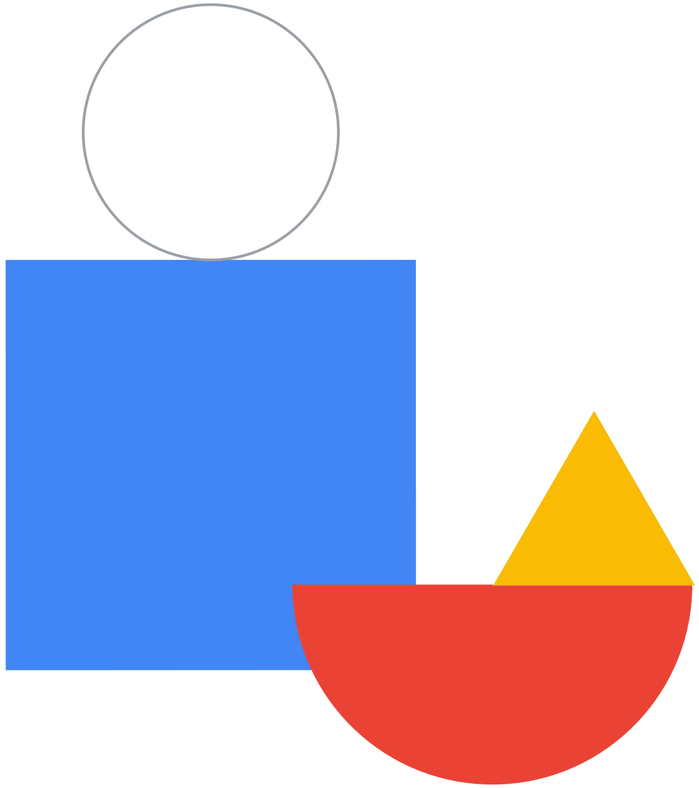
Google Cloud



# Preparing for Your Professional Cloud Security Engineer Journey

Module 4: Managing Operations in a Cloud Environment

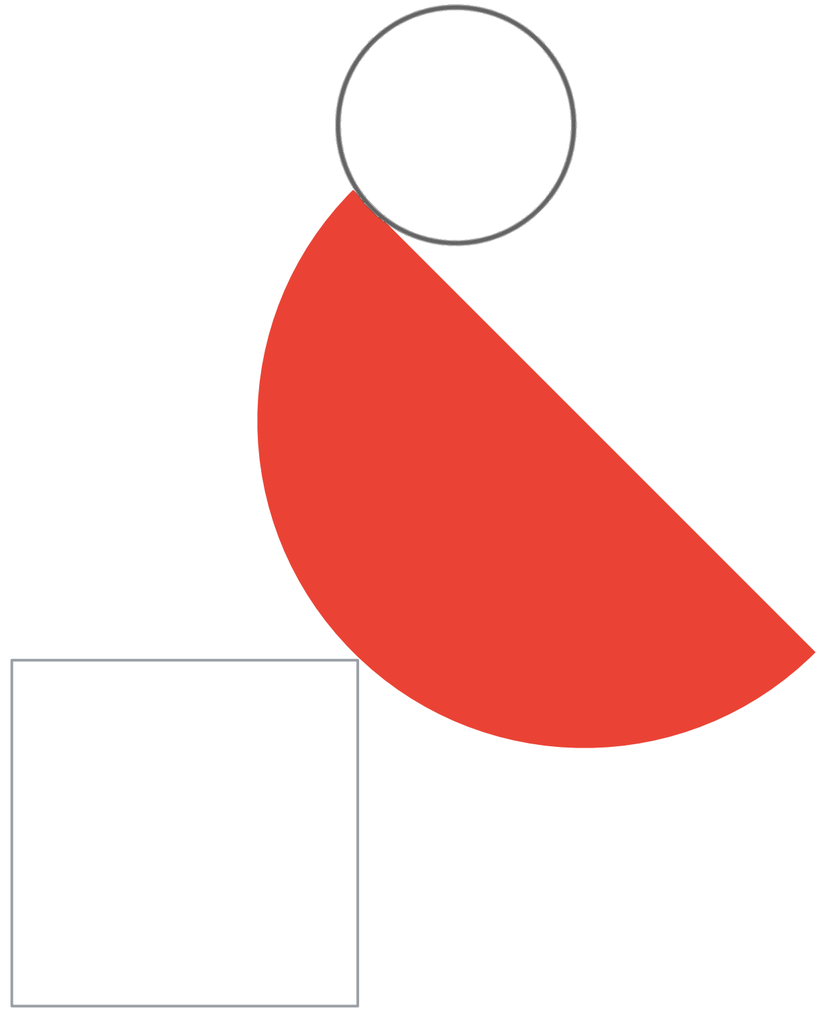
# Module agenda

01 Cymbal Bank’s security operations

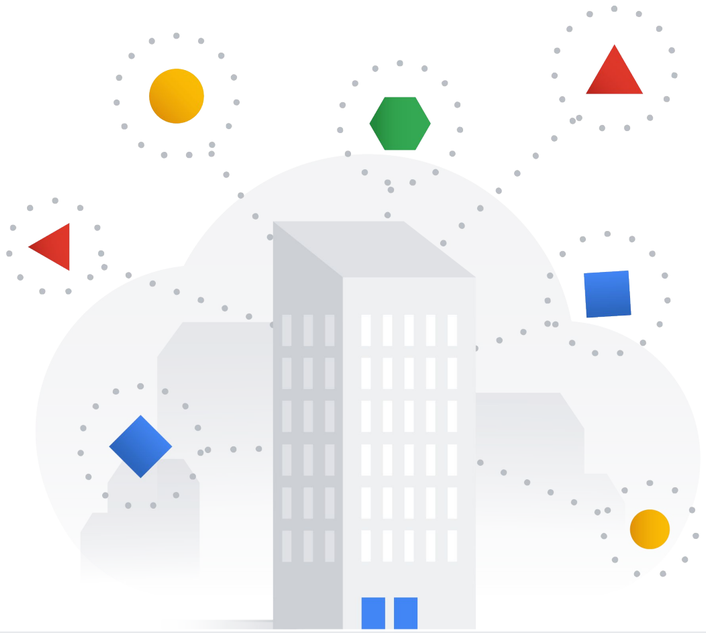
02 Diagnostic questions

03 Review and study planning

# Cymbal Bank's security operations



# Managing security operations at Cymbal Bank



- Building and deploying secure infrastructure and applications
- Configuring logging, monitoring, and detection

Cymbal Bank

# Kubernetes Engine Security Best Practices - Part 2

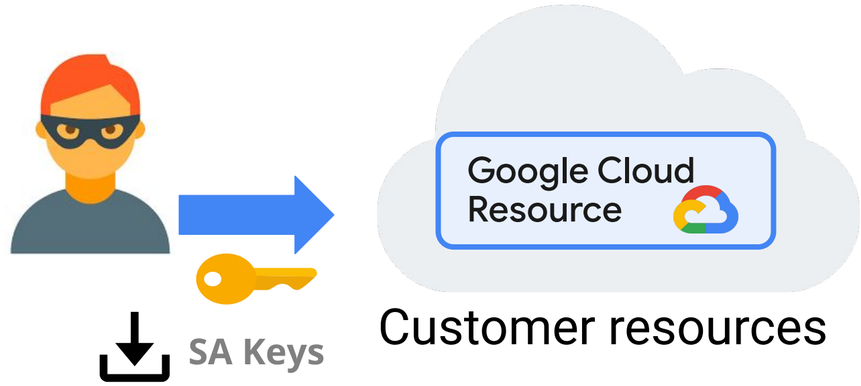
# GKE service accounts

- When compute API is enabled, there is a default Compute Engine service account gets created automatically
- Used across compute services (GCE, GKE, Cloud Run)
- It has Project Editor role by default
- **Recommendation**: create a service account for specific clusters with minimal roles:
  - **monitoring.viewer**
  - **monitoring.metricWriter**
  - **logging.logWriter**
  - **stackdriver.resourceMetadata.writer**
  - **artifactregistry.reader**

# Service account (SA) keys pose a security risk to your cloud resources



- SA keys are similar to a **password without an expiration date**.
- SA Keys can be leaked accidently and attackers can use it to access your (GCP project or org admin) sensitive GCP resources.
- Usage cannot be audited ⟶ compounding the risk




Customers have downloaded > 48 Million Service Account Keys!!

**So what's the solution? Ditch the keys and use Workload Identity & Workload Identity Federation!**

# GCP API access from k8s *without* Workload Identity



[Authenticate to Google Cloud using a service account | Kubernetes Engine]

- Create a GCP Service Account (GSA)
- Create Keys for GSA
- Import GSA Keys as a k8s Secret
- For the k8s Workload:
  - Define a Volume with the Secret
  - Mount the Volume inside the container
  - Point $GOOGLE_APPLICATION_CREDENTIALS at the key file
- Workload can now authenticate to GCP APIs as the GSA

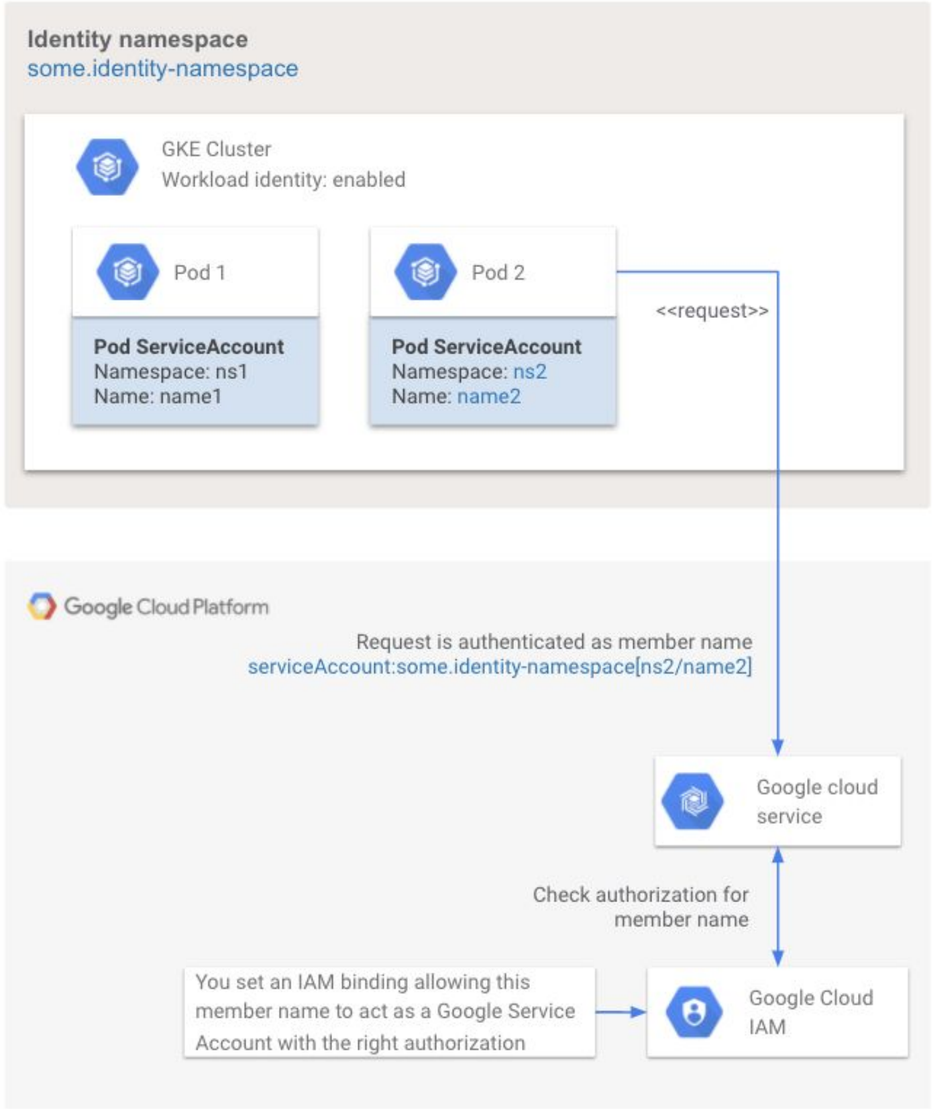
=> toilsome to setup & hard to secure

# API access *with* Workload Identity



- Enable Workload Identity for the GKE cluster
- Run workload using a dedicated k8s service account (KSA)
- Grant KSA access to desired GCP resources using IAM roles
- Workload can now access GCP APIs by presenting (short-lived, auto-rotated) KSA tokens

**It just works!**



# Workload Identity configuration 101

1. kubectl create namespace **K8S_NAMESPACE**

2. kubectl create serviceaccount --namespace **K8S_NAMESPACE KSA_NAME**

3. gcloud iam service-accounts create **GSA_NAME**

   **//When you enable Workload Identity on your GKE cluster, the cluster's**
   **//workload identity pool will be set to PROJECT_ID.svc.id.goog**

