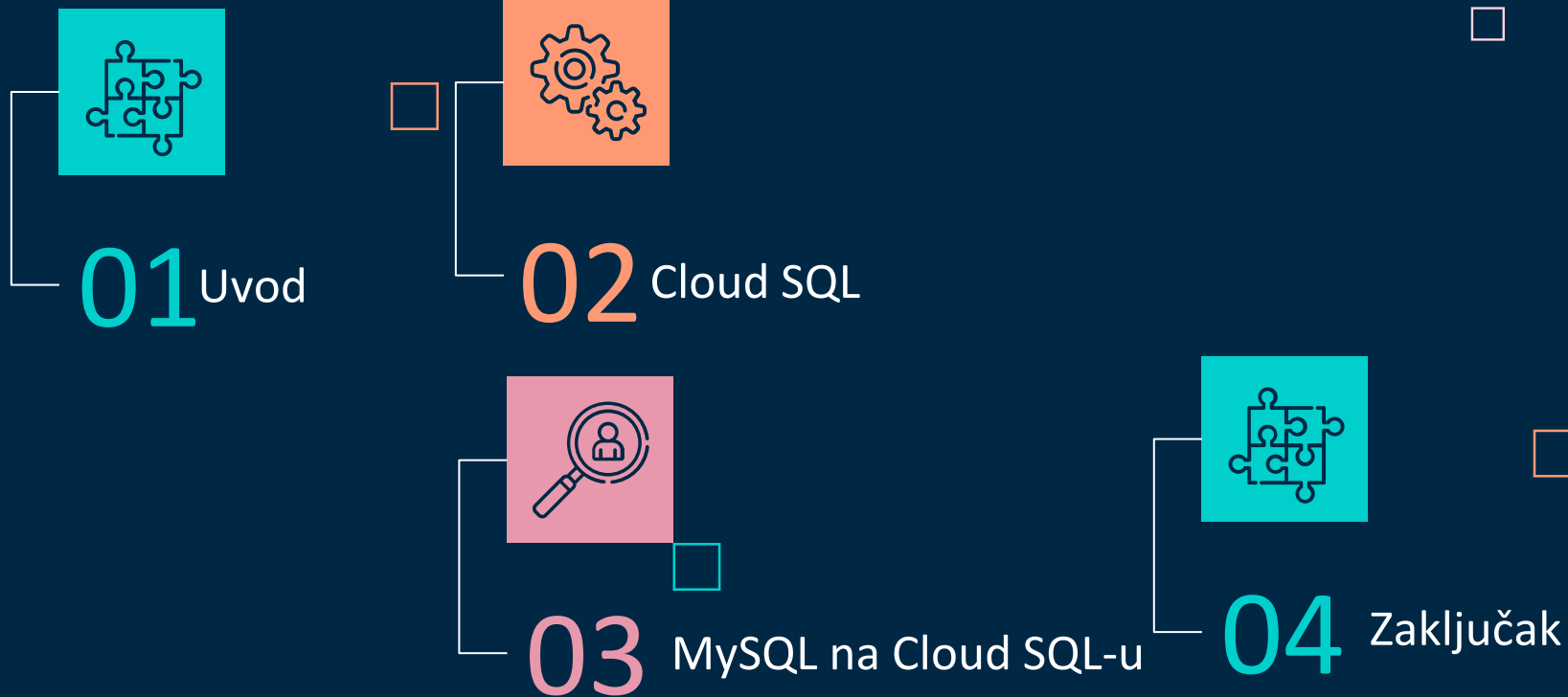


Cloud SQL kao Database-as-a-Service rešenje

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Student: Vladana Stojiljković br. Ind. 1135

Sadržaj



UVOD

01

Uvod

Šta je Cloud SQL?

Šta je DbaaS?



CLOUD SQL

02

Cloud SQL



Kada se koristi?



