

Best practices for defining and enforcing policies across your Google Cloud environment

Security Summit

Solving for the future of security.

05/17/22





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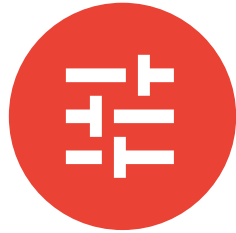


Why are we here?

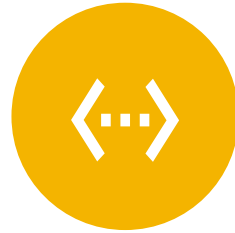
Learn how to take a policy driven approach to governing your cloud resources and data

Guidance on best practices for defining and enforcing policies across GCP environment

How GCP Security approaches Policy



Defense in
Depth Controls



Policy at
Scale



Intelligence &
Automation

Defense in Depth Security

GCP Security Policies



IAM Grant

Who can do
what on which
resource.



IAM Deny

Explicitly block
the use of
permissions in
resources



VPC Service Controls & Firewalls

Constrain data
within a VPC and
mitigate data
exfiltration risks.



Org Policy

Enforce
guardrails
around which
resource
configurations
are allowed.



Tags

Organize and
govern
resources across
various Business
dimensions and
conditionally
enforce IAM &
Org policies
using ACLed
Tags.

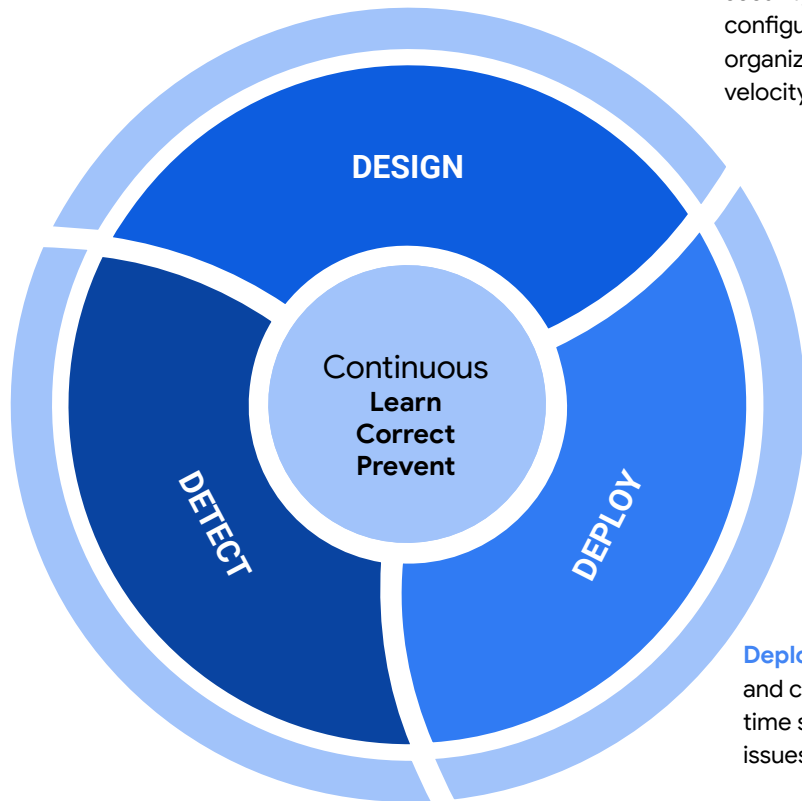


Policy Intelligence

Capabilities
which provide
more visibility
and automation
to understand
and manage
policies to
reduce risk.

Policy Lifecycle

Detect changes to my security posture so that I can understand the impact to risk and my specified business and security outcomes. Report on my security posture for governance and auditing.



Design Security Posture to translate business or security outcomes into underlying policies and configurations so that I can be confident in my organization's posture while meeting my business velocity goals.

Deploy confidently with appropriate business and compliance requirements to reduce risk and time spent remediating downstream security issues.



Design

**More than 95% accounts
in IaaS use less than 3%
of the entitlements
they are granted.**

Gartner®, Innovation Insight for cloud infrastructure entitlement management,
Henrique Teixeira, Michael Kelley, Abhyuday Data, June 15, 2021

IAM Recommender

Helps remove unwanted access to GCP resources by making smart access recommendations to help improve security and reduce risk.