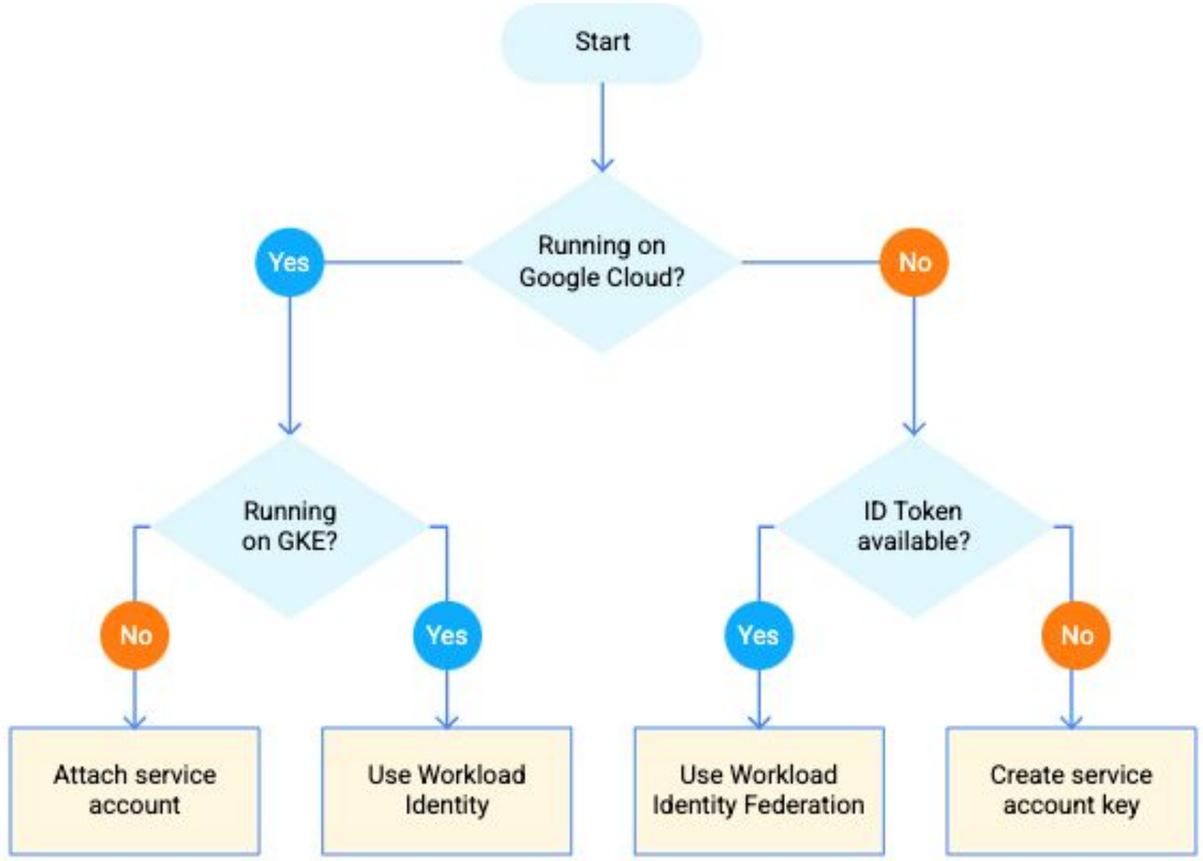
4. gcloud iam service-accounts add-iam-policy-binding \
   --role roles/iam.workloadIdentityUser \
   --member "serviceAccount:**PROJECT_ID**.svc.id.goog[**K8S_NAMESPACE**/**KSA_NAME**]" \
   **GSA_NAME**@**PROJECT_ID**.iam.gserviceaccount.com

5. kubectl annotate serviceaccount \
   --namespace **K8S_NAMESPACE  KSA_NAME** \
   iam.gke.io/gcp-service-account=**GSA_NAME**@**PROJECT_ID**.iam.gserviceaccount.com

# Workload Identity vs Workload Identity Federation



- Those are two different things! Both aim at limiting usage of Service Account keys, but:
  - Workload Identity = used when microservices deployed to your GKE cluster need to access other GCP resources / APIs.
  - Workload Identity Federation = when some services of yours deployed outside of GCP (in on-premises or other hyperscalers) need to access GCP resources / APIs.



# Workload Identity Federation: Keyless Access



NON-GKE

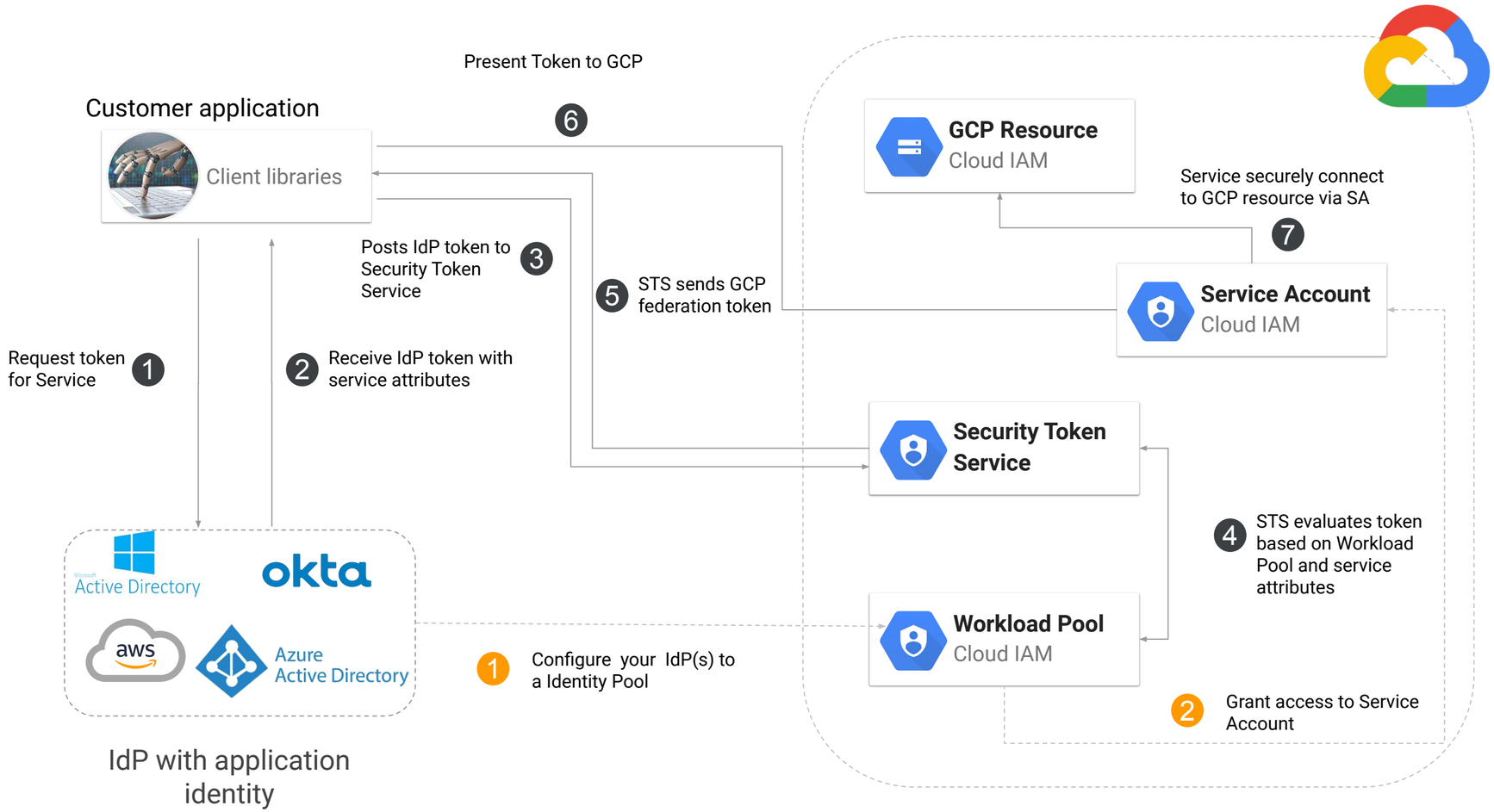
User Story: As an App Developer, I want to **securely connect my service** to GCP resources without downloading access keys.

