Taking Anthos and AlloyDB for a Multicloud ride

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Senior Principal Architect

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Next 15 minutes

Why Multicloud?

How does Google Cloud differentiate?

A reference architecture walkthrough

Some takeaways

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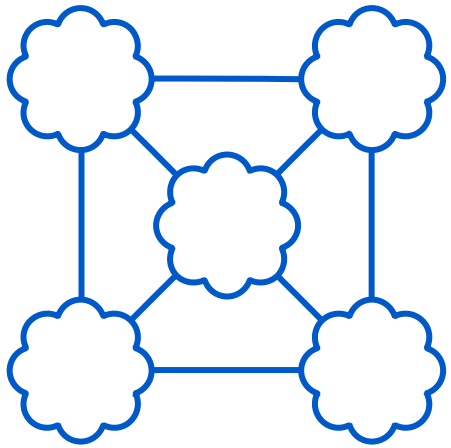
Why multicloud?



The cool kids are doing it ☺

Leverage different features, commercial models and regions

Disaster recovery

Go where your customers/ partners are

Insert image about analyst claims about Multicloud

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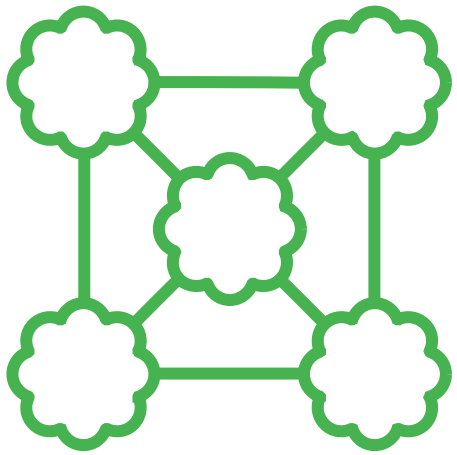
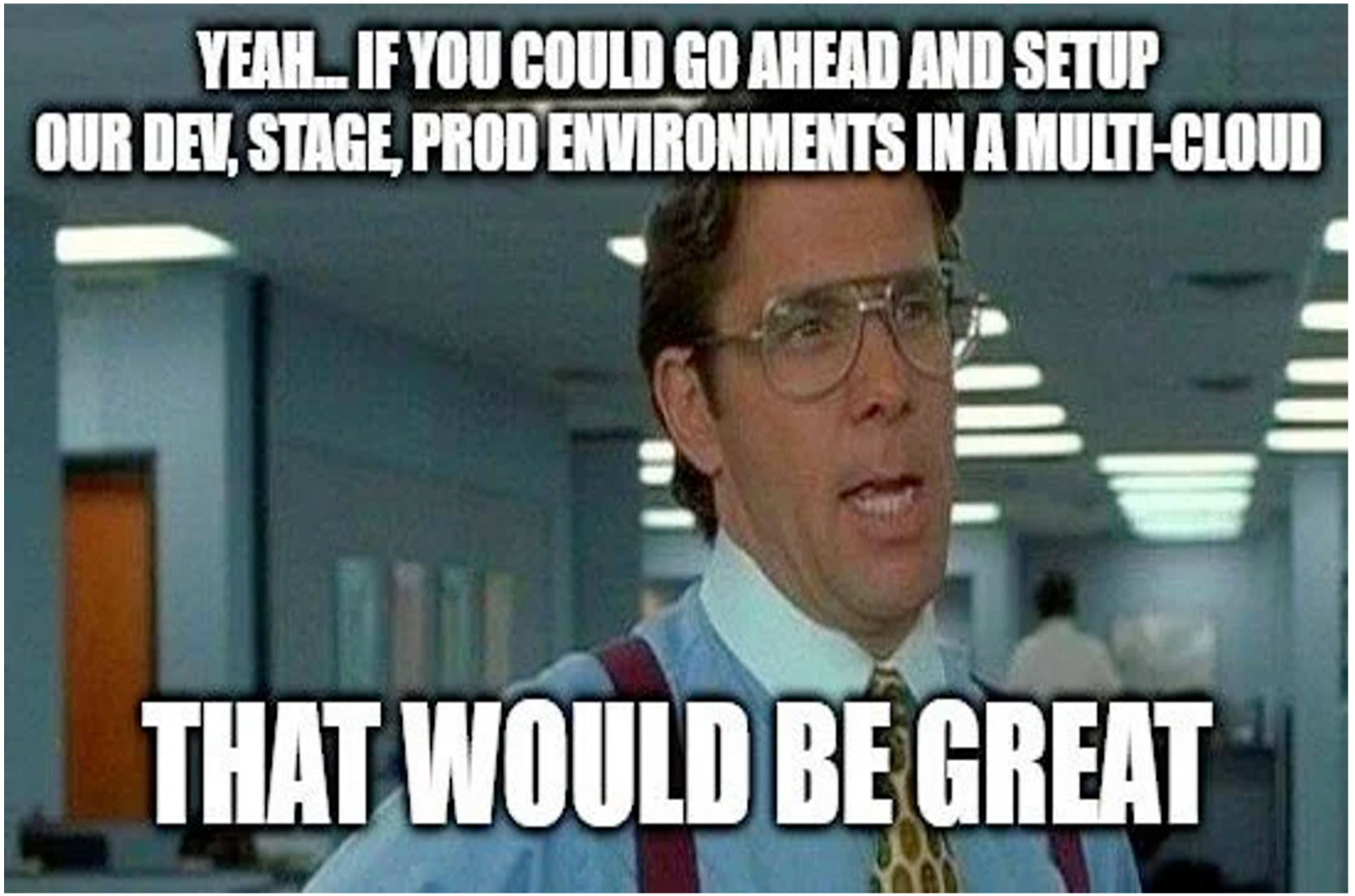
But is it easy?





But **Google Cloud** is trying the best !!