Safely achieve least-privilege, with least effort

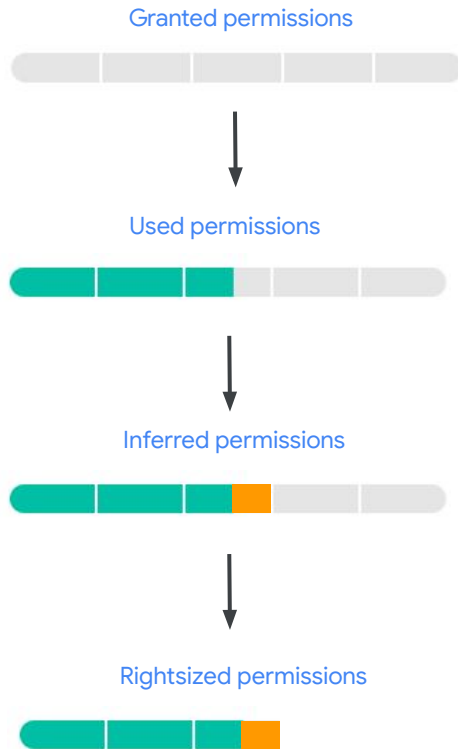
IAM Recommender looks back at the permission usage in the last 90 days and finds unused permissions.

Next, the machine learning model looks at the used permissions and finds “inferred permissions”. These permissions have been granted but not used, however, we can predict that the permission will likely be needed in the future based off of similar usage patterns we have observed elsewhere.

IAM Recommender then recommends a new role that removes unused permissions and keeps inferred permissions.

The best part?

No config or setup required



Google Cloud Platform ACME PROD 00 Search products and resources

IAM Recommendations for Project, Folder, & Organization Level Policies

PERMISSIONS RECOMMENDATIONS

Permissions for project "ACME PROD 00"

These permissions affect this project and all of its resources. [Learn more](#)

4 service accounts with highly privileged roles Owner / Editor have excess permissions. Improve security by applying recommendations to these accounts. [Learn more about recommendations.](#)

Priority Recommendations.

View By: **MEMBERS** ROLES ☐ Include Google-provided role grants

Over-granted permissions

Type	Member	Name	Role	Security insights	Inheritance	Conditions
<input type="checkbox"/>	858728829005-compute@developer.gserviceaccount.com	Compute Engine default service account	Dataproc Worker	27/27 excess permissions		
<input type="checkbox"/>	858728829005@cloudservices.gserviceaccount.com	Google APIs Service Agent	Storage Object Admin			
<input type="checkbox"/>	abhilyadav@google.com	Abhi Yadav	Owner	4467/4550 excess permissions		
<input type="checkbox"/>	acme-prod-00@appspot.gserviceaccount.com	App Engine default service account	Editor	4196/4200 excess permissions		
<input type="checkbox"/>	admin-demo@iam-role-rec-test.joonix.net		Owner		iam-role-rec-test.joonix.net	
<input type="checkbox"/>	agph@google.com	Andrew Priddle-Higson	Organization Admin		iam-role-rec-test.joonix.net	
<input type="checkbox"/>	amolkabe@google.com	Amol Kabe	BigQuery Admin			condition
<input type="checkbox"/>	azadeha@google.com	Azadeh Azarian	Organization Admin		iam-role-rec-test.joonix.net	
<input type="checkbox"/>	azadeha@google.com	Azadeh Azarian	Owner		iam-role-rec-test.joonix.net	
<input type="checkbox"/>	beachy@google.com	Lindsay Beach	Owner		iam-role-rec-test.joonix.net	
<input type="checkbox"/>	carolynhuynh@google.com		Viewer		iam-role-rec-test.joonix.net	
<input type="checkbox"/>	carolynhuynh@google.com		Security Reviewer			
<input type="checkbox"/>	christopherlaw@google.com		Custom Role			
<input type="checkbox"/>	clairelyles@google.com		Storage Object Admin			
<input type="checkbox"/>	cloud-security-ux@google.com		Access Context Manager Admin		iam-role-rec-test.joonix.net	
<input type="checkbox"/>	cloud-security-ux@google.com		Identity Platform Admin		iam-role-rec-test.joonix.net	
<input type="checkbox"/>	cloud-security-ux@google.com		Organization Administrator		iam-role-rec-test.joonix.net	

Recommendations to remove or change to less permissive role(s)

Recommendations for Human users, Groups, & Service Accounts.

Replace Viewer role for jiyun Yao@google.com

Replacement role(s)

Impact of taking this recommendation: Reduce permissions from 1646 to 11



Replacing the Viewer role with the App Engine Viewer role will reduce the project member's permissions from 1646 to 11. Analysis is based off of the last 90 days.