## Benefits

Keyless access to GCP APIs

Auditability through Cloud logs

Attribute-based access control

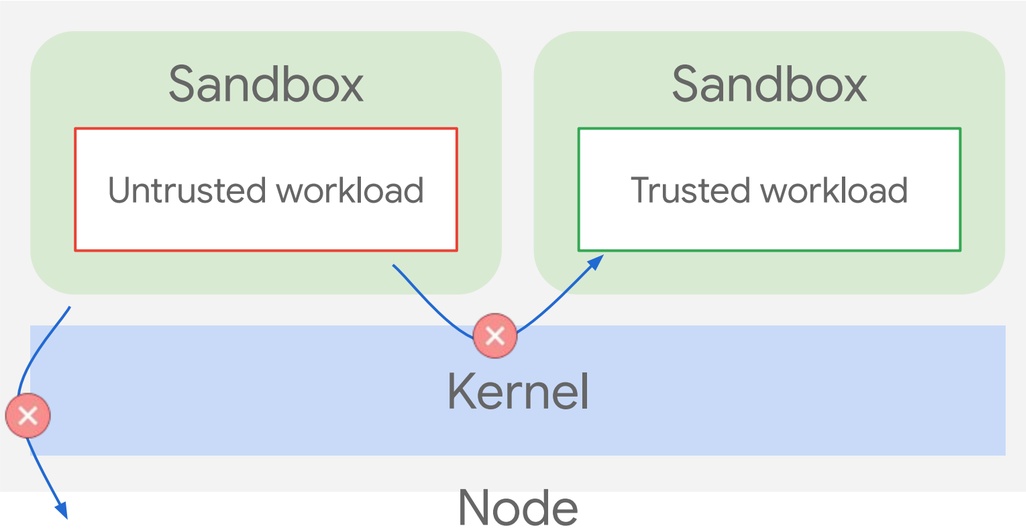


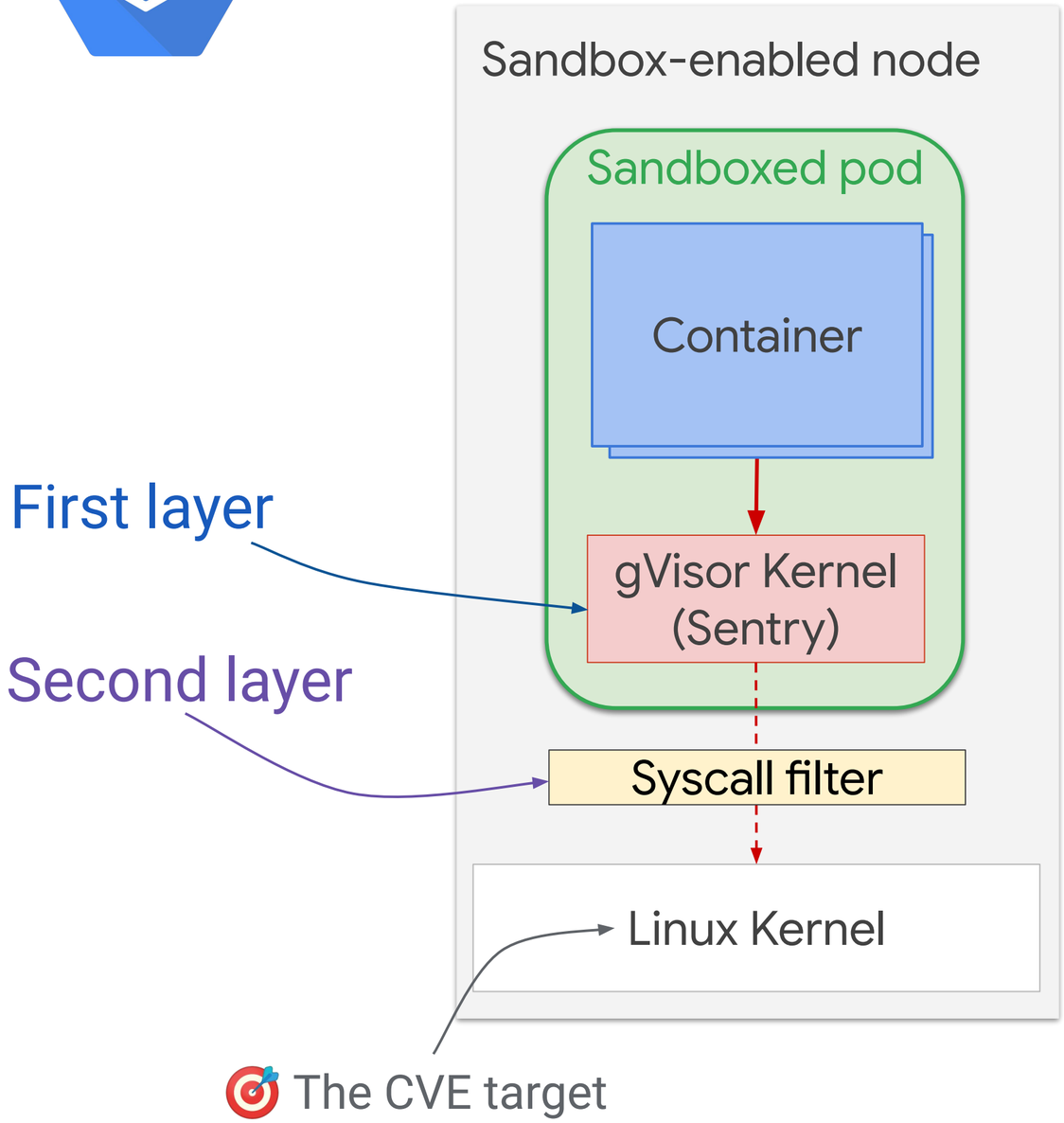
# GKE Sandbox

Run **trusted and untrusted** workloads on the same node

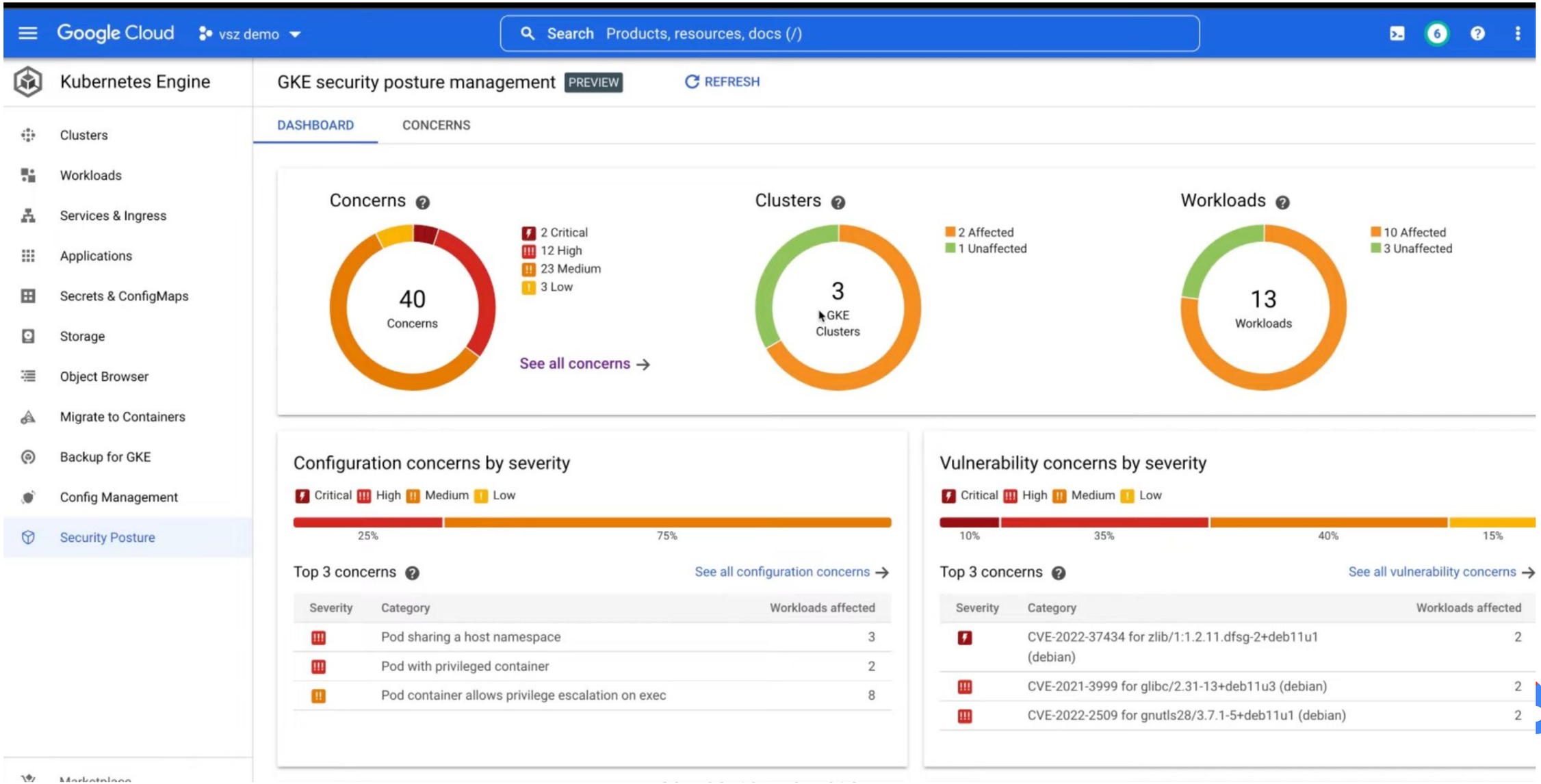
Rather than achieving isolation via separate VMs, you can run workloads of different trust levels on the same node

Performance improvements from not having to allocate a new cluster to achieve isolation

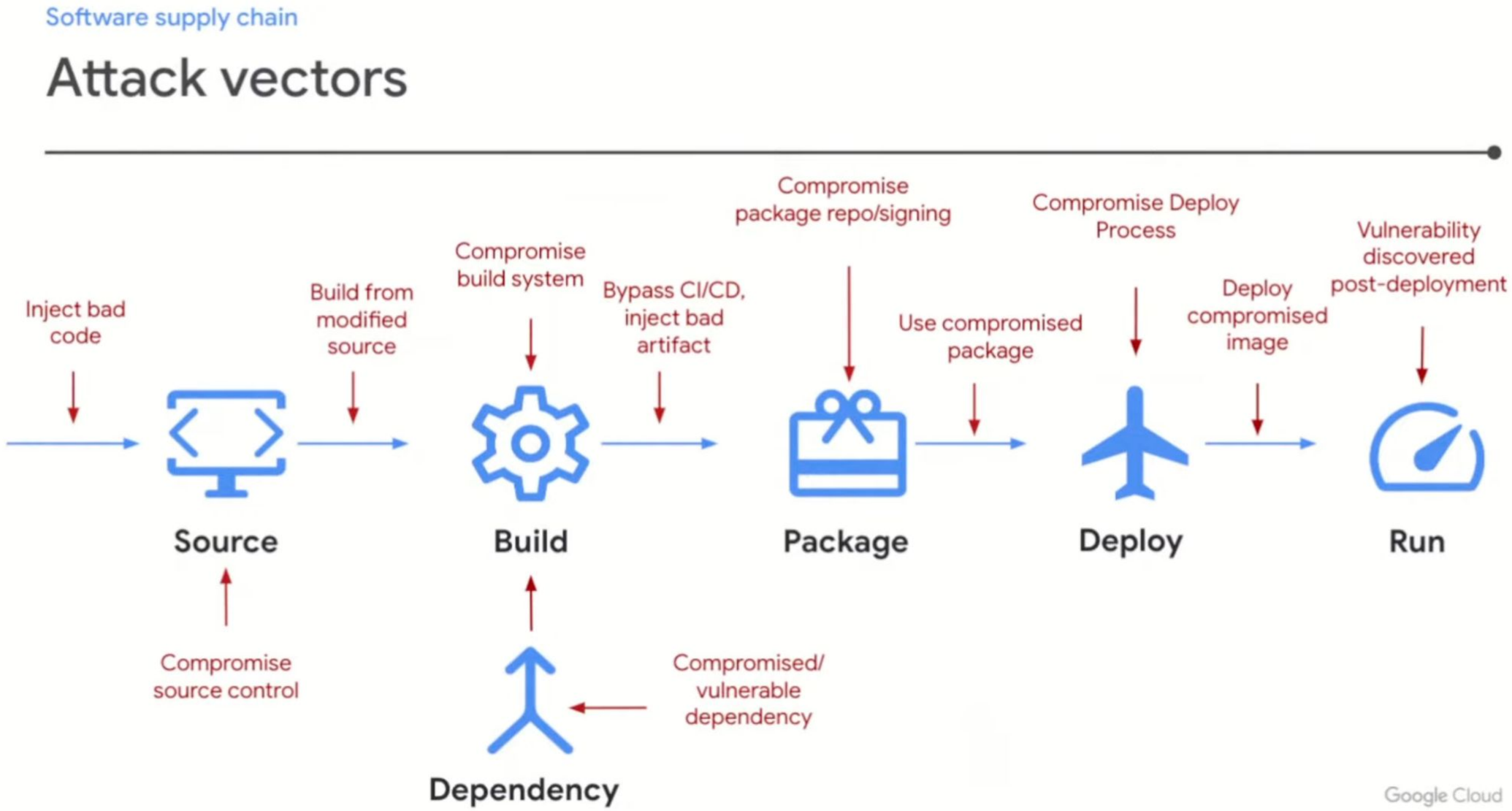


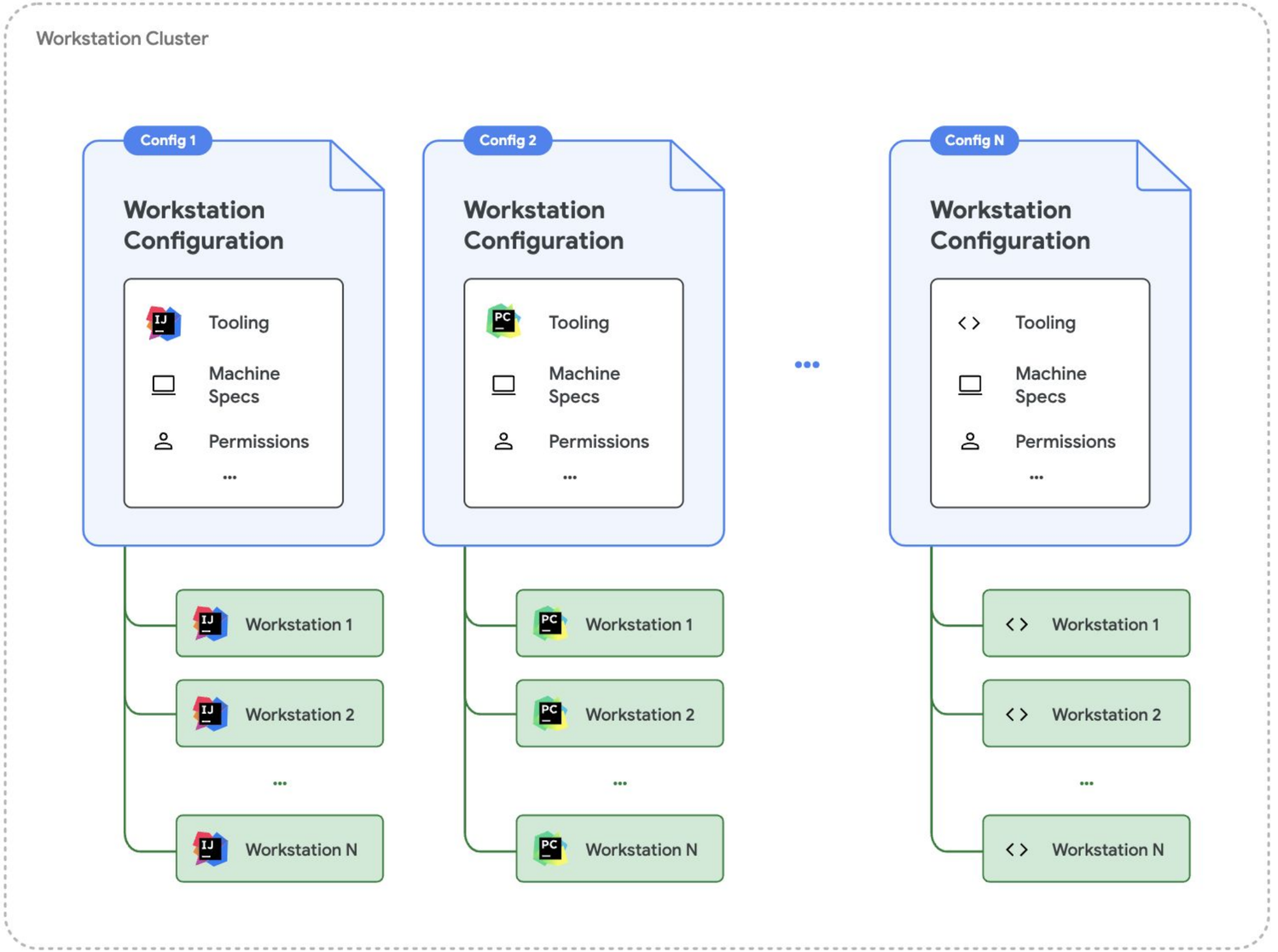
# GKE Cluster Security Posture - *In Preview*



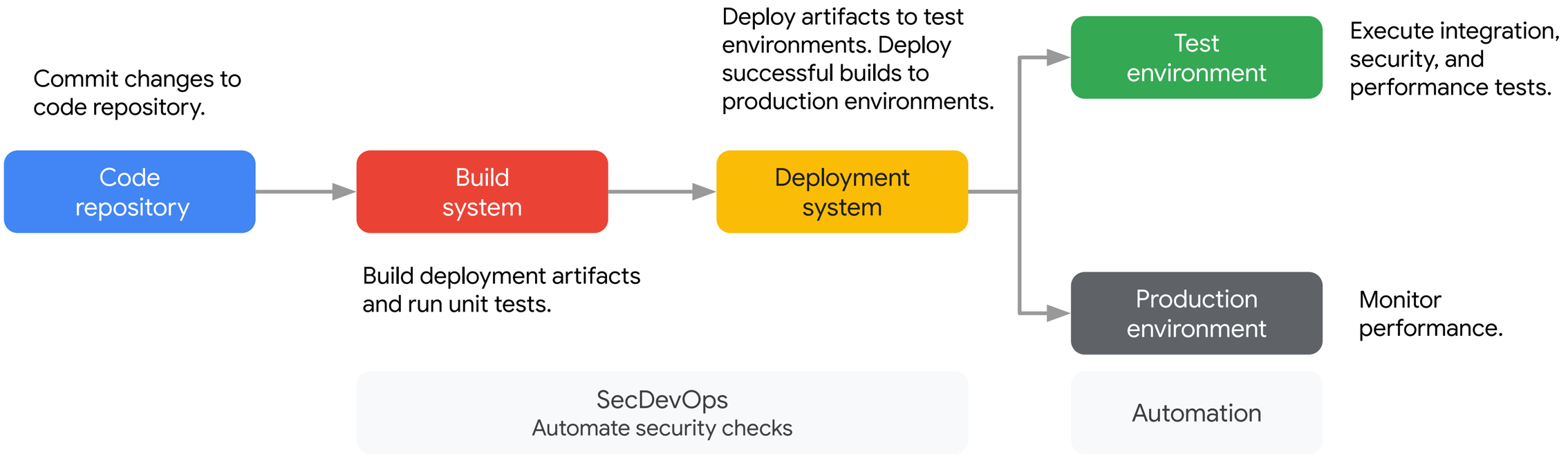
# Why do we need to talk about security in CI/CD?