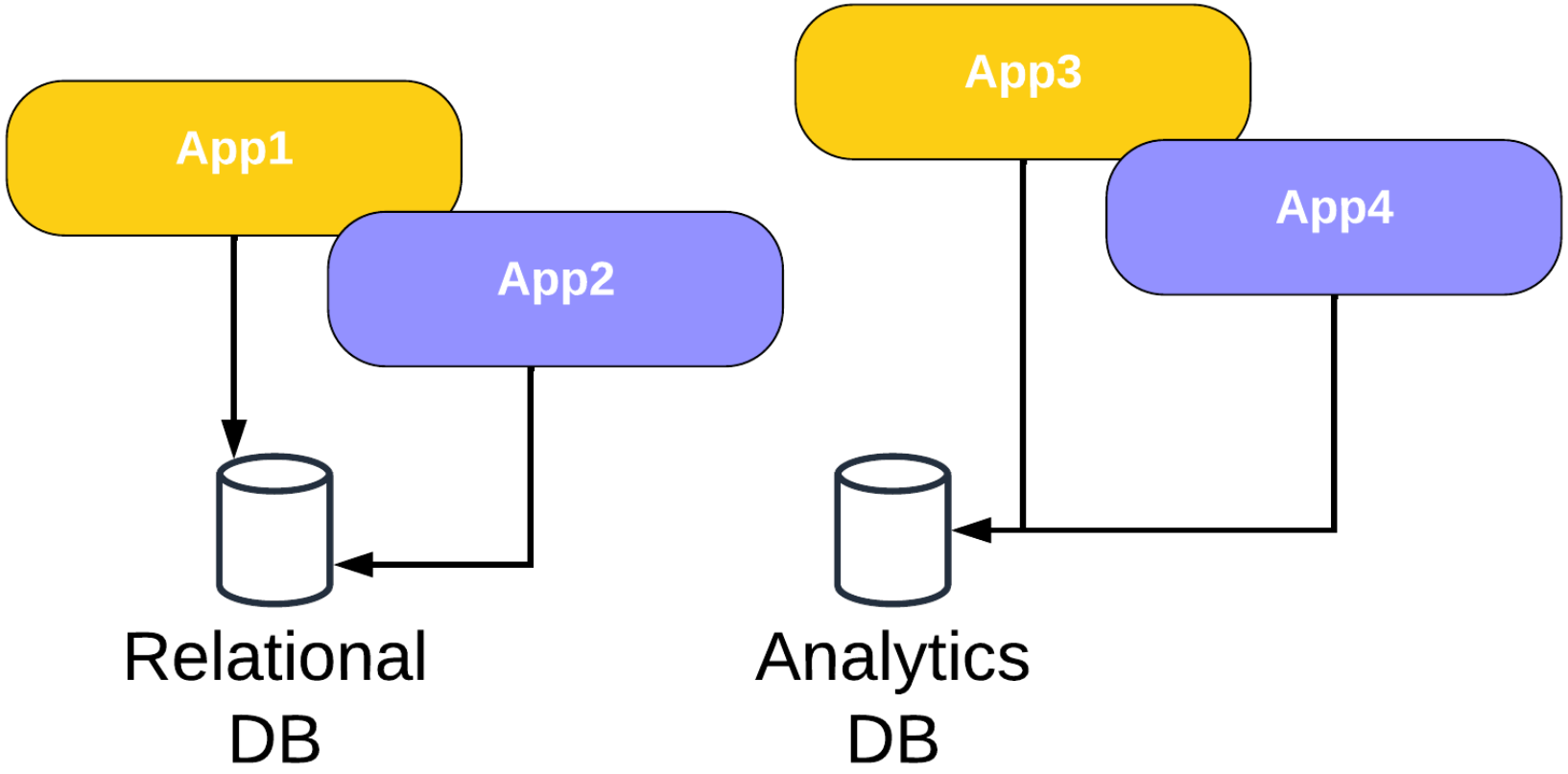
Lots of open themed technologies

Some key product and solutions in the last 12-18 months

"For now, what is important is not finding the answer, but looking for it."

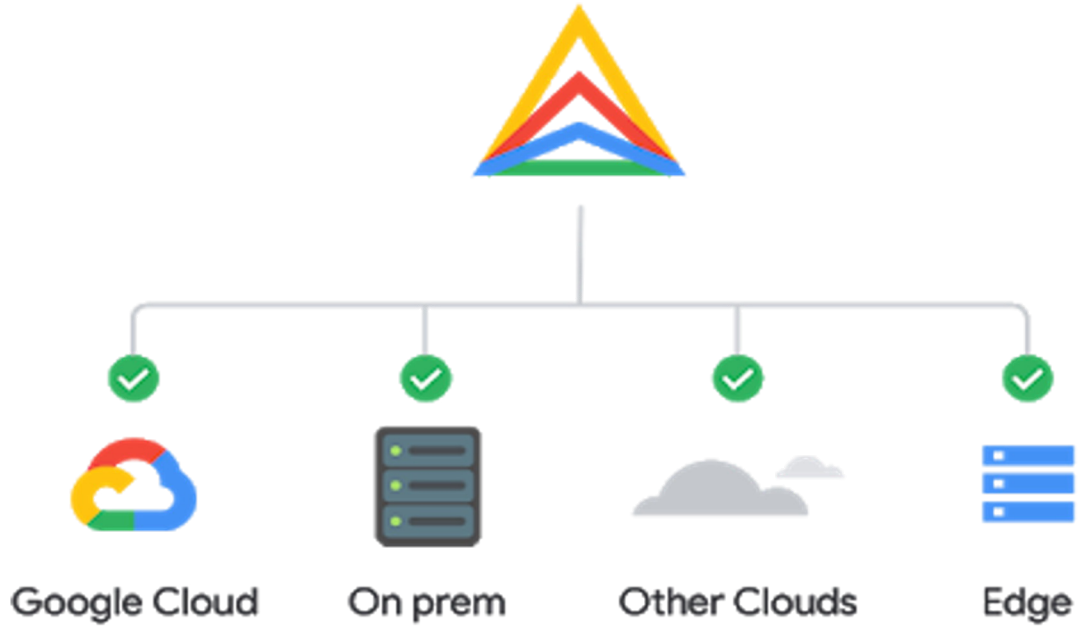
- Douglas R. Hofstadter, *Gödel, Escher, Bach: An Eternal Golden Braid*

Let’s begin the ride !



Building Block #1 - Anthos

- Multicloud Managed Kubernetes
  - Attach feature for EKS/AKS
- Excellent features
  - GitOps for app config management
  - Multi cluster fleet management
  - Operations
  - Security