Current permissions for Viewer role

Last Analyzed 1/28/21	1	resourceManager.projects.get
Excess permissions	2	accessApproval.requests.get
	3	accessApproval.requests.list
	4	accessApproval.settings.get
	5	accessContextManager.accessLevels.get
	6	accessContextManager.accessLevels.list
	7	accessContextManager.accessLevels.set
	8	accessContextManager.accessLevels.update
	9	accessContextManager.accessLevels.delete
	10	accessContextManager.accessLevels.create
	11	accessContextManager.accessZones.list
	12	accessContextManager.gcpUserAccessBindings.get
	13	accessContextManager.gcpUserAccessBindings.list
	14	accessContextManager.policies.get
	15	accessContextManager.policies.getIamPolicy
	16	accessContextManager.policies.list
	17	accessContextManager.servicePerimeters.get

ML-inferred permissions based on similar user access patterns

App Engine Viewer role replacement recommendation

138	-	apigee.sharedflowrevisions.get
139	-	apigee.sharedflowrevisions.list
140	-	apigee.sharedflows.get
141	-	apigee.sharedflows.list
142	-	apigee.targetservers.get
143	-	apigee.targetservers.list
144	-	apigee.tracesessions.get
145	-	apigee.tracesessions.list
146	-	apigeeconnect.connections.list
147	-	apikeys.keys.get
148	-	apikeys.keys.list
149	-	apikeys.keys.lookup
150	+	appengine.applications.get
151	+	appengine.instances.get
152	+	appengine.instances.list
153	+	appengine.operations.get
154	-	appengine.memcache.getKey
155	-	appengine.memcache.list
156	-	appengine.operations.get

This is a machine learning generated permission recommendation

Permissions to be removed after applying recommendation.

APPLY

DISMISS

CANCEL

Actions

Use Case - Safely remove unnecessary access to sensitive data

- Identify buckets with public access grants
- Help reduce security risk by removing excess permissions

The screenshot shows the Google Cloud Platform Cloud Storage interface. A modal window titled "Introducing Recommendations" is displayed at the top, suggesting an extra layer of security by viewing security insights for buckets. Below the modal, a table lists various storage buckets with columns for Name, Labels, Requester Pays, Encryption, and Security Insights. The Security Insights column shows the number of excess permissions for each bucket, with some buckets having a red warning icon. The table is filtered by "Filter table" and "Filter".

Name	Labels	Requester Pays	Encryption	Security Insights
srishtc-test-bucket		OFF	Google-managed key	501/502 excess permissions
test_bucket_1206		OFF	Customer-managed key	199/200 excess permissions
srishtc-hsm-bucket		OFF	Customer-managed key	43/52 excess permissions
bucket-of-london	wackylabel: iamtest	OFF	Google-managed key	14/11 excess permissions
staging.londonfog.google.com.a.appspot.com		OFF	Google-managed key	31/34 excess permissions
londonfog.google.com.a.appspot.com		OFF	Google-managed key	48/50 excess permissions
vm-config.londonfog.google.com.a.appspot.com		OFF	Google-managed key	3/3 excess permissions
vm-containers.londonfog.google.com.a.appspot.com		OFF	Google-managed key	43/52 excess permissions
us.artifacts.londonfog.google.com.a.appspot.com		OFF	Google-managed key	48/50 excess permissions
artifacts.londonfog.google.com.a.appspot.com		OFF	Google-managed key	48/50 excess permissions
us-central1-composer-test-82210e64-bucket	goog-compo...: composer-t...	OFF	Google-managed key	44/44 excess permissions
test_bucketz44		OFF	Google-managed key	104/372 excess permissions
parisfrance		OFF	Google-managed key	31/34 excess permissions
deletemebucket	test: value1	OFF	Google-managed key	104/372 excess permissions