MySQL, PostgreSQL, SQL Server



Cloud SQL instance i instance baze podataka



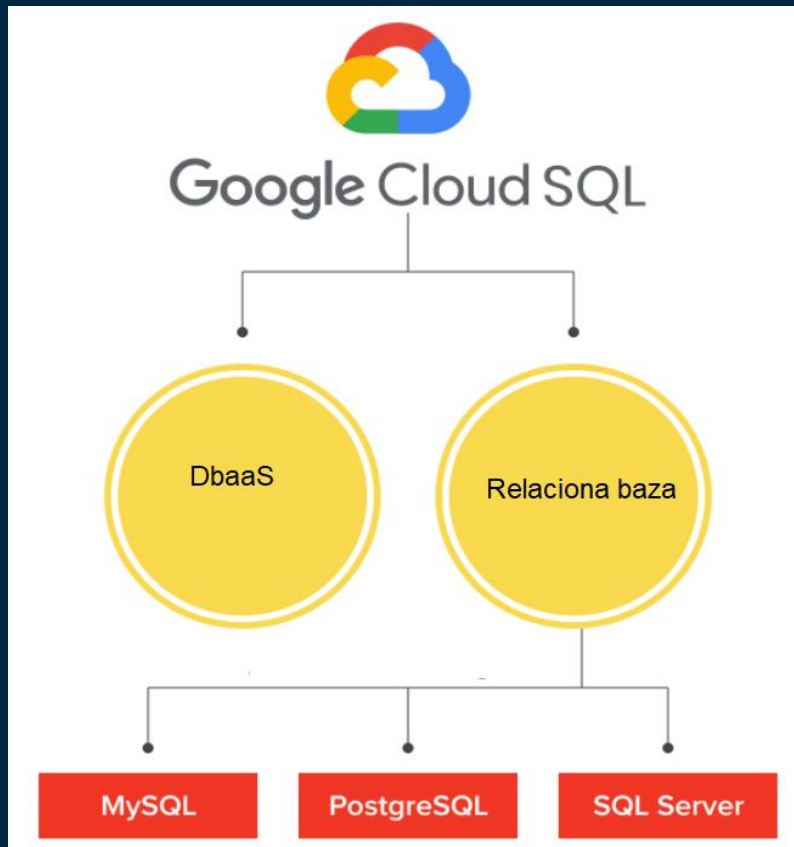
gcloud



Sigurnost



Skalabilnost



Rezervne kopije



Tipovi kopija

Automatske



Na zahtev



Prozori za kreiranje kopija

Replikacija



Čemu služi?



Replike za čitanje



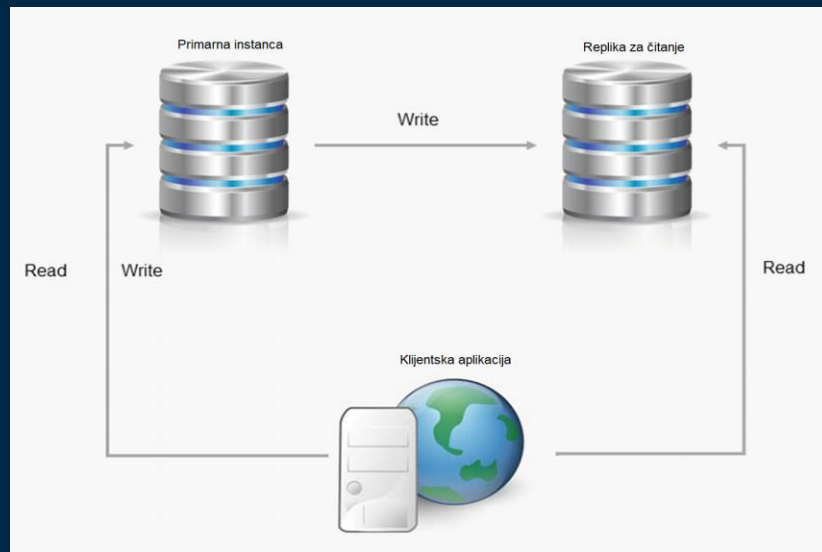
Međuregionalne replike za čitanje



Eksterne i Cloud SQL replike



Logička replikacija PostgreSQL



HA i preusmeravanje



Šta je HA?



