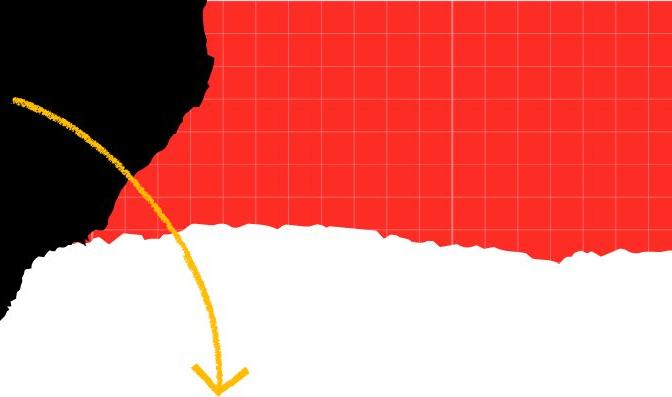


devfest 2022

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Upgrade Your GKE Cluster using Blue-Green Strategy

 Google Developer Groups
Semarang



Ananda Dwi Rahmawati
Sr. Cloud Engineer at Btech

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About Me

1. Student in Software Eng, UGM, Jul 2019 – present
2. Cloud Engineer, Btech, Jul 2019 – present
3. Tech background: System, Networking, IaaS & PaaS
Cloud, DevOps, a bit of Programming
4. Bangkit Academy Contributor & #RoadToGDE
Mentee
5. Open Source Enthusiast and Communities Member
6. <https://linktr.ee/misskecupbung>



Outline

1. Why do we have to upgrade?
2. How Important is it?
3. Implementation?
4. Challenges?



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```



“Making decisions in system design is all about trade-offs, and **microservice** architectures give us lots of trade-offs to make”