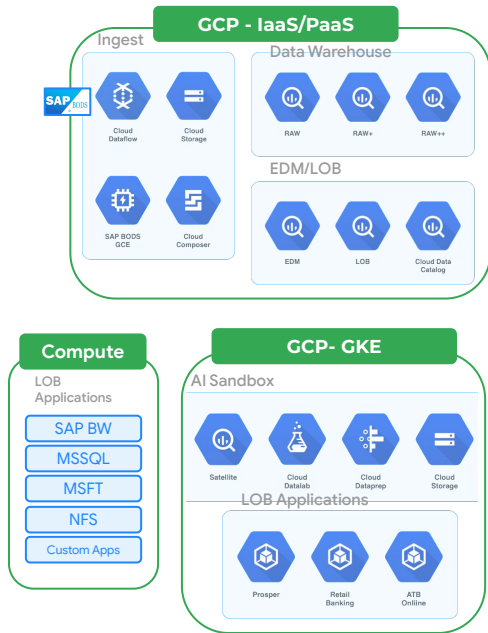
Rows per page: 50 | 1 - 13 of 13



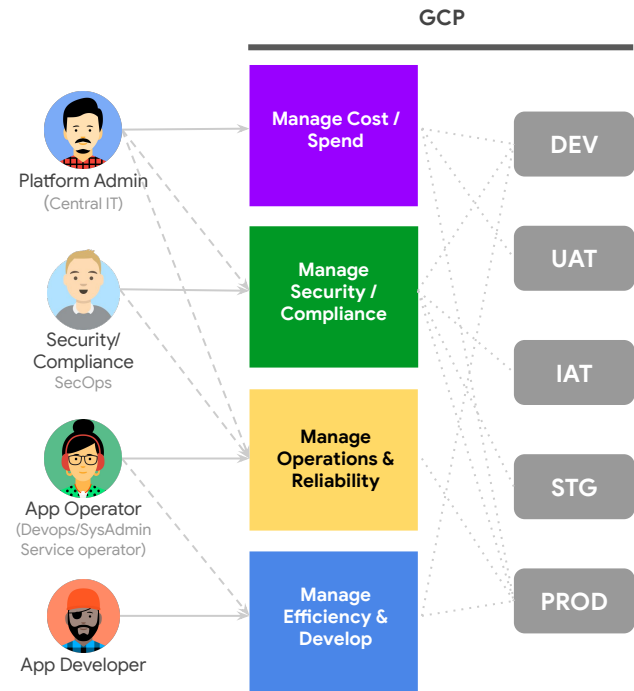
Deploy

Policy at Scale

Managing 1000s of resources & applications across 1000+ projects



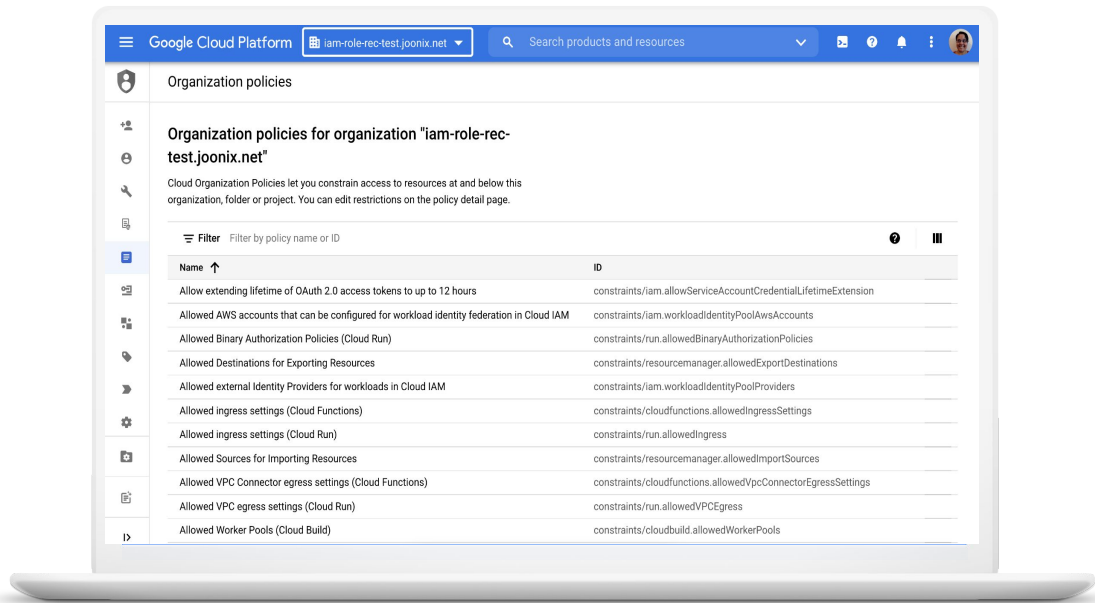
Across multiple teams, environment, roles with an org



Organization Policies

Enable customers to enforce constraints around which **resource configurations** are allowed in an organization.

70+ resource-based constraints to restrict and enforce what and how developers can interact with services and/or resources.



















Use Case - Resource Governance at scale

Compliance Admin wants to ensure resources are only created in Europe.

Compliance needs to ensure only compliant services can be used by developers in organization.

The screenshot shows the Google Cloud Platform interface for managing organization policies. The header includes the Google Cloud Platform logo, the organization name 'chak-cloud-testing-org.joonix.net', a search bar, and a dropdown menu. The main content area is titled 'Organization policies' and shows a list of policies for the organization. The policies are filtered by 'Restrict Resource Service Usage' and 'Google Cloud Platform - Resource Location Restriction'. The table below lists the policies:

Name	ID
Google Cloud Platform - Resource Location Restriction	constraints/gcp.resourceLocations
Restrict Resource Service Usage	constraints/gcp.restrictServiceUsage

-  IAM & Admin
-  IAM
-  Identity & Organization
-  Policy Troubleshooter
-  Policy Analyzer
-  Organization Policies
-  Service Accounts
-  Workload Identity Federat...
-  Labels
-  Tags
-  Settings
-  Privacy & Security
-  Identity-Aware Proxy
-  Manage Resources
-  Release Notes
- 

Organization policies

[HELP ASSISTANT](#)