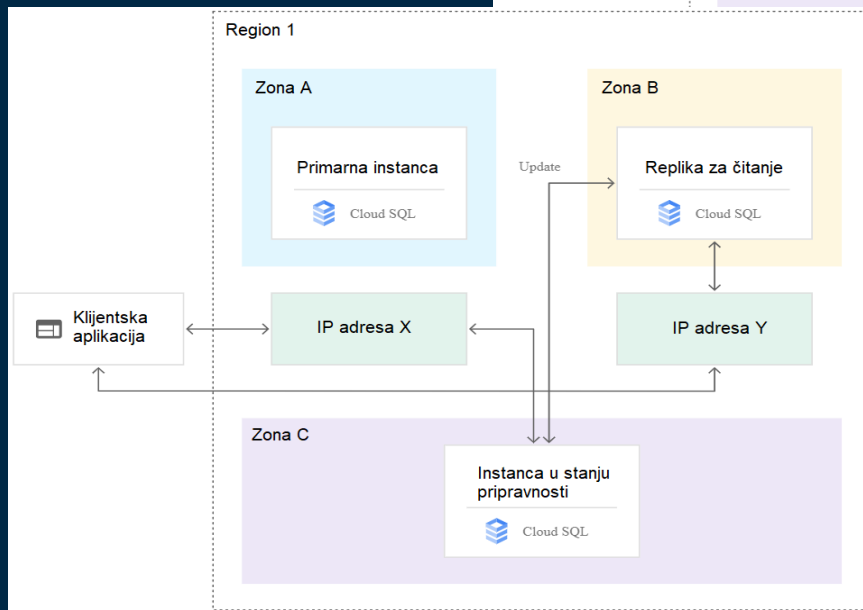
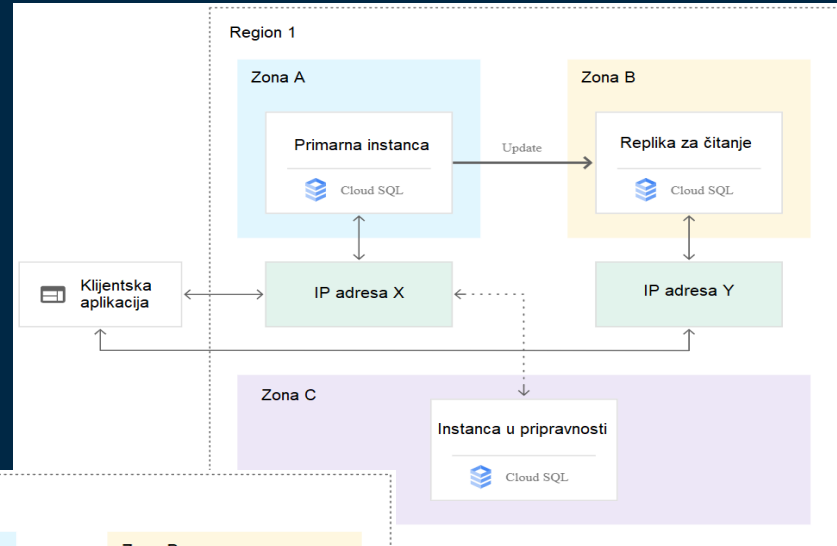
Standby instanca



Preusmeravanje
(failover)



Vraćanje (failback)



