND IMPROVE

Cloud security is an ever-evolving landscape.

Make improvements as needed to ensure your program remains effective.

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Summary

Cloud Security Best Practices

- The Shared Responsibility Model
- IAM & Data Governance
- Security Baselining

Managing Cloud Security Risk

- Shift Left Security
- Continuous Monitoring & Threat Detection
- Incident Response and Recovery

Measuring & Optimizing Cloud Security

- RAFT
- Performance vs Posture
- Don't try to boil the ocean

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Thank You

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