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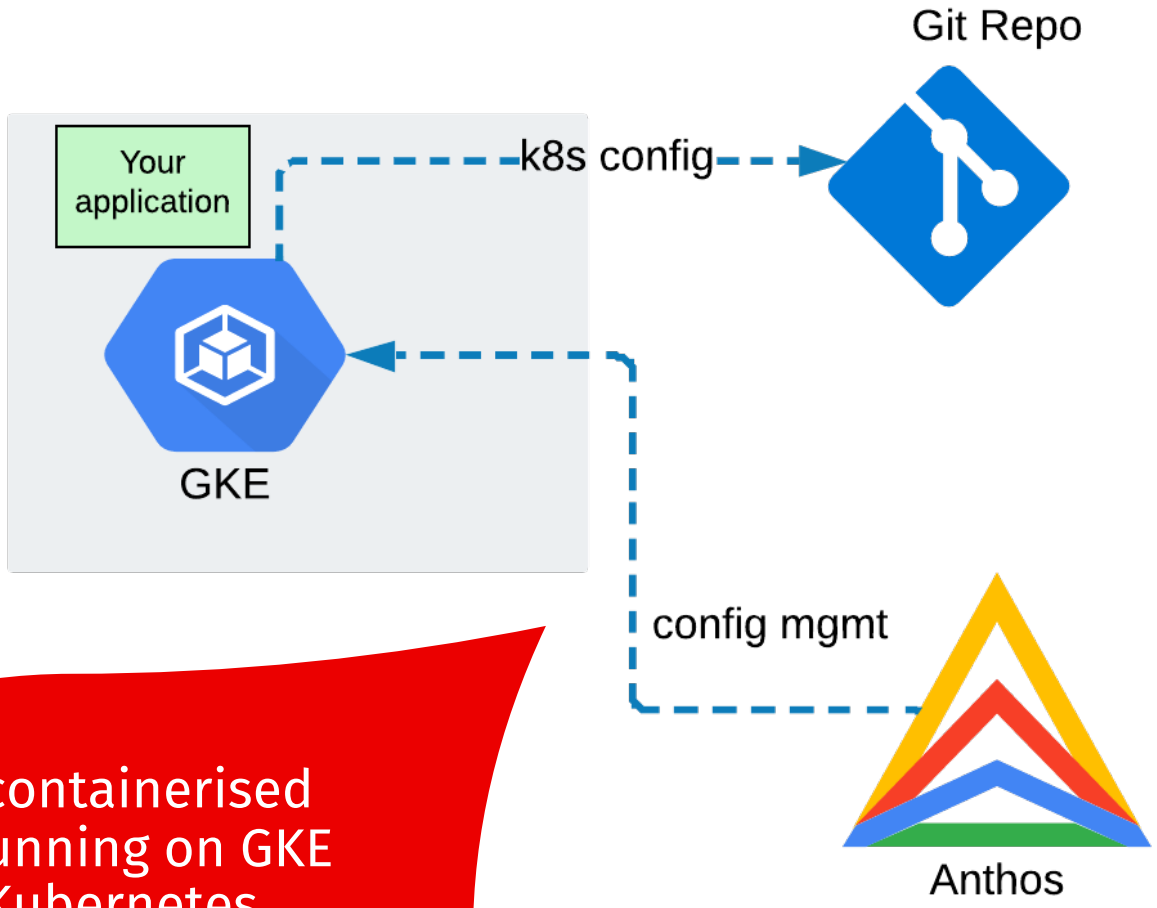
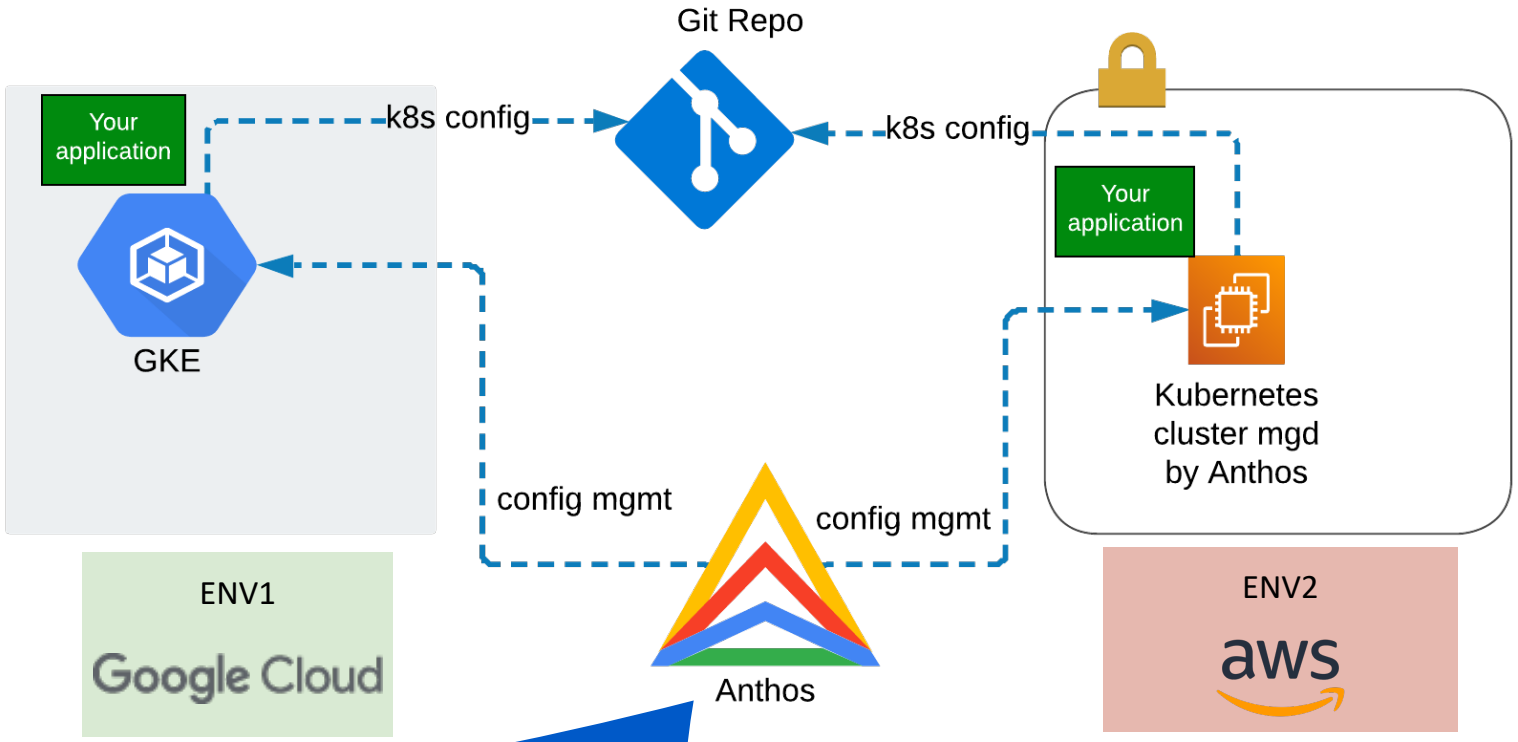
Building Block #1 - Anthos



- Your containerised app running on GKE
- Your Kubernetes configuration in Github with Anthos Config Management

Building Block #1 - Anthos



- Easy mirrored setup on AWS
- Consistent Kubernetes management with Anthos

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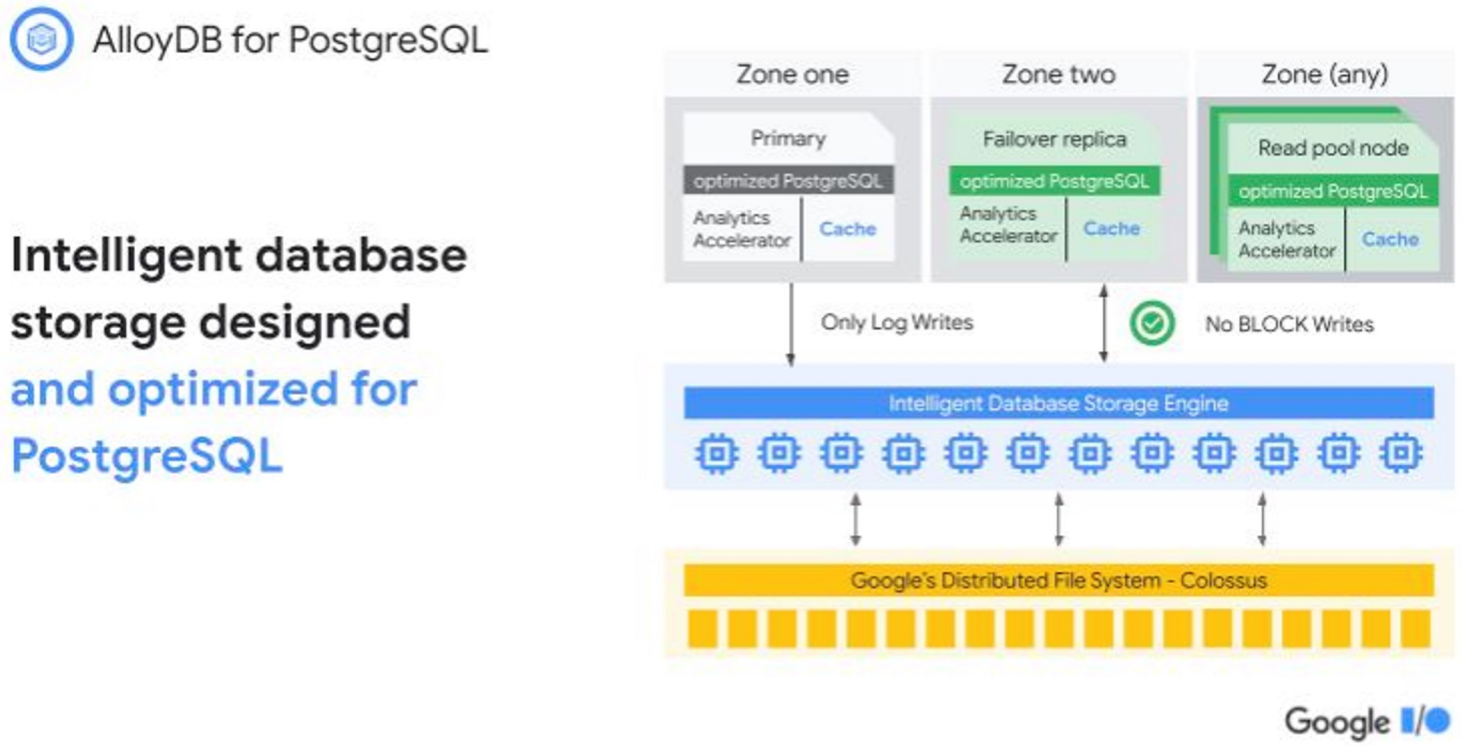
Building Block #2 - AlloyDB