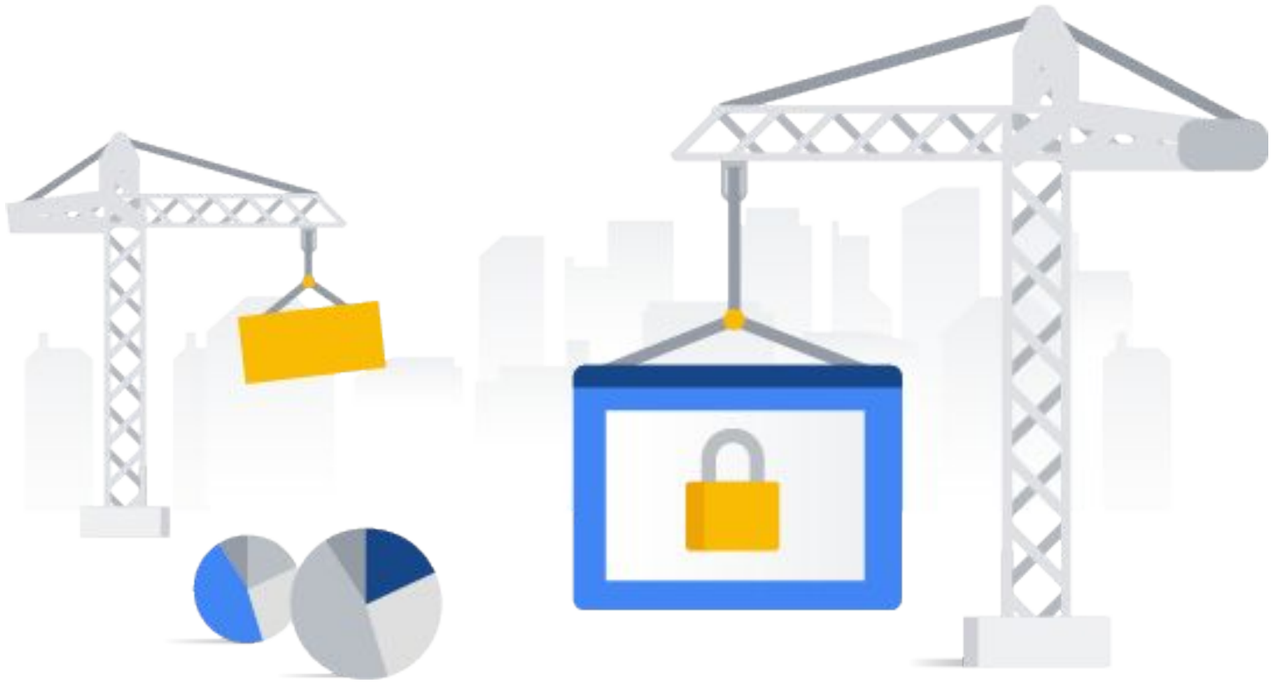
# Cloud Workstations - *In Preview*



# Automated security operations in CI/CD pipelines

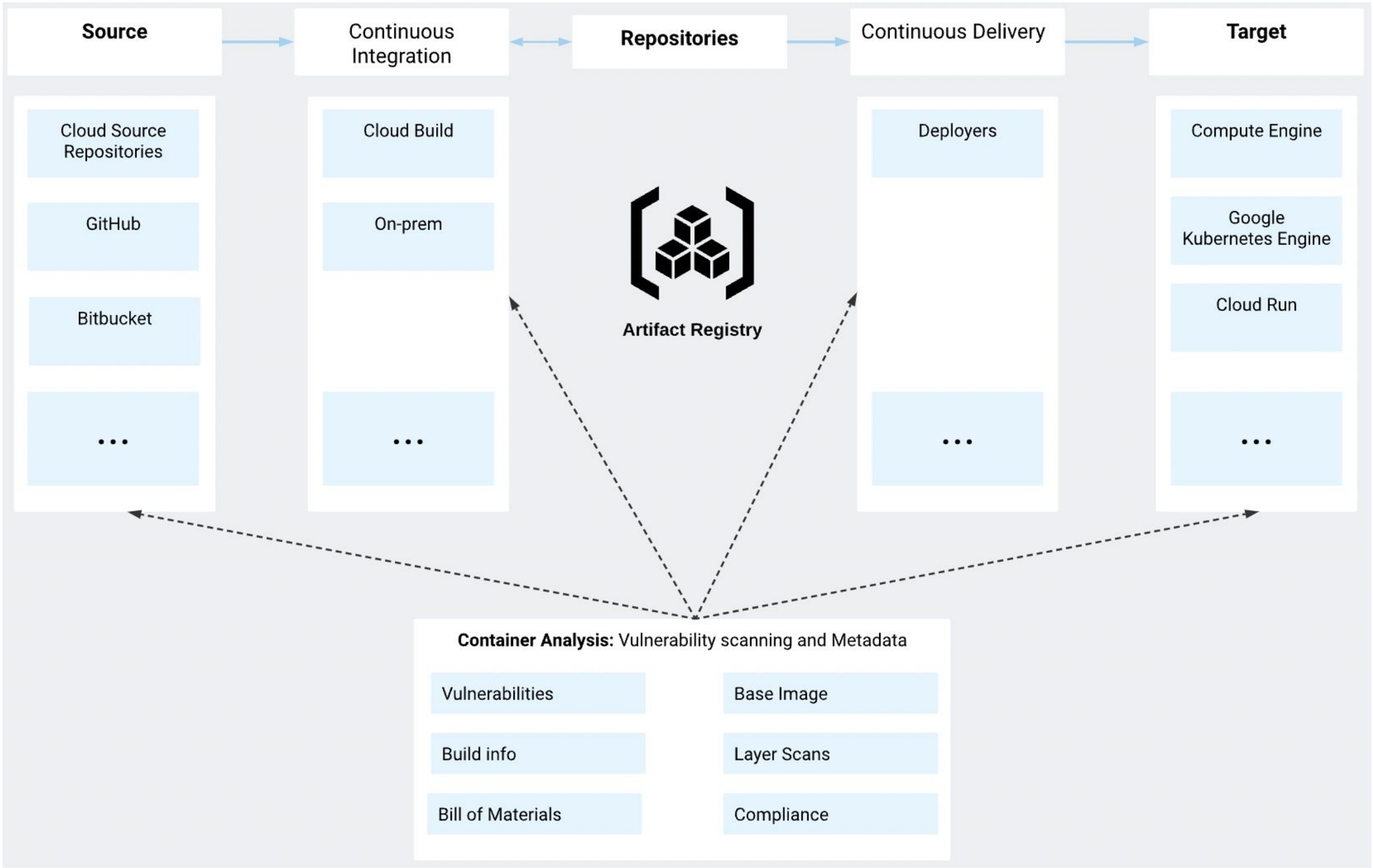


# Infrastructure as code (IaC) for infrastructure creation and updates in CI/CD



- Terraform can be used to create immutable infrastructure which can be modified or deleted and recreated quickly in an automated response to incidents or attacks.
- Packer can be used to create baked images so software and configurations of virtual machines can remain fixed, reducing chance of insecure configuration.

# Container analysis and vulnerability scanning



# Binary Authorization

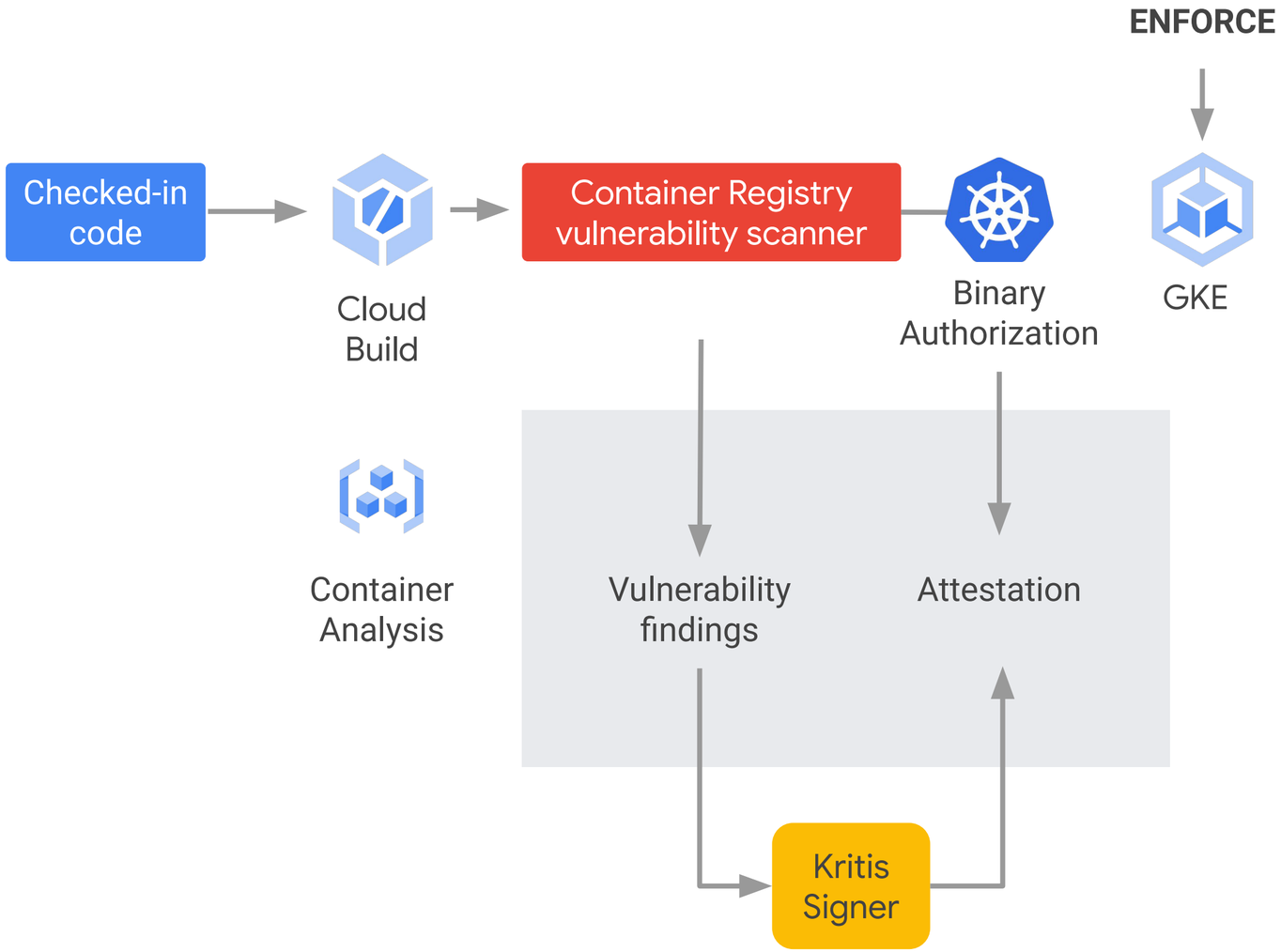
**Run only what you trust**. Allow only signed images or trusted repos

Images signed in CI/CD

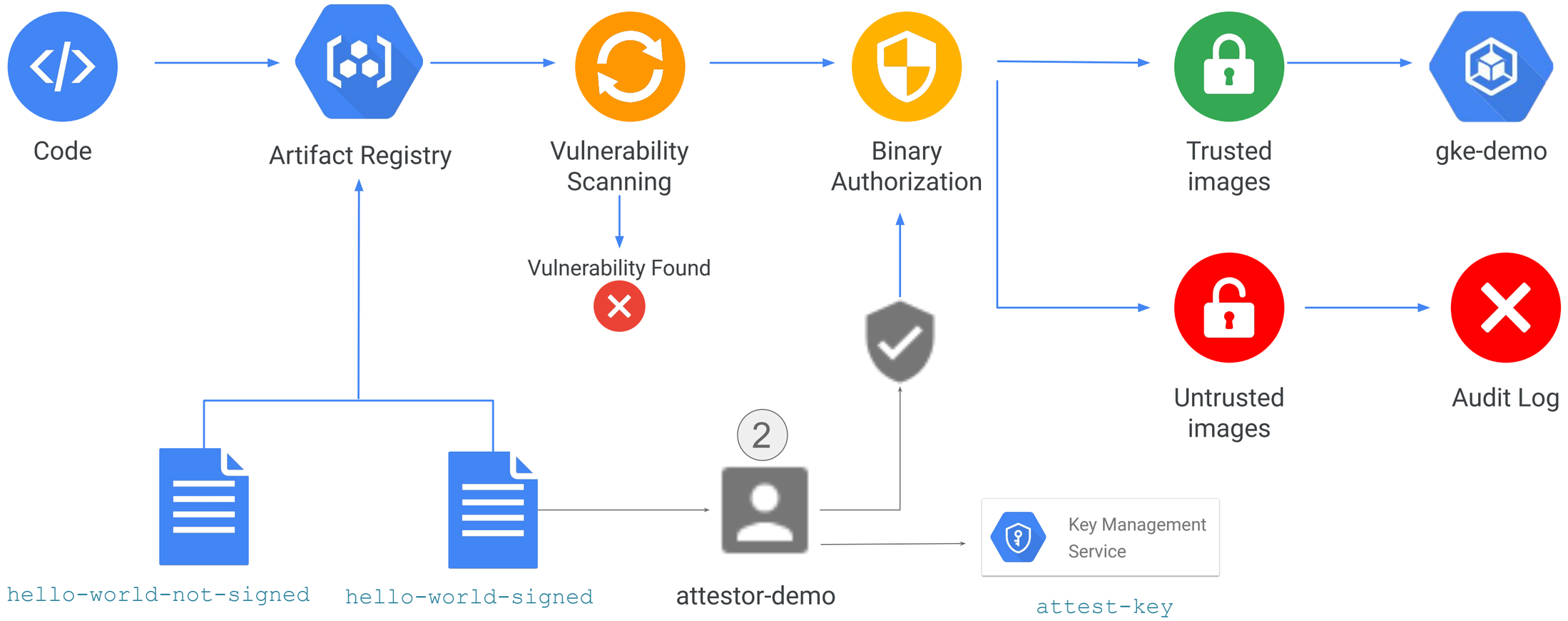
Deployments blocked/allowed at GKE control plane based on policy

# Binary authorization to enforce secure container image deployment

- When an image is built by Cloud Build an “attestor” verifies that it was from a trusted repository, built by a specific pipeline, passed tests, and was scanned for vulnerabilities.
- Artifact Registry includes a vulnerability scanner that scans containers and results can be used to apply attestations allowing or blocking deployment.