— Sam Newman, Building Microservices: Designing Fine-Grained Systems



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navigation" data-title="Hide side navigation"  
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'>open_in_new</span></button>
```

“When services are **loosely coupled**, a change to one service should **not** require a change to another.”

— Sam Newman, Building Microservices: Designing Fine-Grained Systems



devfest
2022

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Why do We have to Upgrade?

1. Security
2. Feature
3. Issue
4. ...



Current versions

The following table lists the latest minor versions available as defaults in GKE for the specified [release channels](#). This table includes the latest default GKE patch version and the Container-Optimized OS version for each supported minor version.

Kubernetes minor versions	1.23	1.22	1.23	1.24
GKE release channel	Static ¹ (no channel)	Stable	Regular	Rapid
Default patch version	1.23.12-gke.100	1.22.15-gke.100	1.23.12-gke.100	1.24.5-gke.600
COS version available	cos-93-16623-227-33	cos-93-16623-227-33	cos-93-16623-227-33	cos-97-16919-103-42



GOOGLE Kubernetes Engine

#GCPSketchnote

@PVERGADIA THECLOUDGIRL.DEV

9.07.2020



What is GKE?

Your app crashed in production!



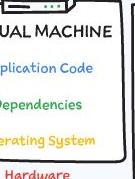
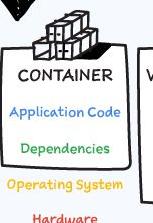
Let's fix it once and for all with CONTAINER!

But it worked on my machine!?



CONTAINER FEATURES

- Portable
- Shareable
- Isolation
- Introspection
- Fast Deployments
- Reusable



But I have got lots of containers, how can I orchestrate all of them?



I have heard Kubernetes could be the answer...

It is open source platform for managing containers.

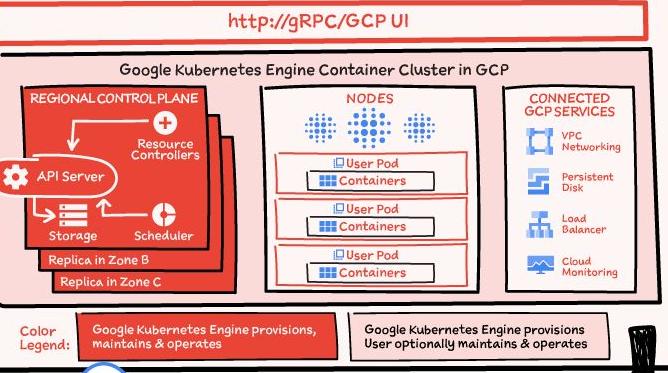
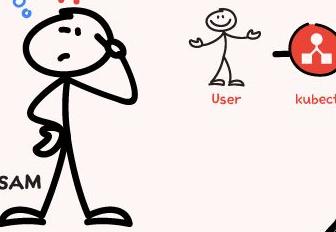


SAM

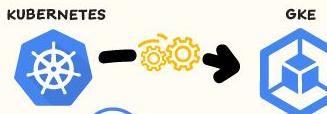


Kubernetes is not that easy from Installation to Provisioning to Upgrades to Scaling & SLAs

How does GKE work?



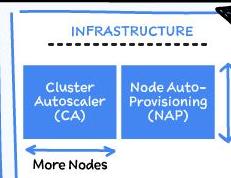
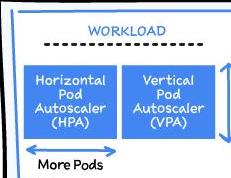
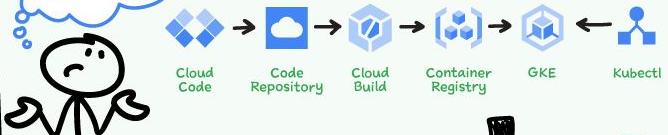
MANAGED KUBERNETES



I bet GKE is the answer with advanced cluster management!

- Easy Cluster Creation
- Load Balancing
- Auto Scaling
- Auto Upgrades
- Auto Repair
- Logging Monitoring

How do I use GKE?



How does it handle traffic growth?



How do I secure apps using GKE?



SECURE APPS

- Data Encryption
- Certified Images
- Private Clusters
- Identity & Access - IAM - RBAC

TRUSTED NETWORKING

- Global VPC
- Global Load Balancing
- Cloud Armor
- Network Policy

SOFTWARE SUPPLY CHAIN SECURITY

- Binary Authorization
- Vulnerability Scanning
- Managed Base Image

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Implementation

1. Upgrade the control-plane version to the newer version
2. Create a new worker node pool (call it a green pool) with the same version as control plane
3. Drain and cordon nodes in the blue node pool (node pool with the previous version)
4. Migrates the applications to the green pool
5. Delete the blue node pool
6. Test and verify



```
ananda_dwi@cloudshell:~ (dev-project-363217)$ NEW_K8S_VER=1.23.11-gke.300
ananda_dwi@cloudshell:~ (dev-project-363217)$ gcloud container clusters upgrade $CLUSTER_NAME \
  --region $GCP_REGION \
  --cluster-version $NEW_K8S_VER \
  --project $PROJECT_ID \
  --master
Master of cluster [gke-dev1] will be upgraded from version [1.22.12-gke.2300] to
version [1.23.11-gke.300]. This operation is long-running and will block other
operations on the cluster (including delete) until it has run to completion.

Do you want to continue (Y/n)? y
Upgrading gke-dev1...working...
```

```
ananda_dwi@cloudshell:~ (dev-project-363217)$ gcloud container clusters list
NAME: gke-dev1
LOCATION: us-central1
MASTER_VERSION: 1.23.11-gke.300
MASTER_IP: 34.70.6.225
MACHINE_TYPE: n1-standard-1
NODE_VERSION: 1.22.12-gke.2300 *
NUM_NODES: 3
STATUS: RUNNING

* - There is an upgrade available for your cluster(s).