- Postgres compatible relational database
- New entry to Google Cloud
- Omni version for other clouds and on-premise



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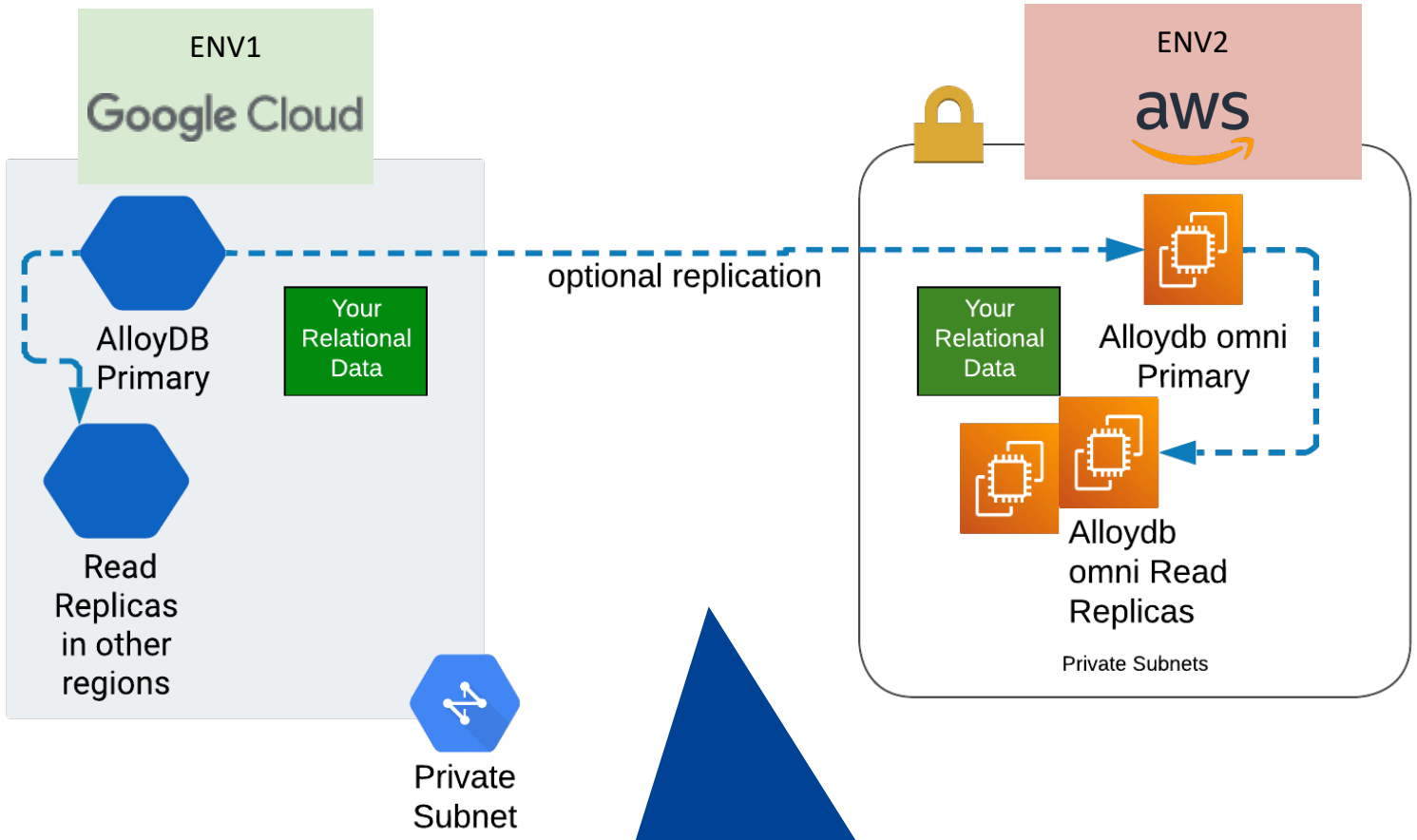
Building Block #2 - AlloyDB

- Relational Data with AlloyDB
- Fully managed on Google Cloud

Building Block #2 - AlloyDB



- AlloyDB x 2
- Omni on AWS (in Preview)
- Partially managed
- Replication

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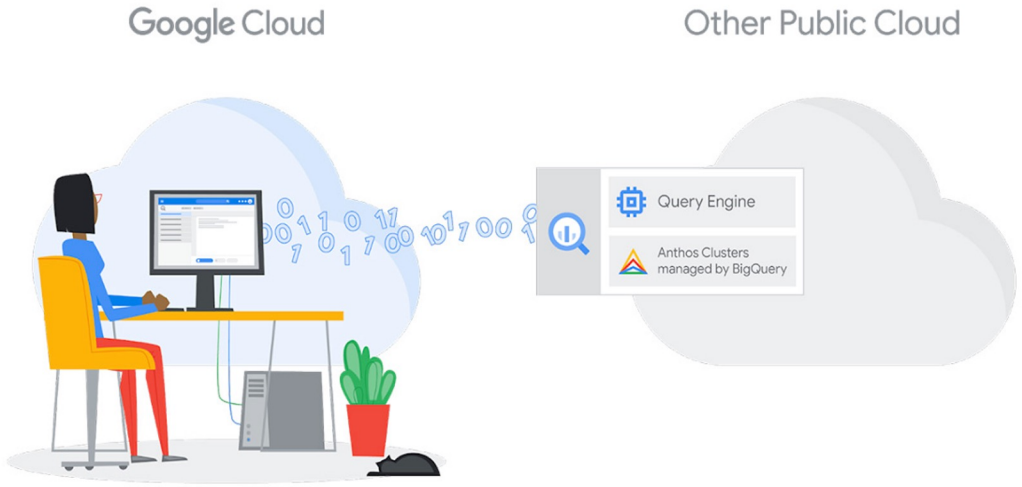
Building Block #3 - Big Query