Name ↑	ID
Allow extending lifetime of OAuth 2.0 access tokens to up to 12 hours	constraints/iam.allowServiceAccountCredentialLifetimeExtension
Allowed AWS accounts that can be configured for workload identity federation in Cloud IAM	constraints/iam.workloadIdentityPoolAwsAccounts
Allowed Binary Authorization Policies (Cloud Run)	constraints/run.allowedBinaryAuthorizationPolicies
Allowed Destinations for Exporting Resources	constraints/resourcemanager.allowedExportDestinations
Allowed external Identity Providers for workloads in Cloud IAM	constraints/iam.workloadIdentityPoolProviders
Allowed ingress settings (Cloud Functions)	constraints/cloudfunctions.allowedIngressSettings
Allowed ingress settings (Cloud Run)	constraints/run.allowedIngress
Allowed Integrations (Cloud Build)	constraints/cloudbuild.allowedIntegrations
Allowed Sources for Importing Resources	constraints/resourcemanager.allowedImportSources
Allowed VPC Connector egress settings (Cloud Functions)	constraints/cloudfunctions.allowedVpcConnectorEgressSettings
Allowed VPC egress settings (Cloud Run)	constraints/run.allowedVPCEgress
Allowed VPC Service Controls mode for Anthos Service Mesh Managed Control Planes	constraints/meshconfig.allowedVpcscModes
Allowed Worker Pools (Cloud Build)	constraints/cloudbuild.allowedWorkerPools
Compute Storage resource use restrictions (Compute Engine disks, images, and snapshots)	constraints/compute.storageResourceUseRestrictions
Datastream - Block Public Connectivity Methods	constraints/datastream.disablePublicConnectivity
Define allowed external IPs for VM instances	constraints/compute.vmExternalIpAccess
Define trusted image projects	constraints/compute.trustedImageProjects
Disable All IPv6 usage	constraints/compute.disableAllIpv6
Disable Automatic IAM Grants for Default Service Accounts	constraints/iam.automaticIamGrantsForDefaultServiceAccounts
Disable BigQuery Omni for Cloud AWS	constraints/bigquery.disableBQOmniAWS
Disable BigQuery Omni for Cloud Azure	constraints/bigquery.disableBQOmniAzure

[Show debug pane](#)

Tags are access controlled resources

Centralized Governance for Tagging Taxonomy

- Tags Defined at the **Organization level**
- Tag Keys & Values must **defined before use**

Delegation of Tag Usage to Users

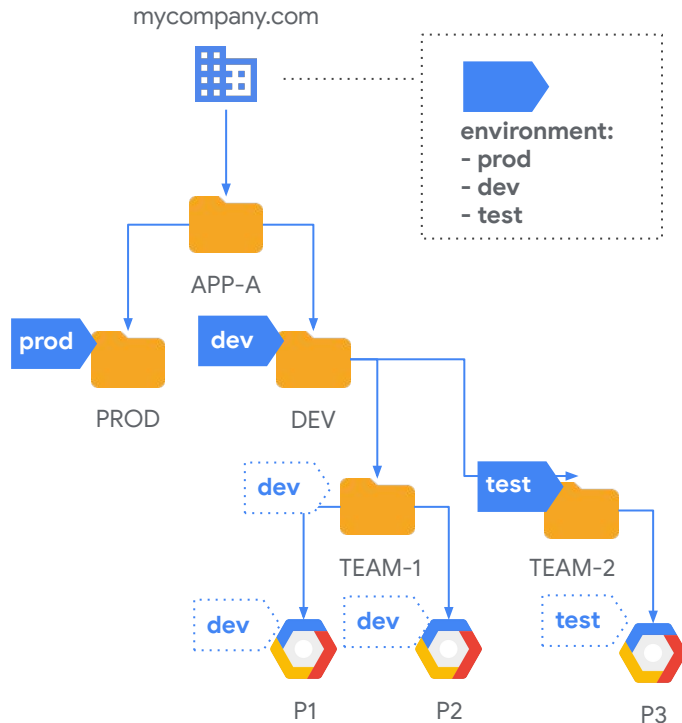
- **IAM policies** control standard CRUD Ops of Tags & Tag Attachment Ops

Resource management





- Tags **group resources** according to custom business dimensions (in addition to resource hierarchy organization)

Policy At Scale








- Tags can be **conditioned in a policy (IAM & Organization Policies)**



IAM & Admin

-  IAM
-  Identity & Organization
-  Policy Troubleshooter
-  Policy Analyzer

Organization Policies

-  Service Accounts
-  Workload Identity Federat...
-  Labels
-  Tags
-  Settings
-  Privacy & Security
-  Identity-Aware Proxy

Manage Resources

Release Notes



← Policy details

 EDIT HELP ASSISTANT

You can specify [value groups](#), collections of locations that are curated by Google to provide a simple way to define your resource locations. To use value groups in your organization policy, prefix your entries with the string `in :`, followed by the value group.

If the `suggested_value` field is used in a location policy, it should be a region or a zone. If the value specified is a region, a UI for a zonal resource may pre-populate any zone in that region. If the value specified is a zone, a UI for a regional resource may pre-populate the region enclosing the zone.

By default, resources can be created in any location.