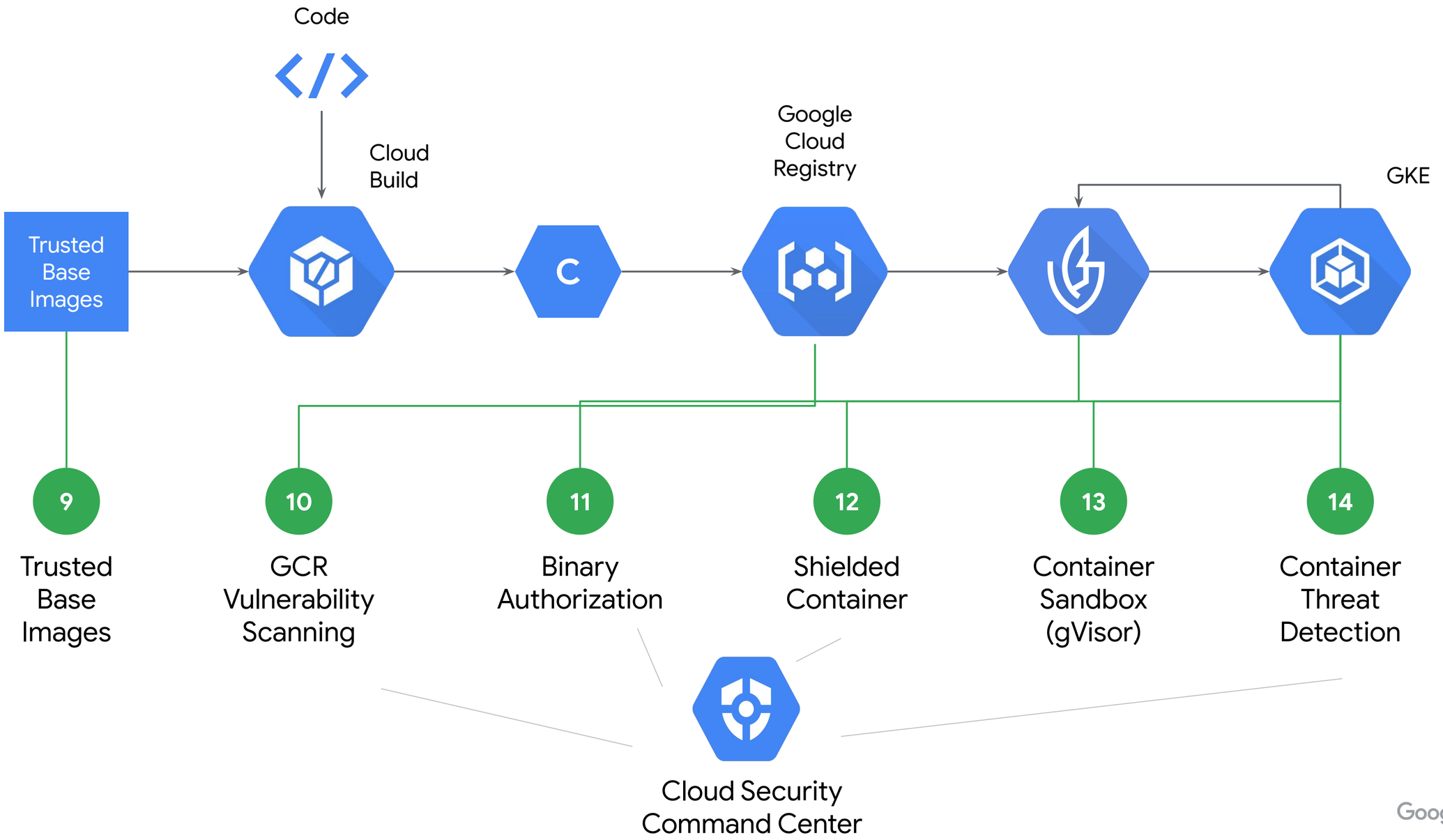


# Example of end-to-end CI/CD pipeline




Google Cloud

# End-to-End Secure Application Lifecycle

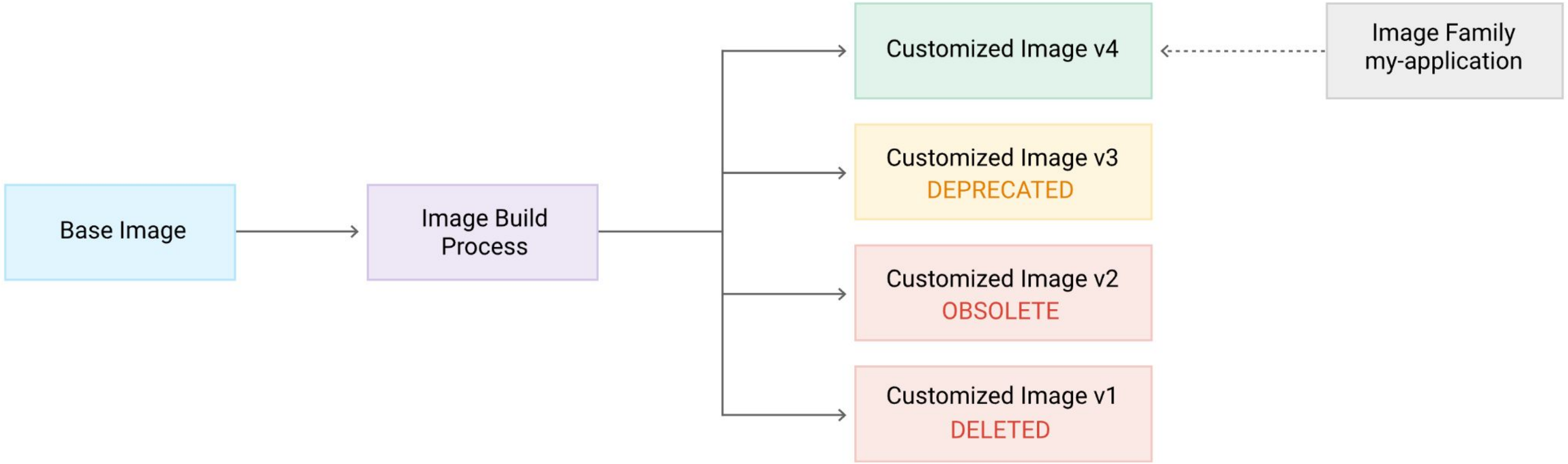


# Shielded Virtual Machines

Google Cloud Shielded VMs ensure integrity of the VM

- Secure boot prevents loading of malicious code during bootup
- Measured boot checks for modified components during bootup

# OS Image Families




Be familiar with:

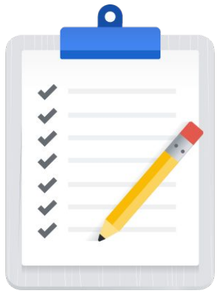
- Image life cycle (DEPRECATED / OBSOLETE / DELETED)
- Trusted image policies (based on Org policy; centralization)
- Sharing images between projects
- Image Families best practices

# Security monitoring and incident response process

Cymbal Bank will use Google Cloud's operations suite to capture, visualize, and alert on logs or metrics indicating security incidents.

Monitoring dashboard

Alerting regimen



Plans and tools for responding to issues

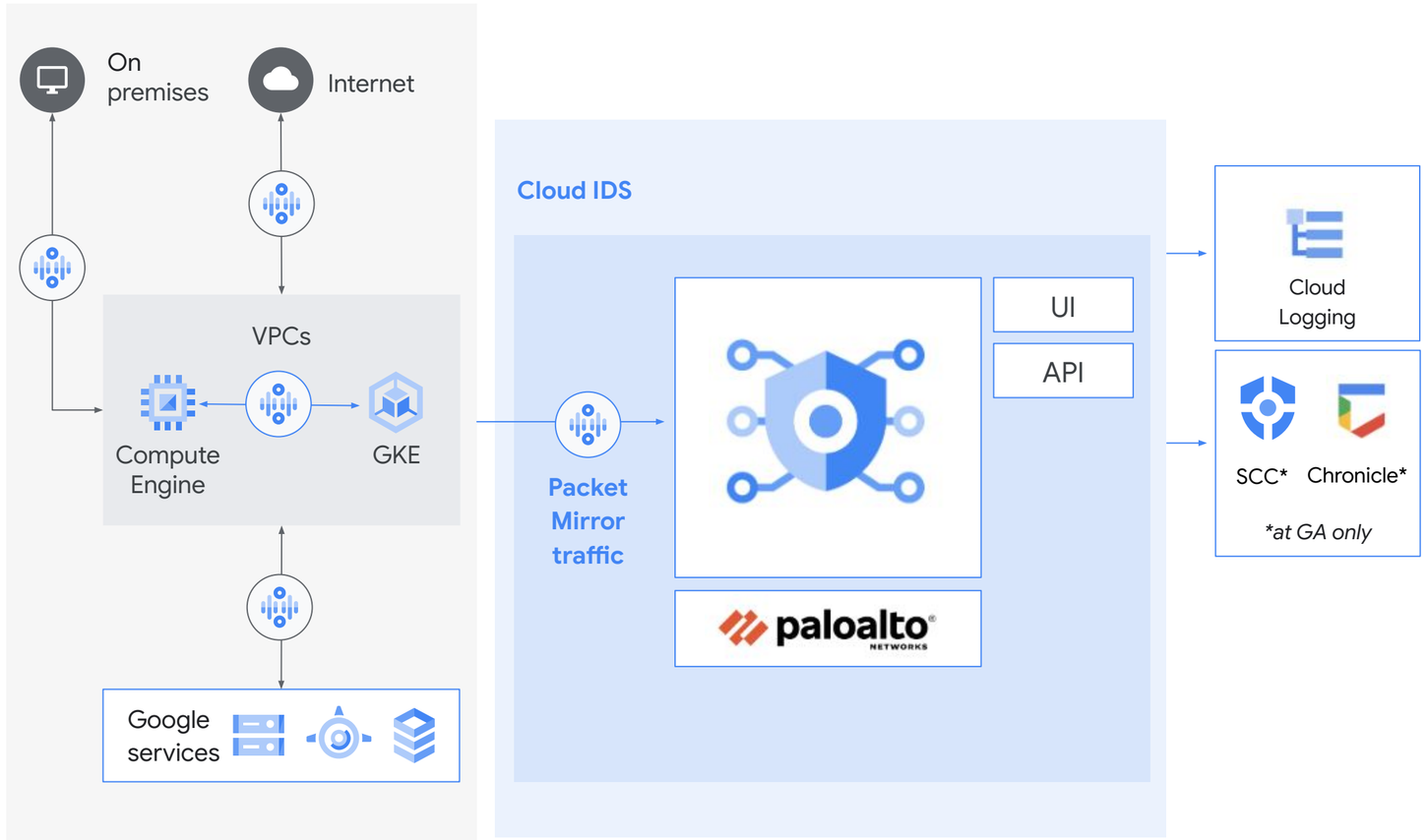
# Cloud IDS - Endpoints & packet mirroring

## IDS endpoint

- Zonal resource that inspects traffic from any zone in its region
- Receives mirrored traffic and performs threat detection analysis

## Packet mirroring

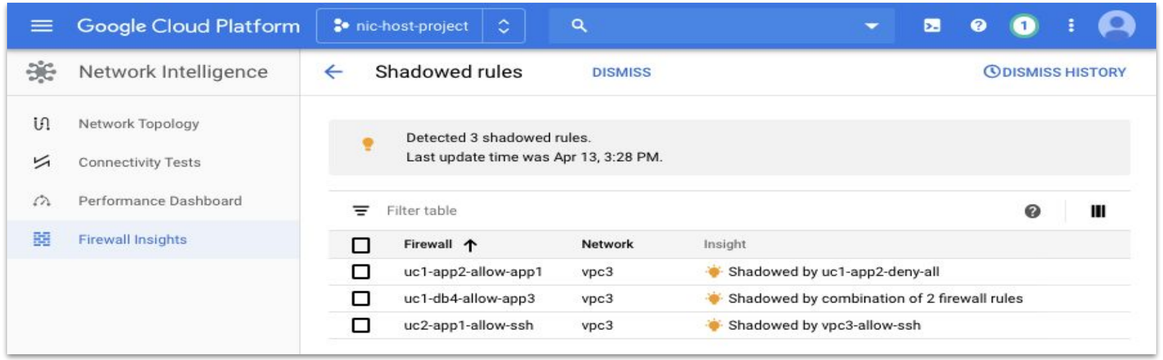
- Creates a copy of your network traffic
- Attack packet mirroring policies to IDS endpoints