- Powerful petabyte-scale analytics with inbuilt ML
- BQ Omni
  - Stateless compute
  - Data in AWS S3 or Azure Blob
- Looker Integration



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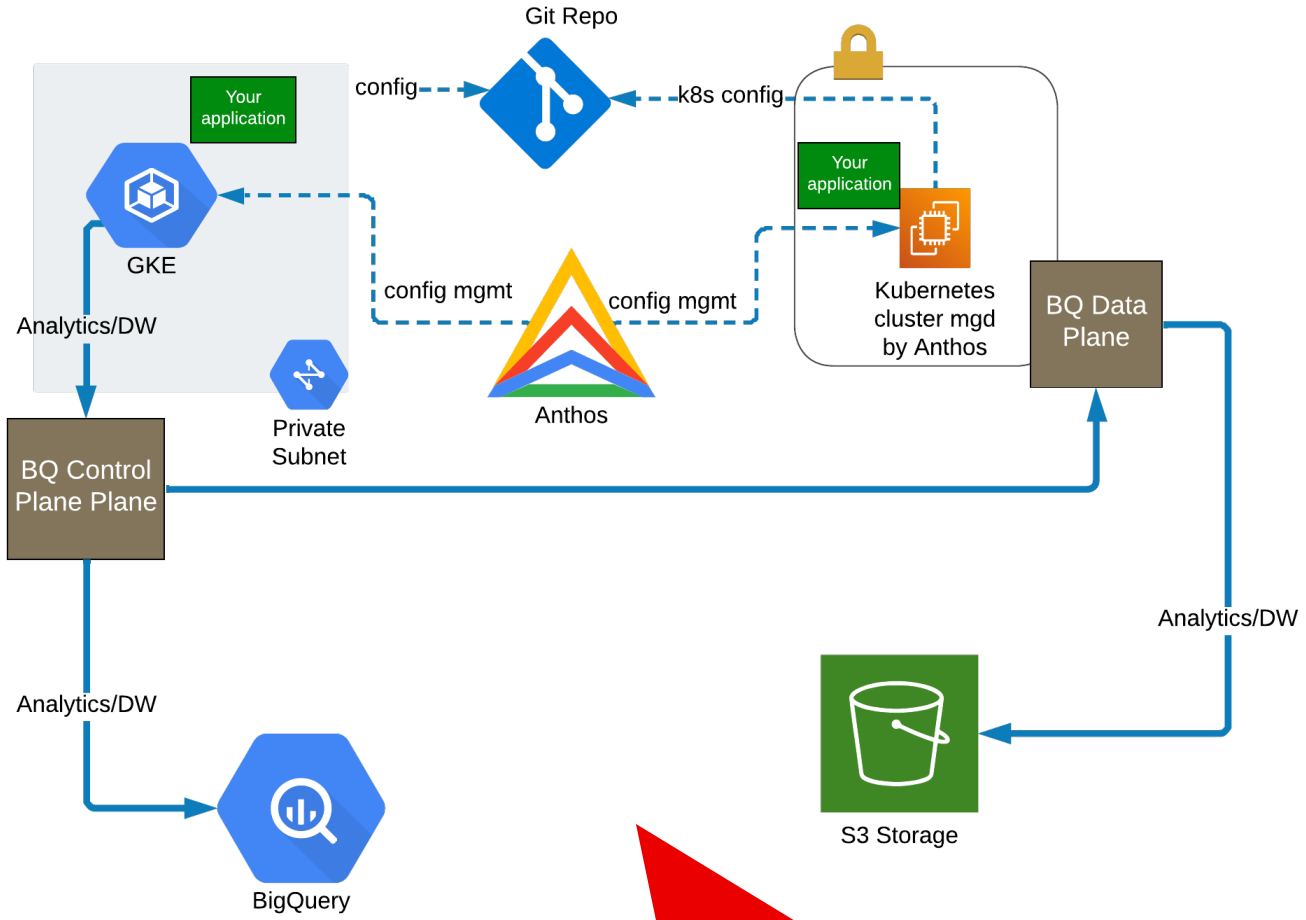
Building Block #3 - Big Query



- Multicloud analytics with local storage and BigQuery Omni

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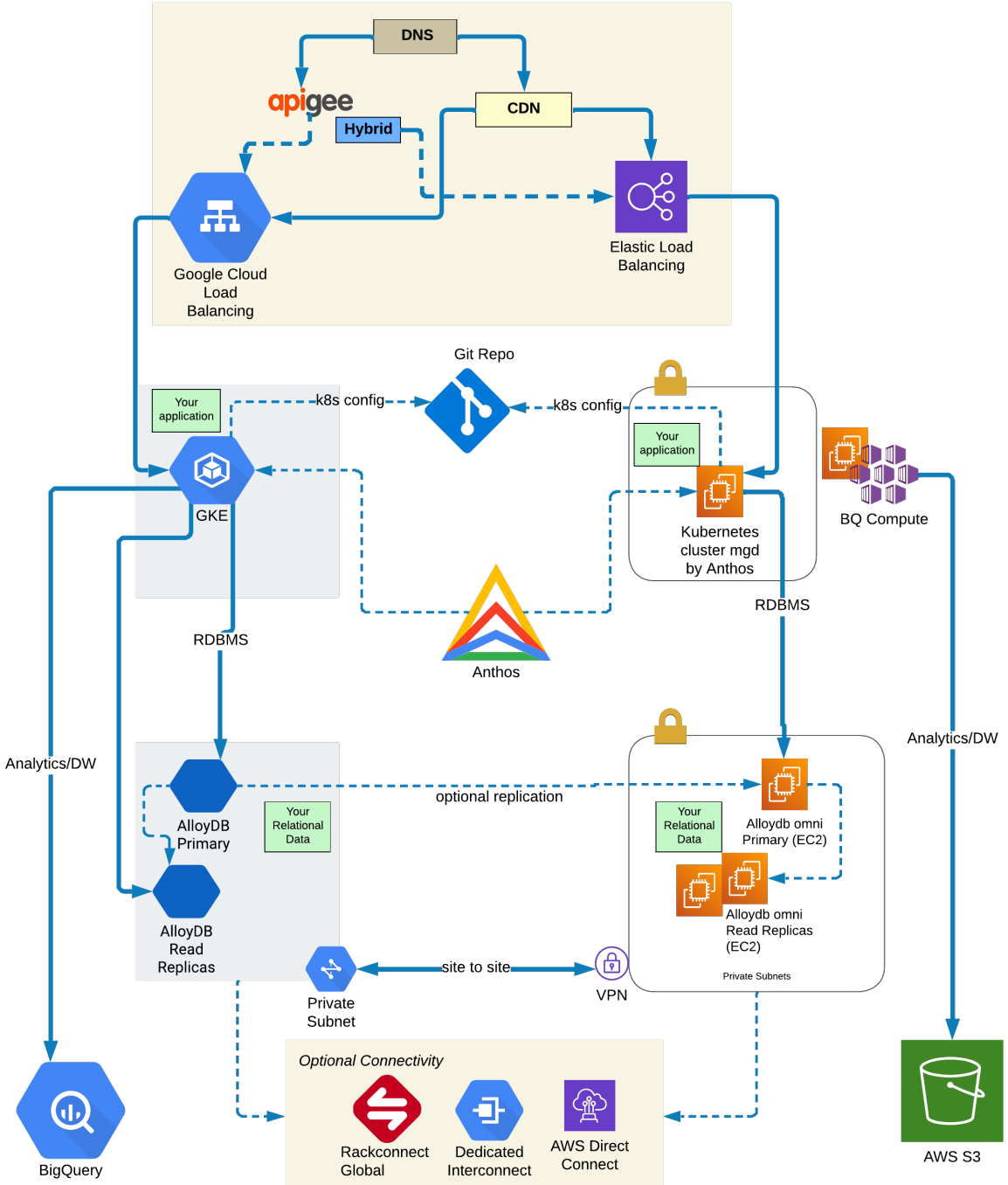
The full design

