

# devfest 2022

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## Upgrade Your GKE Cluster using Blue-Green Strategy



Google Developer Groups  
Semarang



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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>



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## Outline

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



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navigation' data-title='Hide side navigation'
-expanded='true'><span class='material-icons
' /></span></button>
```

“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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-expanded='true'><span class='material-icons
' /></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



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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 <sup>1</sup> (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	<a href="#">cos-93-16623-227-33</a>	<a href="#">cos-93-16623-227-33</a>	<a href="#">cos-93-16623-227-33</a>	<a href="#">cos-97-16919-103-42</a>







# GOOGLE Kubernetes Engine

## #GCPsketchnote

@PVERGADIA THECLOUDGIRL.DEV 9.07.2020



Your app crashed in production!

SYN ADMIN  
SAM

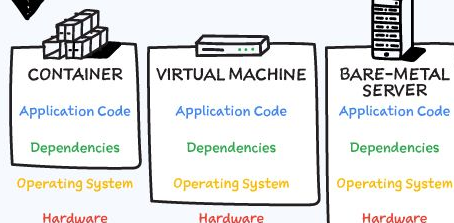
## What is GKE?

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

But it worked on my machine!

DEVELOPER  
ERIN

### CONTAINER FEATURES



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

SAM

I have heard Kubernetes could be the answer...



ERIN

It is open source platform for managing containers.

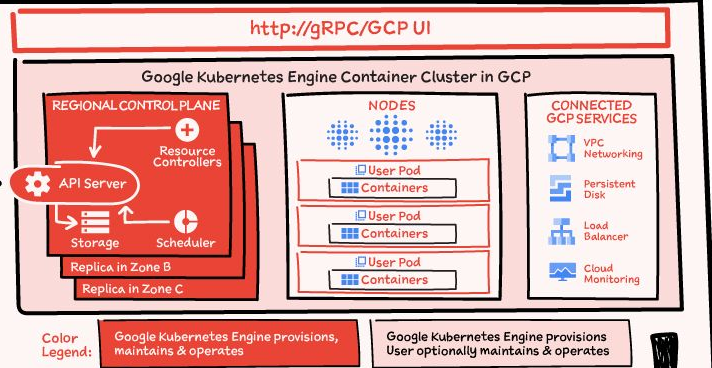
SAM

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

How does GKE work?



kubectl

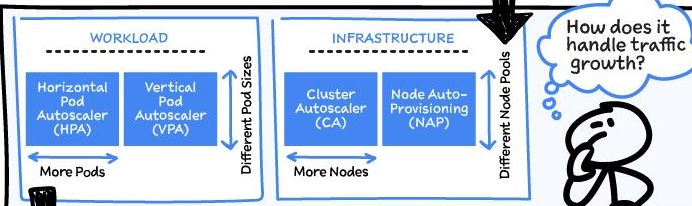


### MANAGED KUBERNETES



- 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?





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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    INTERNAL-IP    EXTERNAL-IP    OS-IMAGE    K
ERNEL-VERSION    CONTAINER-RUNTIME
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
.10.133+    containerd://1.5.13
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
.10.133+    containerd://1.5.13
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
.10.133+    containerd://1.5.13
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
.10.133+    containerd://1.5.13
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
.10.133+    containerd://1.5.13
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
.10.133+    containerd://1.5.13
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 cordoned
```

```
node/gke-gke-dev1-default-pool-ada2a9d5-cd20 cordoned
```

```
node/gke-gke-dev1-default-pool-b92adb88-c7jj cordoned
```

```
ananda_dwi@cloudshell:~ (dev-project-363217)$ kubectl get nodes -o wide
```

NAME	KERNEL-VERSION	CONTAINER-PI	STATUS	ROLES	AGE	VERSION	INTERNAL-IP	EXTERNAL-IP	OS-IMAGE
gke-gke-dev1-default-pool-219934ca-k4hk	5.10.133+	containerd://1.5.13	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	5.10.133+	containerd://1.5.13	Ready, SchedulingDisabled	<none>	129m	v1.22.12-gke.2300	10.128.0.26	34.173.131.110	Container-Optimize
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gke-gke-dev1-pool-gke1-23-16b84cc3-ghkb	5.10.133+	containerd://1.5.13	Ready	<none>	11m	v1.23.11-gke.300	10.128.0.30	35.184.2.159	Container-Optimize
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gke-gke-dev1-pool-gke1-23-6c07235e-dtn9	5.10.133+	containerd://1.5.13	Ready	<none>	11m	v1.23.11-gke.300	10.128.0.31	34.69.131.201	Container-Optimize
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gke-gke-dev1-pool-gke1-23-8c8fc0b4-fg05	5.10.133+	containerd://1.5.13	Ready	<none>	11m	v1.23.11-gke.300	10.128.0.29	34.66.116.199	Container-Optimize
d OS from Google	5.10.133+	containerd://1.5.13							

```
ananda_dwi@cloudshell:~ (dev-project-363217)$
```



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# Challenges

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



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# 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!**