Applies to

Organization "chak-cloud-testing-org.joonix.net"

Inheritance ?

Custom

ID

constraints/gcp.resourceLocations

Effective policy ?

Allowed

europa-central2-locations
europa-central2
europa-central2-a
europa-central2-b
europa-central2-c

[Show debug pane](#)

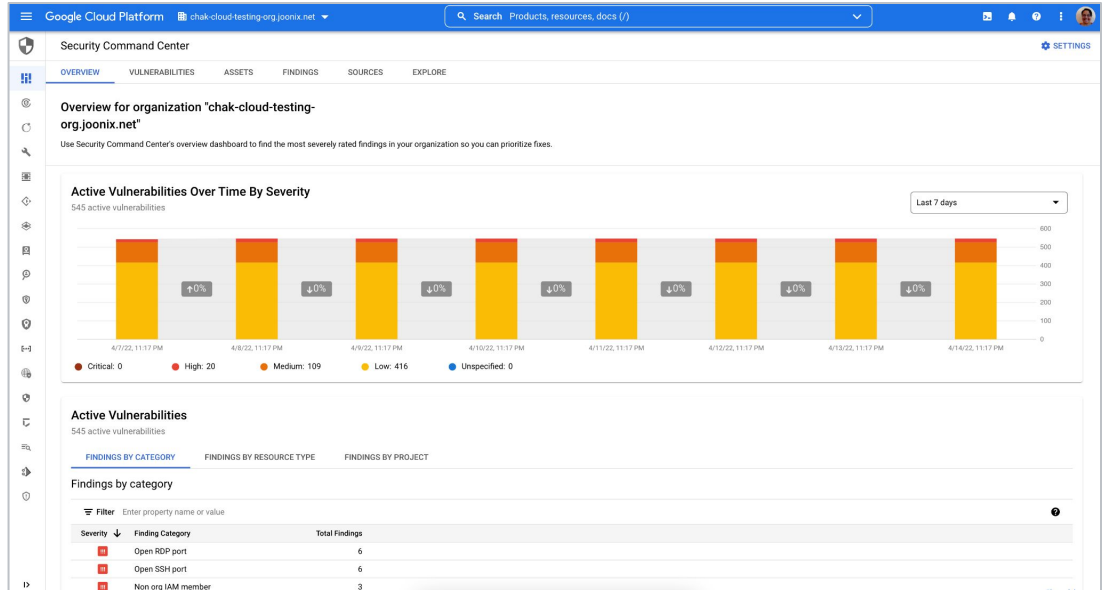


Detect

IAM vulnerabilities & Policy Violations

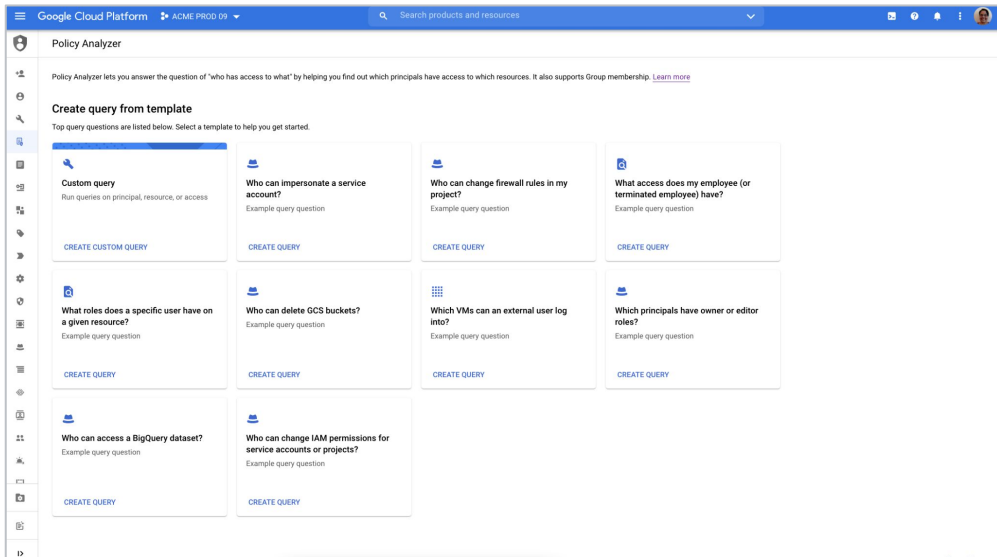
Security Command Center will detect

- Vulnerabilities associated with Identity & Access Management
- Vulnerabilities related to configuration of Org Policy Constraints
- Compliance Violations



Authorization Access Reviews to Sensitive data

- Build queries to report on highly privileged access to data in GCP.
- Uncover **direct and indirect access** through Service Account Impersonations.
- View **history of policies** for auditing.