To upgrade nodes to the latest available version, run
  $ gcloud container clusters upgrade NAME
ananda_dwi@cloudshell:~ (dev-project-363217)$
```

```
ananda_dwi@cloudshell:~ (dev-project-363217)$ kubectl get nodes -o wide
NAME          STATUS  ROLES   AGE   VERSION
gke-gke-dev1-default-pool-219934ca-k4hk  Ready   <none>  123m  v1.22.12-gke.2300  10.128.0.28  104.198.135.42  Container-Optimized OS from Google5
.gke-gke-dev1-default-pool-ada2a9d5-cd20  Ready   <none>  123m  v1.22.12-gke.2300  10.128.0.26  34.173.131.110  Container-Optimized OS from Google5
.gke-gke-dev1-default-pool-b92adb88-c7jj  Ready   <none>  123m  v1.22.12-gke.2300  10.128.0.27  35.192.132.184  Container-Optimized OS from Google5
.gke-gke-dev1-pool-gke1-23-16b84cc3-ghkb  Ready   <none>  4m38s  v1.23.11-gke.300   10.128.0.30  35.184.2.159   Container-Optimized OS from Google5
.gke-gke-dev1-pool-gke1-23-6c07235e-dtn9  Ready   <none>  4m34s  v1.23.11-gke.300   10.128.0.31  34.69.131.201   Container-Optimized OS from Google5
.gke-gke-dev1-pool-gke1-23-8c8fc0b4-fg05  Ready   <none>  4m41s  v1.23.11-gke.300   10.128.0.29  34.66.116.199   Container-Optimized OS from Google5
ananda_dwi@cloudshell:~ (dev-project-363217)$
```

```

ananda_dwi@cloudshell:- (dev-project-363217)$ NODE=$(kubectl get nodes -o wide | grep v1.22.12-gke.2300 | awk '{print $1}')
ananda_dwi@cloudshell:- (dev-project-363217)$ kubectl -n default cordon $NODE
node/gke-gke-dev1-default-pool-219934ca-k4hk cordonned
node/gke-gke-dev1-default-pool-ada2a9d5-cd20 cordonned
node/gke-gke-dev1-default-pool-b92adb88-c7jj cordonned
ananda_dwi@cloudshell:- (dev-project-363217)$ kubectl get nodes -o wide
NAME           STATUS    ROLES   AGE     VERSION   INTERNAL-IP   EXTERNAL-IP   OS-IMAGE
KERNEL-VERSION  CONTAINER-IMAGE
gke-gke-dev1-default-pool-219934ca-k4hk  Ready, SchedulingDisabled  <none>   129m   v1.22.12-gke.2300  10.128.0.28  104.198.135.42  Container-Optimize
d OS from Google  5.10.133+  containerd://1.5.13
gke-gke-dev1-default-pool-ada2a9d5-cd20  Ready, SchedulingDisabled  <none>   129m   v1.22.12-gke.2300  10.128.0.26  34.173.131.110  Container-Optimize
d OS from Google  5.10.133+  containerd://1.5.13
gke-gke-dev1-default-pool-b92adb88-c7jj  Ready, SchedulingDisabled  <none>   129m   v1.22.12-gke.2300  10.128.0.27  35.192.132.184  Container-Optimize
d OS from Google  5.10.133+  containerd://1.5.13
gke-gke-dev1-pool-gke1-23-16b84cc3-ghkb  Ready
d OS from Google  5.10.133+  containerd://1.5.13
gke-gke-dev1-pool-gke1-23-6c07235e-dtn9  Ready
d OS from Google  5.10.133+  containerd://1.5.13
gke-gke-dev1-pool-gke1-23-8c8fc0b4-fg05  Ready
d OS from Google  5.10.133+  containerd://1.5.13
ananda_dwi@cloudshell:- (dev-project-363217)$

```

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lass="descripti...
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Challenges

1. Integration
2. Adoption
3. Risk Management
4. Tools
5. Cost



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class="description">
...<...>

References

1. <https://cloud.google.com/kubernetes-engine/docs/concepts/cluster-upgrades>
2. <https://cloud.google.com/kubernetes-engine/docs/how-to/upgrading-a-cluster>
3. <https://misskecupbung.wordpress.com/2022/10/06/google-cloud-gke-upgrade-using-blue-green-strategy/>



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```

Thank you!