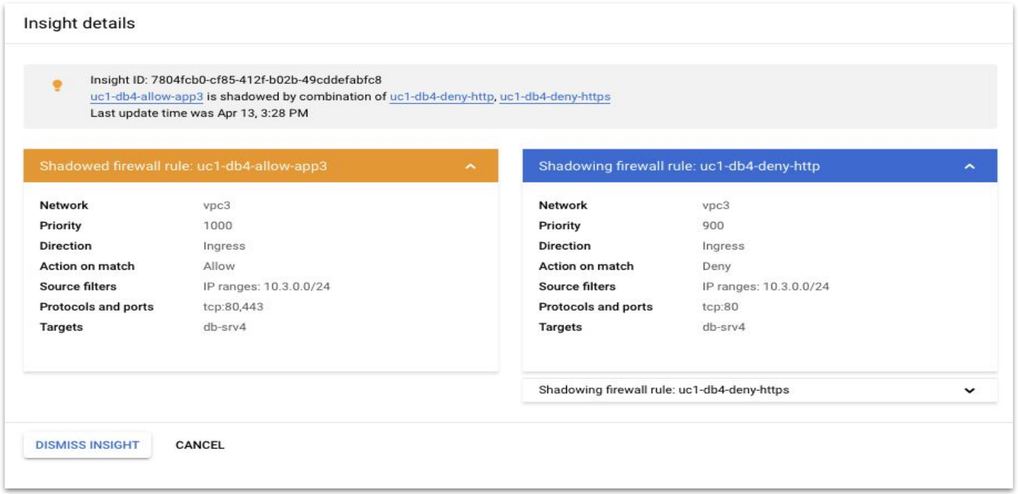


# Firewall Insights

## Misconfigured Firewall Rules

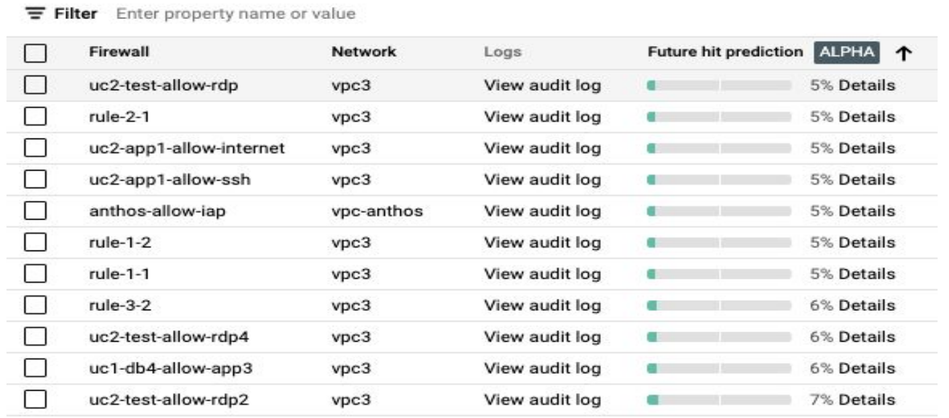
Shadowed Rule Detection (based on configuration analysis)

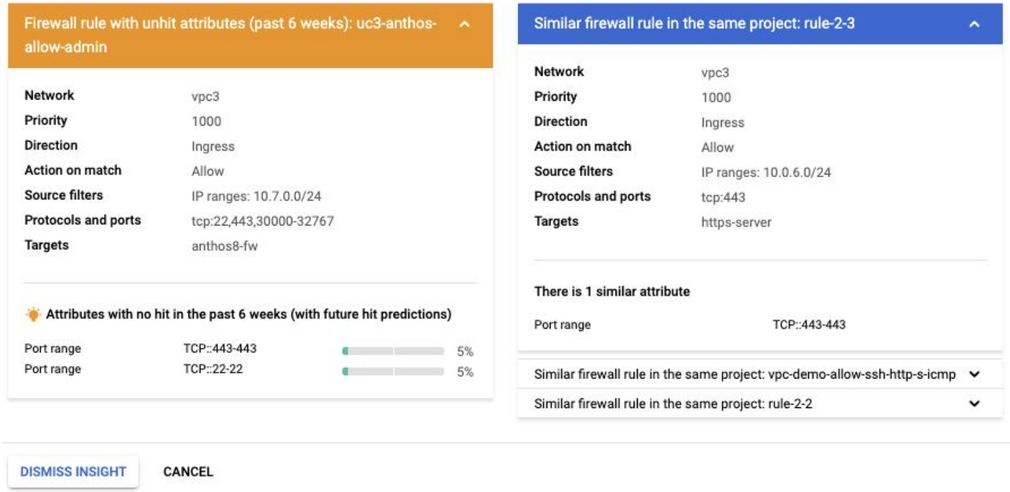



## Usage Metrics & Overly Permissive Rules

(based on firewall log analysis)



# Log categories

### Security Logs

Google Cloud audit logs, Google Workspace audit logs and access transparency logs

### Multi-cloud and On-premises Logs

Logs from other cloud services providers or on-prem workloads

### Platform Logs

Service-specific logs generated by Google Cloud

### System/App Logs

Logs generated by system services or applications

SECURITY LOGS

# Google Cloud audit logs

Record who did what when in your Cloud org

**Admin activity**

API calls / actions **modifying resource configuration or metadata**
*e.g. create VM instance, create object in bucket*

**Data access**

API calls **reading resources or resource metadata**
*e.g. admin-read, list Cloud Storage buckets; data-read read/write Cloud Storage object data*

**Access transparency**

Actions and accesses **performed by Google staff** on your resources
*e.g. support troubleshooting an open case*

**System event**

Google Cloud **managed service modifying resources**
e.g. *Compute Engine VM live migration, reclaiming a Spot instance*

**Policy denied**

Google Cloud **service denying access** to an identity because of a policy violation
*e.g. user is not authorized to list bucket contents*

SECURITY LOGS

# Google Cloud audit logs (Cont.)

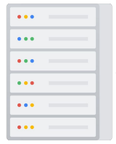
| | | enabled by default? | can be disabled? | free of charge? | retention | min-max retention |
|---|---|---|---|---|---|---|
| **admin activity** | | Yes | No | Yes* | 400d | N/A* |
| **data access** | BigQuery | Yes | No | Yes* | 30d | 1d-10y |
| | other services | No | Yes | No | 30d | 1d-10y |
| **access transparency** | | No | Yes | Yes | 400d | N/A* |
| **system event** | | Yes | No | Yes* | 400d | N/A* |
| **policy denied** | | Yes | Yes | No | 30d | 1d-10y |

** As long as they have not been routed to another storage destination.*

# Log compliance

Developer

Log concentrator



Auditor

Customer Organization

Service project A

global

_Default

_Required

_Default

_Required

PCI/DSS long-term

PCI/DSS searchable

Log collection project

us-west4

GCS

GDPR

Log views

Custom

Audit logs

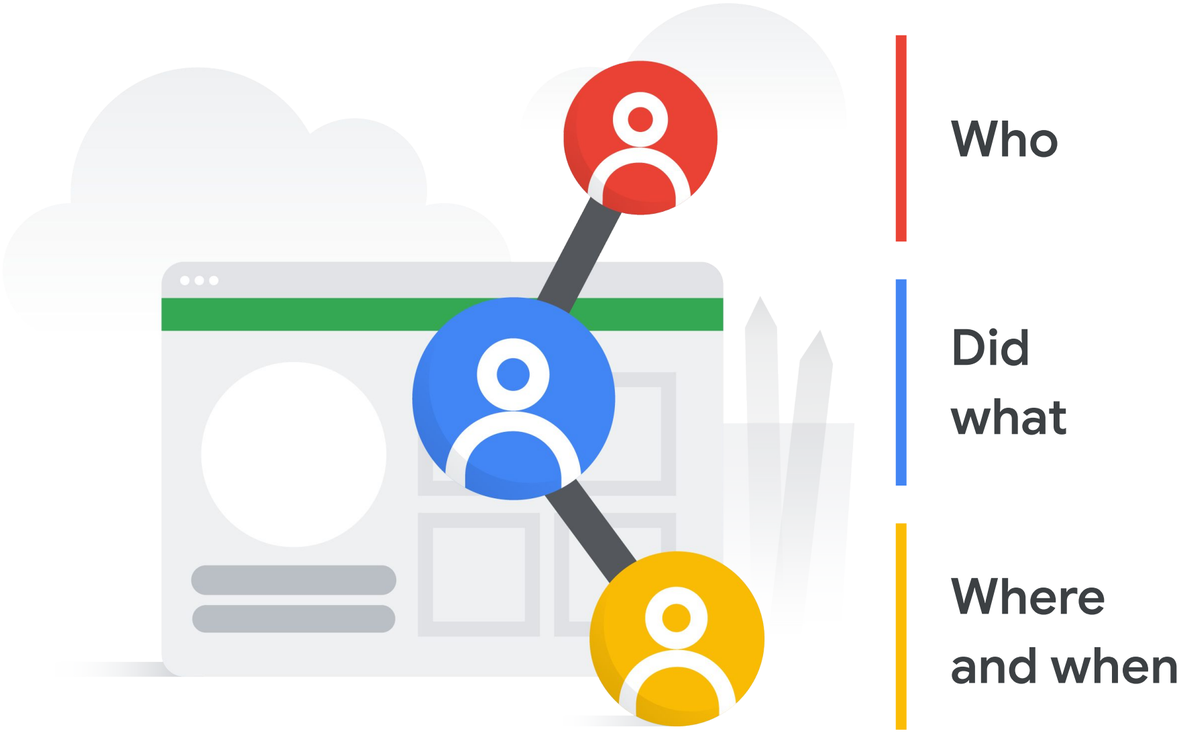
[Logs data: A step by step guide for overcoming common compliance challenges]

Google Cloud

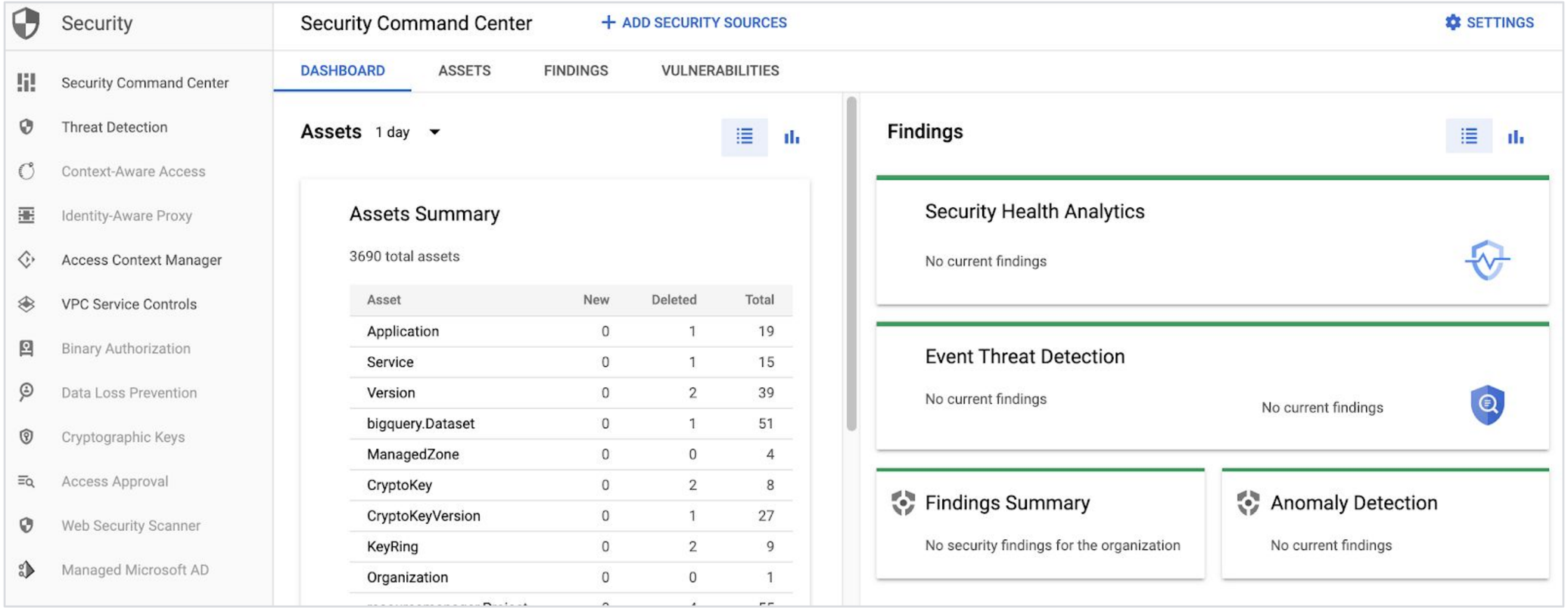
# Cloud Audit Logs to detect invalid administrative activity

Audit logs provide a complete capture of administrative activity and should be periodically audited to ensure compliance

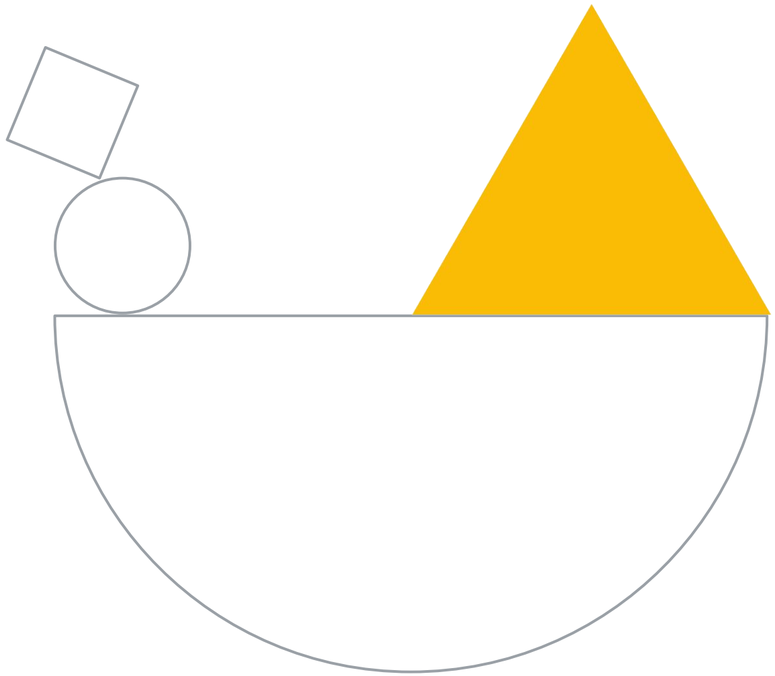
- Optionally enable data access logs to capture reads and writes to managed data storage
- Optionally export logs for long-term storage or analysis