Report on query results



Query parameters

[COPY QUERY URL](#)

Query scope iam-condition-demo.joonix.net

Resource projects/iam-conditions-demo-next/datasets/All_Insights_Alpha_Export_1/tables/recommendations_export_v2

Principal -

Roles -

Permissions -

Advanced options -

Who has access to BigQuery datasets in organization?

Results

Filter Enter property name or value

Resource	Principal ↑	Role grant	Inheritance	
projects/iam-conditions-demo-next/datasets/All_Insights_Alpha_Export_1/tables/recommendations_export_v2	jason@iam-condition-demo.joonix.net	Owner	iam-condition-demo.joonix.net	VIEW BINDING
projects/iam-conditions-demo-next/datasets/All_Insights_Alpha_Export_1/tables/recommendations_export_v2	jeffreyai@google.com	Owner	iam-condition-demo.joonix.net	VIEW BINDING
projects/iam-conditions-demo-next/datasets/All_Insights_Alpha_Export_1/tables/recommendations_export_v2	jeffreyai@iam-condition-demo.joonix.net	Owner	iam-condition-demo.joonix.net	VIEW BINDING
projects/iam-conditions-demo-next/datasets/All_Insights_Alpha_Export_1/tables/recommendations_export_v2	jiacong@google.com	Owner	iam-condition-demo.joonix.net	VIEW BINDING
projects/iam-conditions-demo-next/datasets/All_Insights_Alpha_Export_1/tables/recommendations_export_v2	jianlica@google.com	Owner	iam-condition-demo.joonix.net	VIEW BINDING
projects/iam-conditions-demo-next/datasets/All_Insights_Alpha_Export_1/tables/recommendations_export_v2	joegilbert@google.com	Owner	iam-conditions-demo-next	VIEW BINDING
projects/iam-conditions-demo-next/datasets/All_Insights_Alpha_Export_1/tables/recommendations_export_v2	jonathanxu@google.com	Editor	iam-conditions-demo-next	VIEW BINDING
projects/iam-conditions-demo-next/datasets/All_Insights_Alpha_Export_1/tables/recommendations_export_v2	jsysma@google.com	Viewer	iam-conditions-demo-next	VIEW BINDING
projects/iam-conditions-demo-next/datasets/All_Insights_Alpha_Export_1/tables/recommendations_export_v2	jzz@google.com	Owner	iam-conditions-demo-next	VIEW BINDING
projects/iam-conditions-demo-next/datasets/All_Insights_Alpha_Export_1/tables/recommendations_export_v2	ksaripalli@google.com	Owner	iam-condition-demo.joonix.net	VIEW BINDING
projects/iam-conditions-demo-next/datasets/All_Insights_Alpha_Export_1/tables/recommendations_export_v2	laurapina@google.com	Owner	iam-condition-demo.joonix.net	VIEW BINDING
projects/iam-conditions-demo-next/datasets/All_Insights_Alpha_Export_1/tables/recommendations_export_v2	laurapina@google.com	Owner	iam-conditions-demo-next	VIEW BINDING
projects/iam-conditions-demo-next/datasets/All_Insights_Alpha_Export_1/tables/recommendations_export_v2	liang@iam-condition-demo.joonix.net	Owner	iam-condition-demo.joonix.net	VIEW BINDING
projects/iam-conditions-demo-next/datasets/All_Insights_Alpha_Export_1/tables/recommendations_export_v2	liangzhang@google.com	Owner	iam-condition-demo.joonix.net	VIEW BINDING