- Applications deployed across Google Cloud and AWS using GitOps delivered by Anthos Config Management.
- An consistent database layer using Postgres compatible AlloyDB.
- An storage model using Google Cloud Storage and Amazon S3 but served by Big Query
- Necessary cloud-vendor-native constructs like VPC and Load balancers.

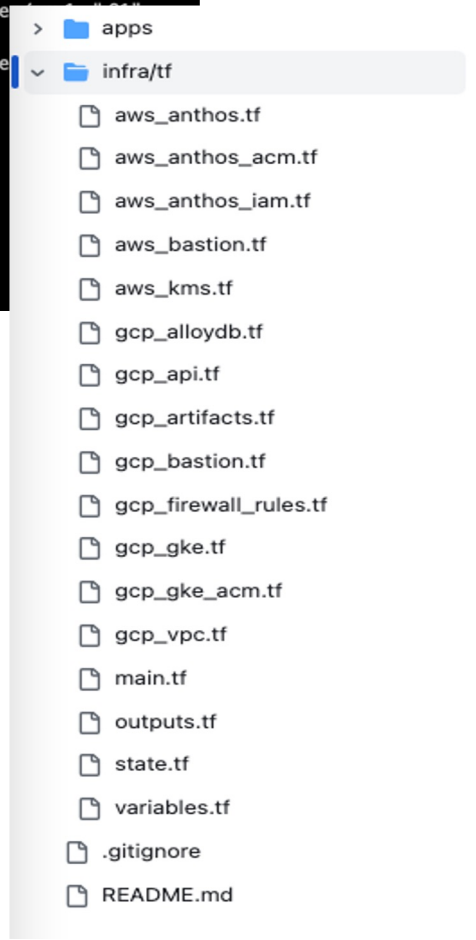


Beyond pictures

```
Apply complete! Resources: 131 added, 0 changed, 0 destroyed.

Outputs:

bigquery_omni_role = "arn:aws:iam::844054940671:role/bq-omni-connection"
env1_alloydb_helper_ip = "35.221.42.171"
env1_bastion_ip = "34.150.138.160"
env1_cluster_location = "us-east4"
env1_cluster_name = "env1-clu01"
env1_db_prim_id = "projects/gcp-mc-demo01/locations/us-east4/clusters/env1-clu01/instance
env1_db_prim_ip = "10.212.0.2"
env1_db_read_id = "projects/gcp-mc-demo01/locations/us-east4/clusters/env1-clu01/instance
env1_db_read_ip = "10.212.0.5"
env2_anthos_api_role_arn = "arn:aws:iam::844054940671:role/anthos-api-role"
env2_anthos_cp_role_arn = "arn:aws:iam::844054940671:role/anthos-cp-role"
env2_anthos_np_role_arn = "arn:aws:iam::844054940671:role/anthos-np-role"
env2_bastion_ip = "54.234.189.146"
env2_db_prim_ip = "10.1.77.87"
env2_db_prim_public_ip = "44.198.93.169"
myapp_repo_id = "projects/gcp-mc-demo01/locations/us-east4/repositories/myapp"
util_repo_id = "projects/gcp-mc-demo01/locations/us-east4/repositories/util"
```



- Deployment using Terraform
- Some glue using kubectl

Code and reference at https://github.com/rax-incubate/gcp-mc-demo

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Example App

Not Secure | a0c1b014db14a4c2eadf237b3a042226-419817784.us-east-1.elb.amazonaws.com/run

Environment:env2-aws

Tile	Start Year
A Thin Life	2018
Holy Hollywood	2021
Bachelor Trip	2012
Take Out	2022
Party Crashers	2012
Stan	2011
Bamboo Shark	2011
Persona Au Gratin	2012
Monkey Man	2011
Have You Seen Me?	2016
The Incredible Burt Wonderstone	2013
Jack and Jill	2011
The Do-Deca-Pentathlon	2012

Not Secure | 34.86.43.162/run

Environment:env1-gcp

Tile	Start Year
A Thin Life	2018
Holy Hollywood	2021
Bachelor Trip	2012
Take Out	2022
Party Crashers	2012
Stan	2011
Bamboo Shark	2011
Persona Au Gratin	2012
Monkey Man	2011
Have You Seen Me?	2016
The Incredible Burt Wonderstone	2013
Jack and Jill	2011
The Do-Deca-Pentathlon	2012
The Babymakers	2012
Naked Run	2011
6 Month Rule	2011
The Nightclub Days	2012
The Wedding Ringer	2015