# Security Command Center



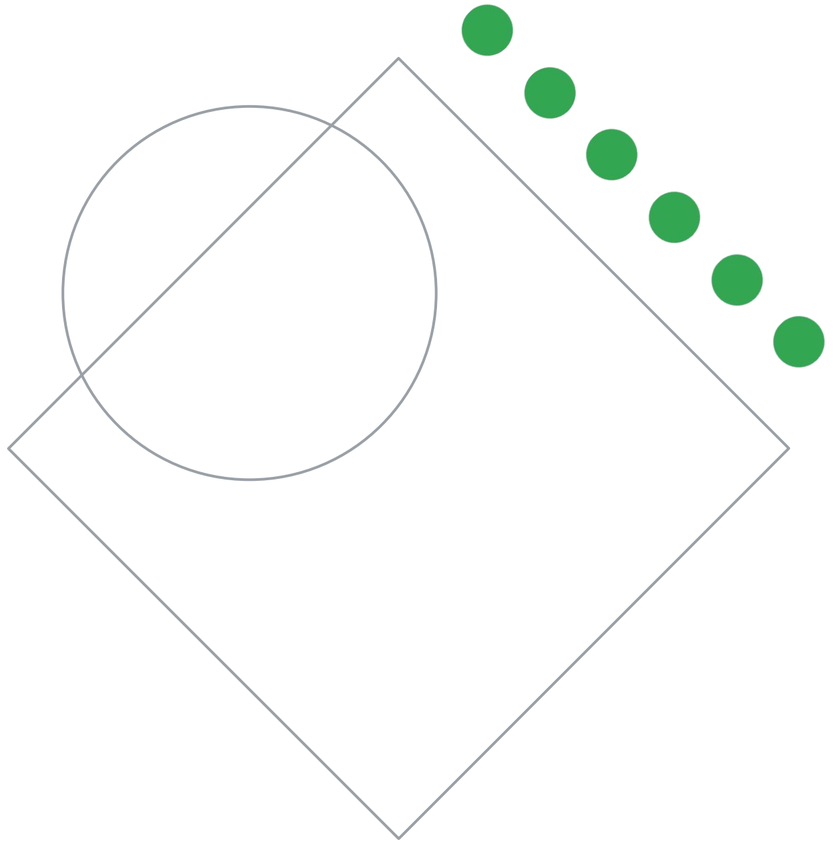
# Diagnostic questions



# Please complete the diagnostic questions now

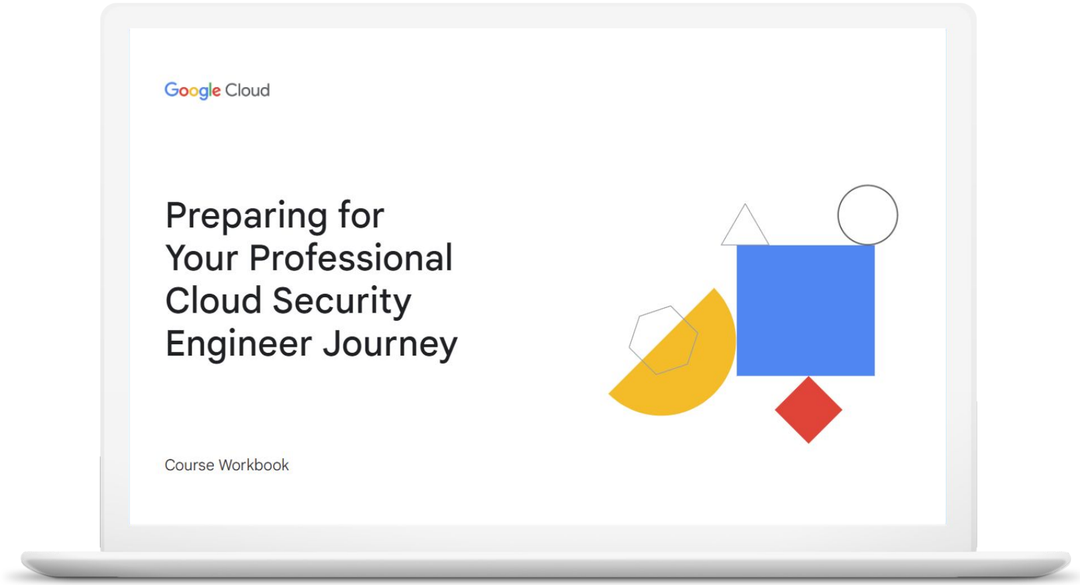
- Forms are provided for you to answer the diagnostic questions
- The instructor will provide you a link to the forms
- The diagnostic questions are also available in the workbook

# Review and study planning



# Your study plan:

## Managing operations in a cloud environment




4.1 Building and deploying secure infrastructure and applications

4.2 Configuring logging, monitoring, and detection

# 4.1 Building and deploying secure infrastructure and applications

Considerations include:

- Automating security scanning for Common Vulnerabilities and Exposures (CVEs) through a CI/CD pipeline
- Automating virtual machine image creation, hardening, and maintenance
- Automating container image creation, verification, hardening, maintenance, and patch management

# 4.1 Diagnostic Question 01 Discussion

Cymbal Bank has received Docker source files from its third-party developers in an Artifact Registry repository. These Docker fil2es will be part of a CI/CD pipeline to update Cymbal Bank's personal loan offering. The bank wants to prevent the possibility of remote users arbitrarily using the Docker files to run any code. You have been tasked with using Container Analysis' On-Demand scanning to scan the images for a one-time update.

What should you do?

A. Prepare a cloudbuild.yaml file. In this file, add four steps in order—build, scan, severity check, and push—specifying the location of Artifact Registry repository. Specify severity level as **CRITICAL**. Start the build with the command `gcloud builds submit.`

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# 4.1 Diagnostic Question 02 Discussion

Cymbal Bank's management is concerned about virtual machines being compromised by bad actors. More specifically, they want to receive immediate alerts if there have been changes to the boot sequence of any of their Compute Engine instances.

What should you do?

A. Set an organization-level policy that requires all Compute Engine VMs to be configured as Shielded VMs. Use Secure Boot enabled with Unified Extensible Firmware Interface (UEFI). Validate integrity events in Cloud Monitoring and place alerts on launch attestation events.

B. Set Cloud Logging measurement policies on the VMs. Use Cloud Logging to place alerts whenever actualMeasurements and policyMeasurements don't match.

C. Set an organization-level policy that requires all Compute Engine VMs to be configured as Shielded VMs. Use Measured Boot enabled with Virtual Trusted Platform Module (vTPM). Validate integrity events in Cloud Monitoring and place alerts on late boot validation events.

D. Set project-level policies that require all Compute Engine VMs to be configured as Shielded VMs. Use Measured Boot enabled with Virtual Trusted Platform Module (vTPM). Validate integrity events in Cloud Monitoring and place alerts on late boot validation events.

# 4.1 Diagnostic Question 02 Discussion

Cymbal Bank's management is concerned about virtual machines being compromised by bad actors. More specifically, they want to receive immediate alerts if there have been changes to the boot sequence of any of their Compute Engine instances.

What should you do?

A. Set an organization-level policy that requires all Compute Engine VMs to be configured as Shielded VMs. Use Secure Boot enabled with Unified Extensible Firmware Interface (UEFI). Validate integrity events in Cloud Monitoring and place alerts on launch attestation events.

B. Set Cloud Logging measurement policies on the VMs. Use Cloud Logging to place alerts whenever actualMeasurements and policyMeasurements don't match.

C. Set an organization-level policy that requires all Compute Engine VMs to be configured as Shielded VMs. Use Measured Boot enabled with Virtual Trusted Platform Module (vTPM). Validate integrity events in Cloud Monitoring and place alerts on late boot validation events.

D. Set project-level policies that require all Compute Engine VMs to be configured as Shielded VMs. Use Measured Boot enabled with Virtual Trusted Platform Module (vTPM). Validate integrity events in Cloud Monitoring and place alerts on late boot validation events.

# 4.1 Diagnostic Question 03 Discussion

Cymbal Bank runs a Node.js application on a Compute Engine instance. Cymbal Bank needs to share this base image with a ‘development’ Google Group. This base image should support secure boot for the Compute Engine instances deployed from this image. How would you automate the image creation?

How would you automate the image creation?

A. Prepare a shell script. Add the command gcloud compute instances stop with the Node.js instance name. Set up certificates for secure boot. Add gcloud compute images create, and specify the Compute Engine instance’s persistent disk and zone and the certificate files. Add gcloud compute images add-iam-policy-binding and specify the ‘development’ group.

B. Start the Compute Engine instance. Set up certificates for secure boot. Prepare a cloudbuild.yaml configuration file. Specify the persistent disk location of the Compute Engine and the ‘development’ group. Use the command gcloud builds submit --tag, and specify the configuration file path and the certificates.

C. Prepare a shell script. Add the command gcloud compute instances start to the script to start the Node.js Compute Engine instance. Set up Measured Boot for secure boot. Add gcloud compute images create, and specify the persistent disk and zone of the Compute Engine instance.

D. Stop the Compute Engine instance. Set up Measured Boot for secure boot. Prepare a cloudbuild.yaml configuration file. Specify the persistent disk location of the Compute Engine instance and the ‘development’ group. Use the command gcloud builds submit --tag, and specify the configuration file path.

# 4.1 Diagnostic Question 03 Discussion

Cymbal Bank runs a Node.js application on a Compute Engine instance. Cymbal Bank needs to share this base image with a 'development' Google Group. This base image should support secure boot for the Compute Engine instances deployed from this image. How would you automate the image creation?

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D. Stop the Compute Engine instance. Set up Measured Boot for secure boot. Prepare a cloudbuild.yaml configuration file. Specify the persistent disk location of the Compute Engine instance and the 'development' group. Use the command gcloud builds submit --tag, and specify the configuration file path.

# 4.1 Diagnostic Question 04 Discussion

Cymbal Bank uses Docker containers to interact with APIs for its personal banking application. These APIs are under PCI-DSS compliance. The Kubernetes environment running the containers will not have internet access to download required packages.

How would you automate the pipeline that is building these containers?

A. Create a Dockerfile with container definition and cloudbuild.yaml file. Use Cloud Build to build the image from Dockerfile. Upload the built image to a Google Container registry and Dockerfile to a Git repository. In the cloudbuild.yaml template, include attributes to tag the Git repository path with a Google Kubernetes Engine cluster. Create a trigger in Cloud Build to automate the deployment using the Git repository.

B. Create a Dockerfile with a container definition and a Cloud Build configuration file. Use the Cloud Build configuration file to build and deploy the image from Dockerfile to a Google Container registry. In the configuration file, include the Google Container Registry path and the Google Kubernetes Engine cluster. Upload the configuration file to a Git repository. Create a trigger in Cloud Build to automate the deployment using the Git repository.

C. Build a foundation image. Store all artifacts and a Packer definition template in a Git repository. Use Container Registry to build the artifacts and Packer definition. Use Cloud Build to extract the built container and deploy it to a Google Kubernetes Engine (GKE) cluster. Add the required users and groups to the GKE project.

D. Build an immutable image. Store all artifacts and a Packer definition template in a Git repository. Use Container Registry to build the artifacts and Packer definition. Use Cloud Build to extract the built container and deploy it to a Google Kubernetes Engine Cluster (GKE). Add the required users and groups to the GKE project.

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# 4.1 Building and deploying secure infrastructure and applications

## Courses

[Security in Google Cloud](#)
- M5 Securing Compute Engine: Techniques and Best Practices
- M7 Application Security: Techniques and Best Practices
- M8 Securing Kubernetes: Techniques and Best Practices
- M11 Monitoring, Logging, Auditing, and Scanning

[Security Best Practices in Google Cloud](#)
- M1 Securing Compute Engine: Techniques and Best Practices
- M3  Application Security: Techniques and Best Practices
- M4 Securing Kubernetes: Techniques and Best Practices

[Mitigating Security Vulnerabilities in Google Cloud](#)
- M3 Monitoring, Logging, Auditing, and Scaning

## Skill Badges

Google Cloud

[Secure Workloads in Google Kubernetes Engine Quest](#)

## Documentation

[Using On-Demand Scanning in your Cloud Build pipeline | Container Analysis documentation | Google Cloud](#)

[Container scanning | Container Analysis documentation | Google Cloud](#)

[Creating custom shielded images | Shielded VM | Google Cloud](#)

[Creating, deleting, and deprecating custom images | Compute Engine Documentation | Google Cloud](#)

[Managing access to custom images | Compute Engine Documentation | Google Cloud](#)

[Image management best practices | Compute Engine Documentation | Google Cloud](#)

[Deploying to GKE | Cloud Build Documentation](#)

[Quickstart: Build and push a Docker image with Cloud Build](#)

[Automated image builds with Jenkins, Packer, and Kubernetes | Cloud Architecture Center | Google Cloud](#)

# 4.2 Configuring logging, monitoring, and detection

Considerations include:

- Configuring and analyzing network logs (Firewall rule logs, VPC flow logs, packet mirroring)
- Designing an effective logging strategy
- Logging, monitoring, responding to, and remediating security incidents
- Exporting logs to external security systems
- Configuring and analyzing Google Cloud audit logs and data access logs
- Configuring log exports (log sinks, aggregated sinks, logs router)
- Configuring and monitoring Security Command Center (Security Health Analytics, Event Threat Detection, Container Threat Detection, Web Security Scanner)

# 4.2 Diagnostic Question 05 Discussion

Cymbal Bank has Docker applications deployed in Google Kubernetes Engine. The bank has no offline containers. This GKE cluster is exposed to the public internet and has recently recovered from an attack. Cymbal Bank suspects that someone in the organization changed the firewall rules and has tasked you to analyze and find all details related to the firewall for the cluster. You want the most cost-effective solution for this task.