BigQuery datasets in org

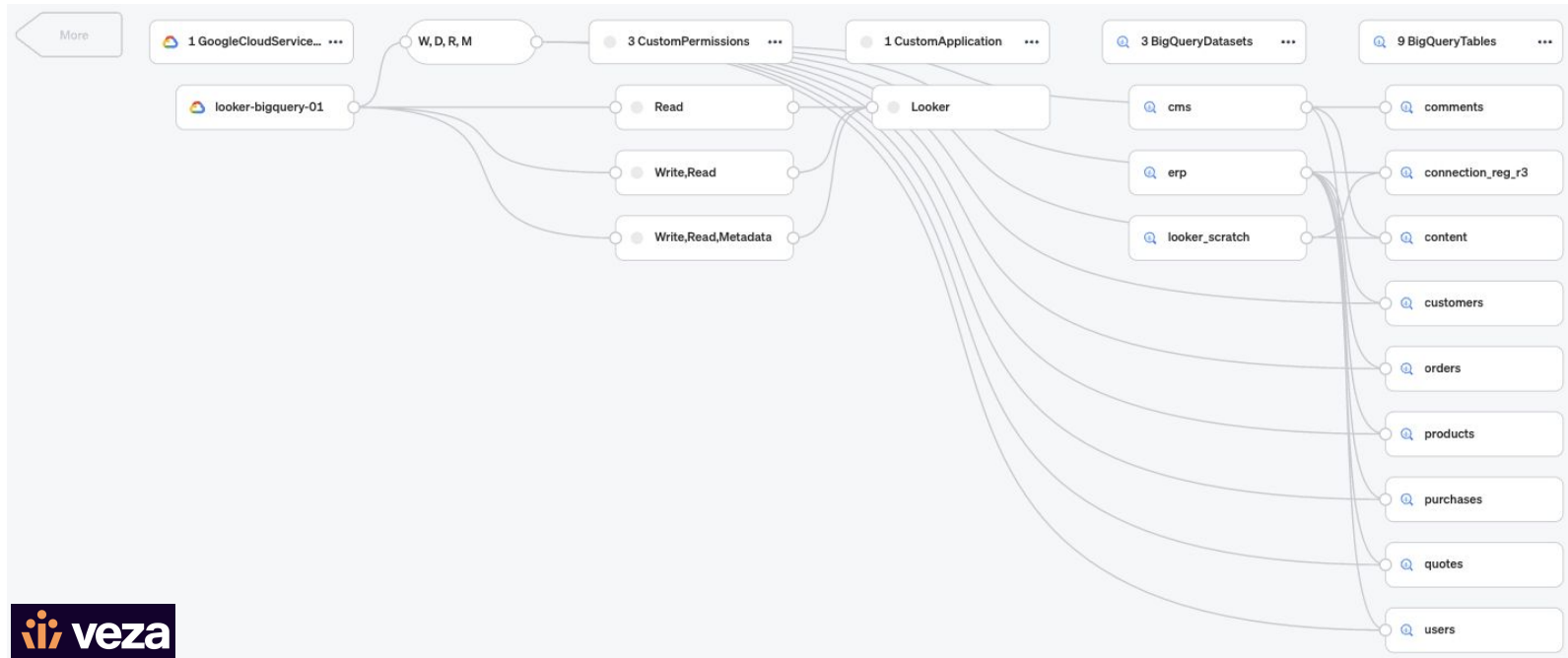
Principals who have access

Roles granted

Where Role was granted

Who can access the data across multi-cloud?

- Review which external applications leverage GCP data.
- Review which external identities access GCP data.



Policy Report

Integration with Veza

Identity Overview

1 cell hidden

External applications leverage GCP data

2 cells hidden

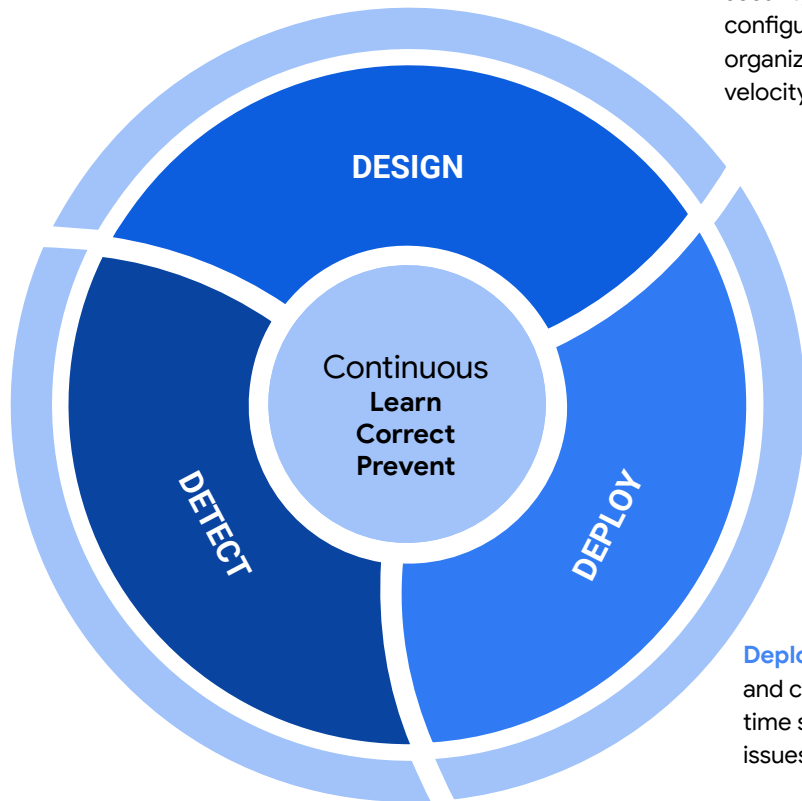
External identities access GCP data via external applications

2 cells hidden



Policy Lifecycle

Detect changes to my security posture so that I can understand the impact to risk and my specified business and security outcomes. Report on my security posture for governance and auditing.



Design Security Posture to translate business or security outcomes into underlying policies and configurations so that I can be confident in my organization's posture while meeting my business velocity goals.

Deploy confidently with appropriate business and compliance requirements to reduce risk and time spent remediating downstream security issues.



Google Cloud Summit

Thank you for joining