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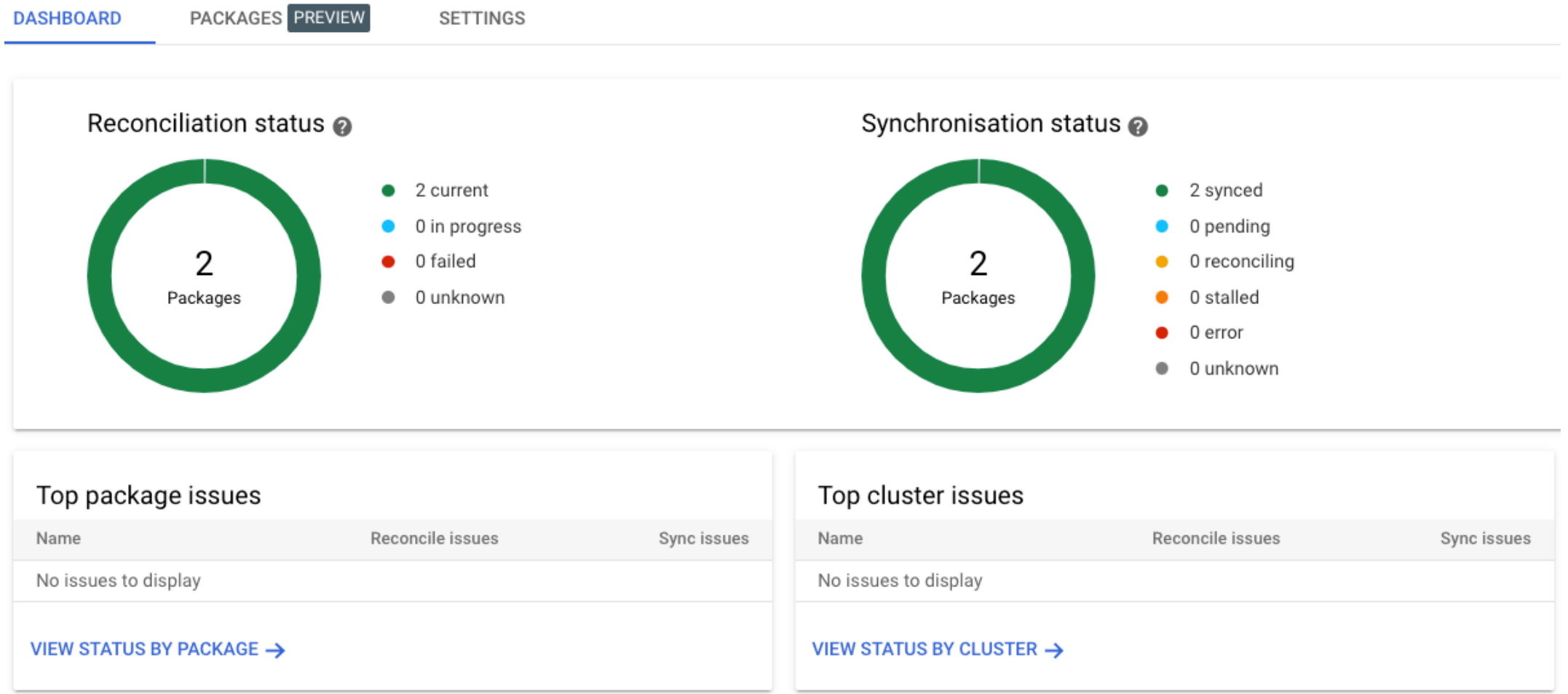
Code and reference at https://github.com/rax-incubate/gcp-mc-demo

Configuration Sync



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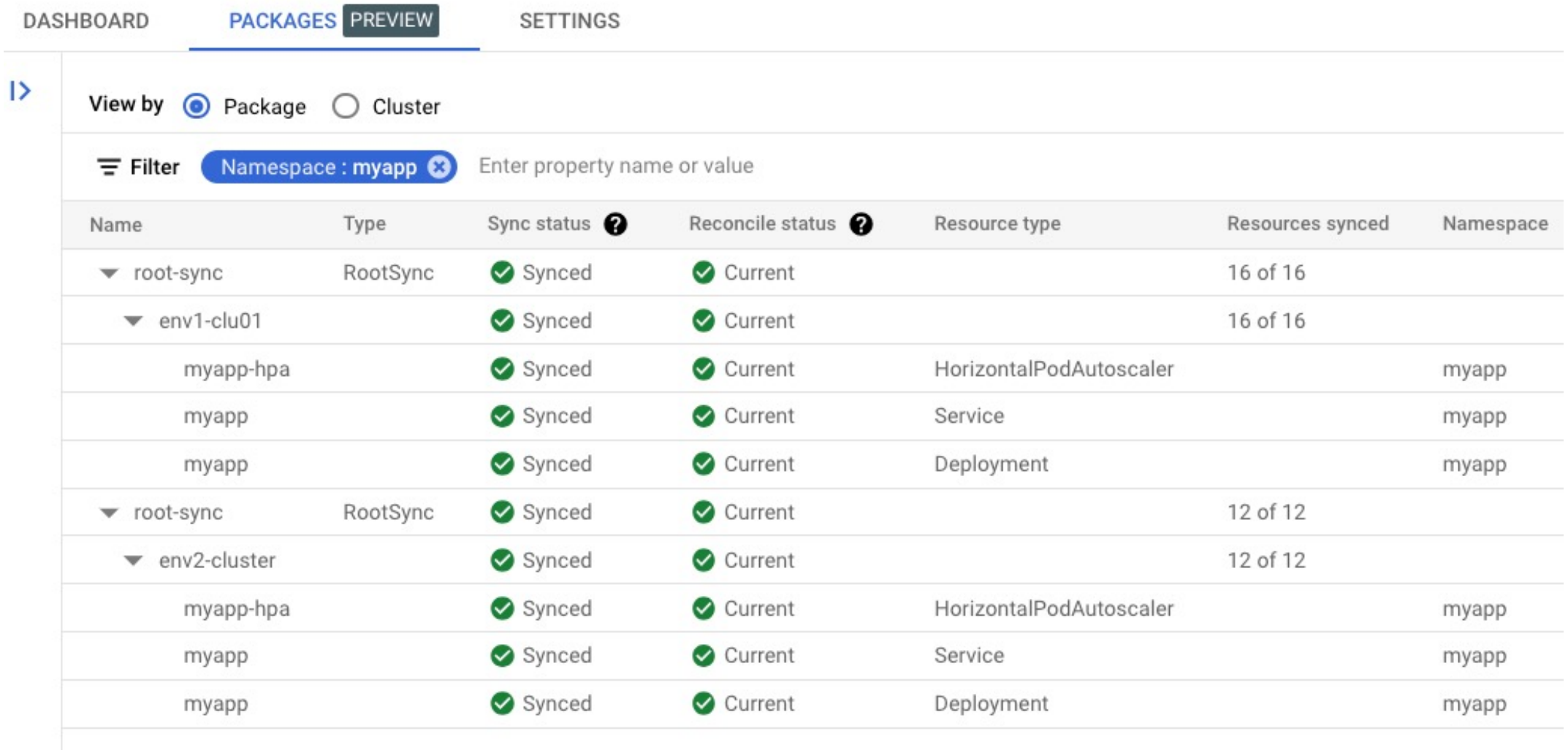
Code and reference at https://github.com/rax-incubate/gcp-mc-demo

Package view



Name	Type	Sync status	Reconcile status	Resource type	Resources synced	Namespace
root-sync	RootSync	Synced	Current		16 of 16	
env1-clu01		Synced	Current		16 of 16	
myapp-hpa		Synced	Current	HorizontalPodAutoscaler		myapp
myapp		Synced	Current	Service		myapp
myapp		Synced	Current	Deployment		myapp
root-sync	RootSync	Synced	Current		12 of 12	
env2-cluster		Synced	Current		12 of 12	
myapp-hpa		Synced	Current	HorizontalPodAutoscaler		myapp
myapp		Synced	Current	Service		myapp
myapp		Synced	Current	Deployment		myapp