What should you do?

A. View the GKE logs in Cloud Logging. Use the log scoping tool to filter the Firewall Rules log. Create a Pub/Sub topic. Export the logs to a Pub/Sub topic using the command gcloud logging sinks create. Use Dataflow to read from Pub/Sub and query the stream.

B. View the GKE logs in the local GKE cluster. Use the kubectl Sysdig Capture tool to filter the Firewall Rules log. Create a Pub/Sub topic. Export these logs to a Pub/Sub topic using the GKE cluster. Use Dataflow to read from Pub/Sub and query the stream.

C. View the GKE logs in the local GKE cluster. Use Docker-explorer to explore the Docker file system. Filter and export the Firewall logs to Cloud Logging. Create a dataset in BigQuery to accept the logs. Use the command gcloud logging sinks create to export the logs to a BigQuery dataset. Query this dataset.

D. View the GKE logs in Cloud Logging. Use the log scoping tool to filter the Firewall Rules log. Create a dataset in BigQuery to accept the logs. Export the logs to BigQuery using the command gcloud logging sinks create. Query this dataset.

# 4.2 Diagnostic Question 05 Discussion

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D. View the GKE logs in Cloud Logging. Use the log scoping tool to filter the Firewall Rules log. Create a dataset in BigQuery to accept the logs. Export the logs to BigQuery using the command gcloud logging sinks create. Query this dataset.

# 4.2 Diagnostic Question 06 Discussion

Cymbal Bank experienced a recent security issue. A rogue employee with admin permissions for Compute Engine assigned existing Compute Engine users some arbitrary permissions. You are tasked with finding all these arbitrary permissions.

What should you do to find these permissions most efficiently?

A. Use Event Threat Detection and configure Continuous Exports to filter and write only Firewall logs to the Security Command Center. In the Security Command Center, select **Event Threat Detection** as the source, filter by **evasion: Iam**, and sort to find the attack time window. Click on **Persistence: IAM Anomalous Grant** to display Finding Details. View the **Source** property of the Finding Details section.

B. Use Event Threat Detection and configure Continuous Exports to filter and write only Firewall logs to the Security Command Center. In the Security Command Center, select **Event Threat Detection** as the source, filter by **category: anomalies**, and sort to find the attack time window. Click on **Evasion: IAM Anomalous Grant** to display Finding Details. View the **Source** property of the Finding Details section.

C. Use Event Threat Detection and trigger the IAM Anomalous grants detector. Publish results to the Security Command Center. In the Security Command Center, select **Event Threat Detection** as the source, filter by **category: iam**, and sort to find the attack time window. Click on **Persistence: IAM Anomalous Grant** to display Finding Details. View the **Source** property of the Finding Details section.

D. Use Event Threat Detection and trigger the IAM Anomalous Grant detector. Publish results to Cloud Logging. In the Security Command Center, select **Cloud Logging** as the source, filter by **category: anomalies**, and sort to find the attack time window. Click on **Persistence: IAM Anomalous Grant** to display Finding Details. View the **Source** property of the Finding Details section.

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# 4.2 Diagnostic Question 07 Discussion

Cymbal Bank wants to use Cloud Storage and BigQuery to store safe deposit usage data. Cymbal Bank needs a cost-effective approach to auditing only Cloud Storage and BigQuery data access activities.

How would you use Cloud Audit Logs to enable this analysis?

A. Enable Data Access Logs for ADMIN_READ, DATA_READ, and DATA_WRITE at the service level for BigQuery and Cloud Storage.

B. Enable Data Access Logs for ADMIN_READ, DATA_READ, and DATA_WRITE at the organization level.

C. Enable Data Access Logs for ADMIN_READ, DATA_READ, and DATA_WRITE for Cloud Storage. All Data Access Logs are enabled for BigQuery by default.

D. Enable Data Access Logs for ADMIN_READ, DATA_READ, and DATA_WRITE for BigQuery. All Data Access Logs are enabled for Cloud Storage by default.

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C. Enable Data Access Logs for ADMIN_READ, DATA_READ, and DATA_WRITE for Cloud Storage. All Data Access Logs are enabled for BigQuery by default.

D. Enable Data Access Logs for ADMIN_READ, DATA_READ, and DATA_WRITE for BigQuery. All Data Access Logs are enabled for Cloud Storage by default.

# 4.2 Diagnostic Question 08 Discussion

Cymbal Bank has suffered a remote botnet attack on Compute Engine instances in an isolated project. The affected project now requires investigation by an external agency. An external agency requests that you provide all admin and system events to analyze in their local forensics tool. You want to use the most cost-effective solution to enable the external analysis.

What should you do?

A. Use Event Threat Detection. Trigger the IAM Anomalous Grant detector to detect all admins and users with admin or system permissions. Export these logs to the Security Command Center. Give the external agency access to the Security Command Center.

B. Use Cloud Audit Logs. Filter Admin Activity audit logs for only the affected project. Use a Pub/Sub topic to stream the logs from Cloud Audit Logs to the external agency's forensics tool.

C. Use the Security Command Center. Select Cloud Logging as the source, and filter by category: Admin Activity and category: System Activity. View the Source property of the Finding Details section. Use Pub/Sub topics to export the findings to the external agency's forensics tool.

D. Use Cloud Monitoring and Cloud Logging. Filter Cloud Monitoring to view only system and admin logs. Expand the system and admin logs in Cloud Logging. Use Pub/Sub to export the findings from Cloud Logging to the external agency's forensics tool or storage.

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C. Use the Security Command Center. Select Cloud Logging as the source, and filter by category: Admin Activity and category: System Activity. View the Source property of the Finding Details section. Use Pub/Sub topics to export the findings to the external agency's forensics tool.

D. Use Cloud Monitoring and Cloud Logging. Filter Cloud Monitoring to view only system and admin logs. Expand the system and admin logs in Cloud Logging. Use Pub/Sub to export the findings from Cloud Logging to the external agency's forensics tool or storage.

# 4.2 Diagnostic Question 09 Discussion

The loan application from Cymbal Bank's lending department collects credit reports that contain credit payment information from customers. According to bank policy, the PDF reports are stored for six months in Cloud Storage, and access logs for the reports are stored for three years. You need to configure a cost-effective storage solution for the access logs.

What should you do?

A. Set up a logging export dataset in BigQuery to collect data from Cloud Logging and Cloud Monitoring. Create table expiry rules to delete logs after three years.

B. Set up a logging export dataset in BigQuery to collect data from Cloud Logging and the Security Command Center. Create table expiry rules to delete logs after three years.

C. Set up a logging export bucket in Cloud Storage to collect data from the Security Command Center. Configure object lifecycle management rules to delete logs after three years.

D. Set up a logging export bucket in Cloud Storage to collect data from Cloud Audit Logs. Configure object lifecycle management rules to delete logs after three years.

# 4.2 Diagnostic Question 09 Discussion

The loan application from Cymbal Bank's lending department collects credit reports that contain credit payment information from customers. According to bank policy, the PDF reports are stored for six months in Cloud Storage, and access logs for the reports are stored for three years. You need to configure a cost-effective storage solution for the access logs.

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B. Set up a logging export dataset in BigQuery to collect data from Cloud Logging and the Security Command Center. Create table expiry rules to delete logs after three years.

C. Set up a logging export bucket in Cloud Storage to collect data from the Security Command Center. Configure object lifecycle management rules to delete logs after three years.

D. Set up a logging export bucket in Cloud Storage to collect data from Cloud Audit Logs. Configure object lifecycle management rules to delete logs after three years.

# 4.2 Diagnostic Question 10 Discussion

Cymbal Bank uses Compute Engine instances for its APIs, and recently discovered bitcoin mining activities on some instances. The bank wants to detect all future mining attempts and notify the security team. The security team can view the Security Command Center and Cloud Audit Logs.

How should you configure the detection and notification?

A. Use Event Threat Detection's threat detectors. Export findings from 'Suspicious account activity' and 'Anomalous IAM behavior' detectors and publish them to a Pub/Sub topic. Create a Cloud Function to send notifications of suspect activities. Use Pub/Sub notifications to invoke the Cloud Function.

B. Enable the VM Manager tools suite in the Security Command Center. Perform a scan of Compute Engine instances. Publish results to Cloud Audit Logging. Create an alert in Cloud Monitoring to send notifications of suspect activities.

C. Enable Anomaly Detection in the Security Command Center. Create and configure a Pub/Sub topic and an email service. Create a Cloud Function to send email notifications for suspect activities. Export findings to a Pub/Sub topic, and use them to invoke the Cloud Function.

D. Enable the Web Security Scanner in the Security Command Center. Perform a scan of Compute Engine instances. Publish results to Cloud Audit Logging. Create an alert in Cloud Monitoring to send notifications for suspect activities.

# 4.2 Diagnostic Question 10 Discussion

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C. Enable Anomaly Detection in the Security Command Center. Create and configure a Pub/Sub topic and an email service. Create a Cloud Function to send email notifications for suspect activities. Export findings to a Pub/Sub topic, and use them to invoke the Cloud Function.

D. Enable the Web Security Scanner in the Security Command Center. Perform a scan of Compute Engine instances. Publish results to Cloud Audit Logging. Create an alert in Cloud Monitoring to send notifications for suspect activities.

# 4.2 Configuring logging, monitoring, and detection

## Courses

[Security in Google Cloud](#)
- M11 Monitoring, Logging, Auditing, and Scanning

[Mitigating Security Vulnerabilities in Google Cloud](#)
- M3 Monitoring, Logging, Auditing, and Scanning

## Documentation

[Security controls and forensic analysis for GKE apps | Cloud Architecture Center](#)

[Scenarios for exporting logging data: Security and access analytics | Cloud Architecture Center | Google Cloud](#)

[Security controls and forensic analysis for GKE apps | Cloud Architecture Center](#)

[Cloud Audit Logs overview](#)

[Cloud Audit Logs with Cloud Storage | Google Cloud](#)

[Configure Data Access audit logs](#)

[Scenarios for exporting Cloud Logging: Compliance requirements | Cloud Architecture Center | Google Cloud](#)

[Security sources for vulnerabilities and threats | Security Command Center | Google Cloud](#)

[Configuring Security Command Center](#)

[Enabling real-time email and chat notifications](#)

# Knowledge Check 1

Which feature of Google Cloud will Cymbal Bank use to prevent unauthorized container images from being deployed into production environments?

A. Audit logs

B. Cloud Build

C. Binary Authorization

D. Cloud Monitoring

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Which feature of Google Cloud will Cymbal Bank use to prevent unauthorized container images from being deployed into production environments?

A. Audit logs

B. Cloud Build

C. Binary Authorization

D. Cloud Monitoring

# Knowledge Check 2

How will Cymbal Bank be able to determine who performed a particular administrative action and when?

A. VPC flow logs

B. Audit logs

C. VPC service controls

D. Cloud Monitoring

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How will Cymbal Bank be able to determine who performed a particular administrative action and when?

A. VPC flow logs

B. Audit logs

C. VPC service controls

D. Cloud Monitoring

# Additional content

# QUIZ week 4

(the one we went through during the meeting)

Reminder:

- NOT as complex as questions on the exam
- Technical knowledge validation (No business context)

# Additional content 1

**[ READING ]**

- Disaster recovery scenarios for data
- Data incident response process - Creating and automating an incident response plan
- Cloud Audit Logs overview - Log sinks, audit logs, and data access logs for near-real-time monitoring
- Container analysis and vulnerability scanning - Automate security scanning for Common Vulnerabilities and Exposures (CVEs) through a CI/CD pipeline
- Create a Binary Authorization attestation in a Cloud Build pipeline
- OS Image management best practices
- Securing artifacts in Artifact Registry
- Monitoring and alerting on logs
- Trusted image policies - based on Organization Policy service
- Cloud Asset Inventory overview
- Monitoring asset changes
- VPC Flow logs + PAcket Mirroring + Cloud IDS explained
- Web Security Scanner overview
- Packet Mirroring overview and a blog post with a use-case.
- How to set up Packet Mirroring?
- Firewall Insights explained

# Additional content 2

- Exporting security logs to SIEM system - a step-by-step tutorial, highly recommended.
- Overview of Forseti
- Granting access to an image in a different project to a MIG
- Container Threat Detection conceptual overview
- Firewall Insights - based on firewall logs
- Exporting logs to Splunk
- Scenarios for exporting logging data: Security and access analytics

**[ VIDEOS ]**

- [Recommended] How to secure your software supply chain from dependencies to deployment
- Security Command Center playlist (9 short videos)
- How to use Cloud Logging  to detect security breaches
- Chronicle in a minute
- Security Command Center introduction: Cloud posture and workload protection with Security Command Center

**[ PODCASTS ]**

- The Magic of Cloud Migration: Learn Security Lessons from the Field

# Make sure to...

## Enjoy the journey as much as the destination!