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Security view

Filter | Namespace : myapp | Enter property name or value

Resource name	Group	Namespace	Kind	Constraint	Status
myapp-69f7c69596-64mtk		myapp	Pod	policy-essentials-v2022-psp-pods-must-run-as-nonroot	Container myapp is attempting to run without a required securityContext/runAsNonRoot or securityContext/runAsUser != 0
myapp-69f7c69596-64mtk		myapp	Pod	policy-essentials-v2022-psp-allow-privilege-escalation	Privilege escalation container is not allowed: myapp
myapp-69f7c69596-64mtk		myapp	Pod	policy-essentials-v2022-psp-seccomp-default	Seccomp profile is not allowed, pod: myapp-69f7c69596-64mtk, container: myapp, Allowed profiles: ["runtime/default", "doc...
myapp-69f7c69596-64mtk		myapp	Pod	policy-essentials-v2022-psp-capabilities	container <myapp> is not dropping all required capabilities. Container must drop all of ["NET_RAW"] or "ALL"
myapp-69f7c69596-64mtk		myapp	Pod	policy-essentials-v2022-pods-require-security-context	securityContext must be defined for all Pod containers
myapp-69f7c69596-64mtk		myapp	Pod	policy-essentials-v2022-no-secrets-as-env-vars	Container <myapp> has secret defined as environment variable

Constraints

Your cluster was audited against the following constraints. Learn more

Filter | Enter property name or value

Name	Kind	Description
policy-essentials-v2022-no-secrets-as-env-vars	K8sNoEnvVarSecrets	
policy-essentials-v2022-pods-require-security-context	K8sPodsRequireSecurityContext	
policy-essentials-v2022-prohibit-role-wildcard-access	K8sProhibitRoleWildcardAccess	
policy-essentials-v2022-psp-allow-privilege-escalation	K8sPSPAllowPrivilegeEscalationContainer	
policy-essentials-v2022-psp-capabilities	K8sPSPCapabilities	
policy-essentials-v2022-psp-host-namespace	K8sPSPHostNamespace	
policy-essentials-v2022-psp-host-network-ports	K8sPSPHostNetworkingPorts	
policy-essentials-v2022-psp-pods-must-run-as-nonroot	K8sPSPAllowedUsers	

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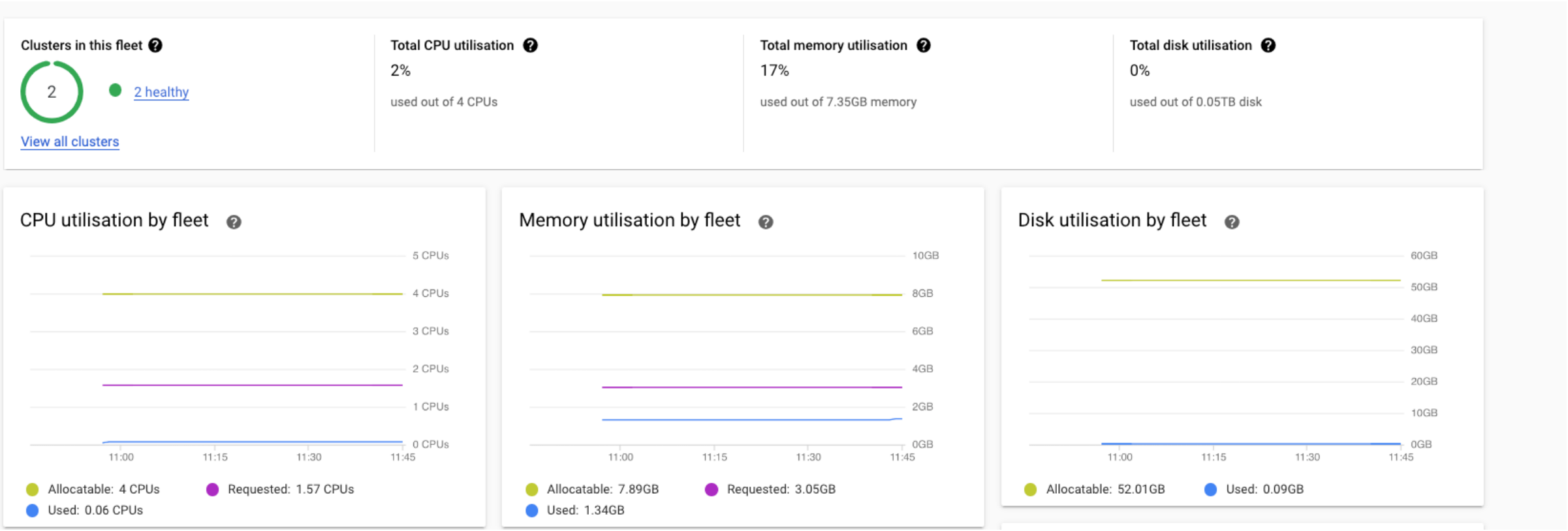
Fleet Management



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Code and reference at https://github.com/rax-incubate/gcp-mc-demo

Some Takeaways

Multicloud is very much feasible with some design choices

Don’t go for the lowest common denominator

Region selection is a tricky if you want to use Anthos and BQ Omni together

Cost of experimenting is roughly 400 USD per week for this reference design

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Code and reference at https://github.com/rax-incubate/gcp-mc-demo

www.rackspace.com/cloud/google-cloud

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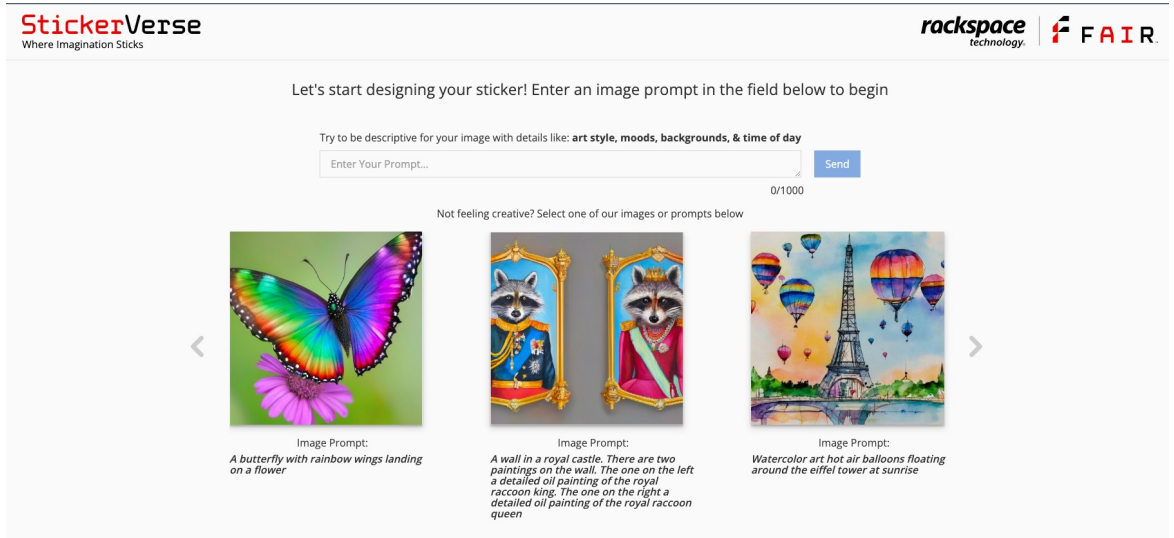

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Dank Je
Obrigado
Dyakuyu
Arigato
Salamat
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Grazie
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Juspaxar
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Mochchakkeram
Multumesc
Asante
Vinaka
Cam on ban
Kia Ora
Chokrane
Maake
Terma Kasih
Welalin
Matur Nuwun
Raibh Maith Agat
Nirringrazzjak
Matondo
Ua Tsaug Rau Koj
Salamat