Oporavak od katastrofe - DR



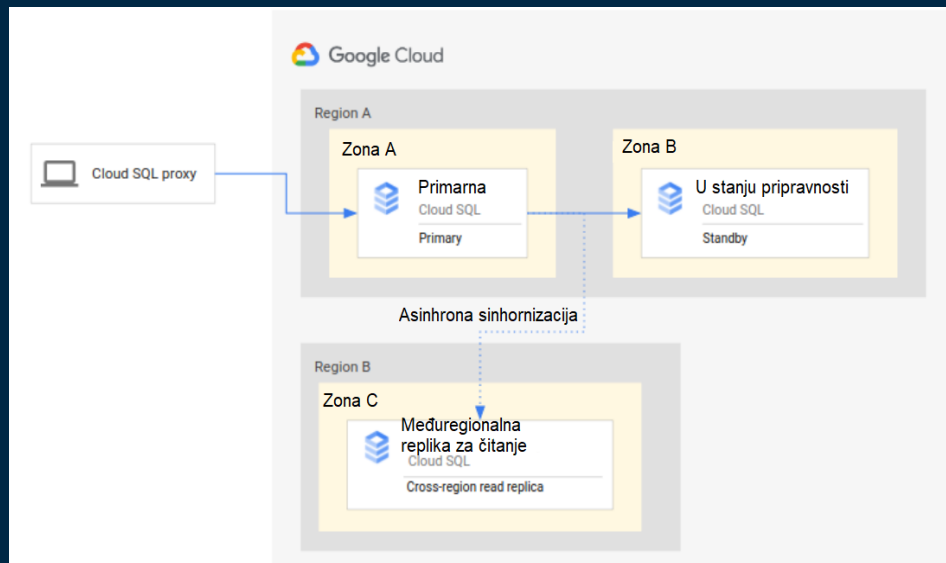
Varijante DR procesa



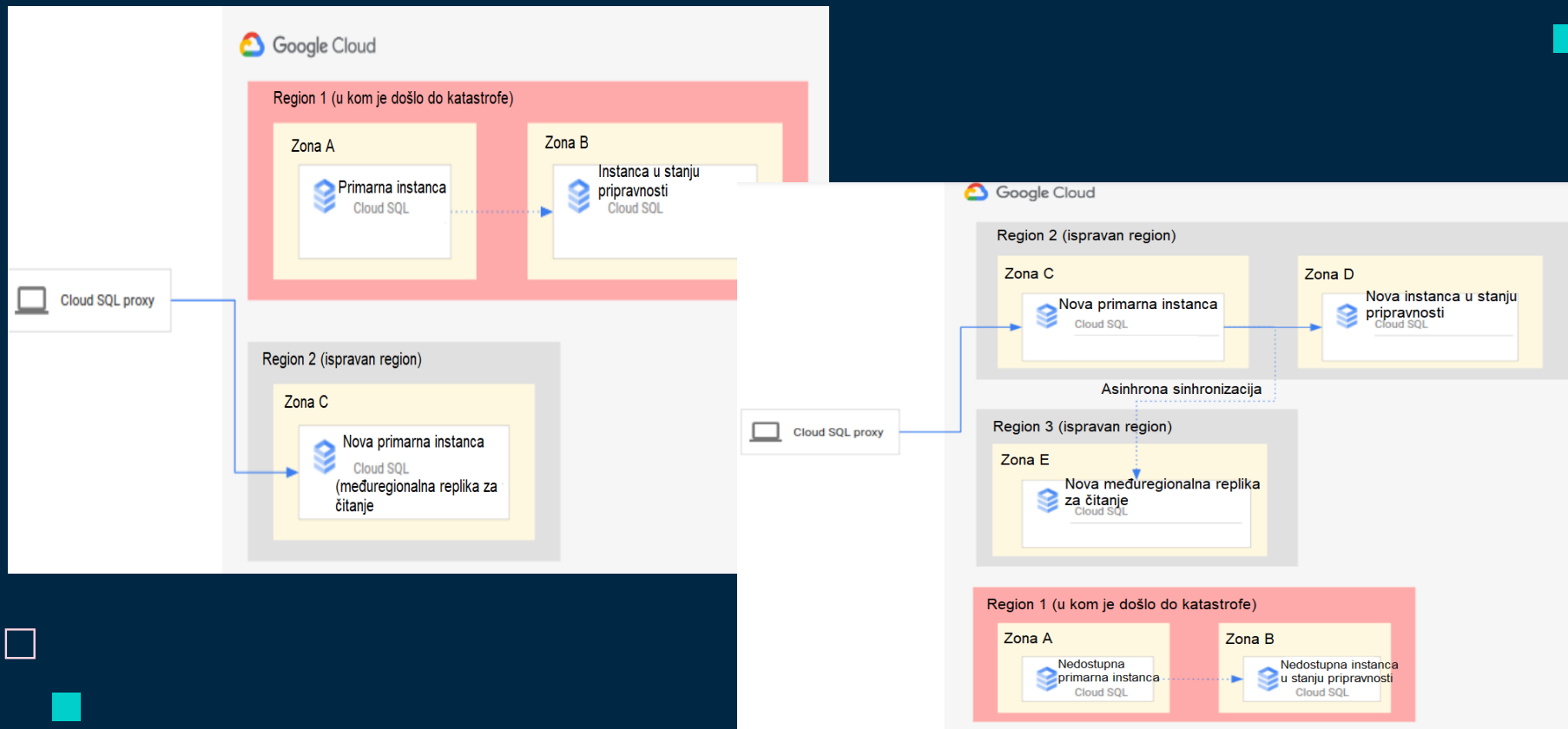
DR arhitektura



Osnovni i kompletni DR proces



Oporavak od katastrofe - DR



MySQL na Cloud SQL-u

03

MySQL

01 Kreiranje MySQL instance

```
cloudshell:~ (bustling-cosmos-318123)$ gcloud sql instances create mysqlshell1135 --cpu=1 --memory=4 --region=us-central1  
Creating Cloud SQL instance...!
```

02 Povezivanje na instancu

```
cloudshell:~ (bustling-cosmos-318123)$ gcloud sql connect mysql1135 --user=root --quiet  
Allowlisting your IP for incoming connection for 5 minutes...done.  
Connecting to database with SQL user [root].Enter password:  
Welcome to the MySQL monitor.  Commands end with ; or \g.  
Your MySQL connection id is 177  
Server version: 8.0.18-google (Google)
```

```
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```

```
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owners.
```

```
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
```

```
mysql> 
```

03 Kreiranje baze podataka

```
mysql> CREATE DATABASE guestbook;  
Query OK, 1 row affected (0.13 sec)
```

```
mysql>
```

```
mysql> USE guestbook;  
Database changed
```

```
mysql>
```

```
mysql> CREATE TABLE entries (guestName VARCHAR(255), content VARCHAR(255), entryID INT NOT NULL AUTO_INCREMENT, PRIMARY KEY(entryID));  
Query OK, 0 rows affected (0.14 sec)
```

```
mysql>
```

```
mysql> INSERT INTO entries (guestName, content) values ("first guest", "I got here!");  
Query OK, 1 row affected (0.11 sec)
```

```
mysql> INSERT INTO entries (guestName, content) values ("second guest", "Me too!");  
Query OK, 1 row affected (0.12 sec)
```

Kreiranje rezervnih kopija

Podršavanje automatskih kopija

```
eonrokk123@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql instances patch mysql1135 --backup-start-time 03:00
```

The following message will be used for the patch API method.

```
{"name": "mysql1135", "project": "bustling-cosmos-318123", "settings": {"backupConfiguration": {"backupRetentionSettings": {"retainedBackups": 7, "retentionUnit": "COUNT"}, "binaryLogEnabled": true, "enabled": true, "location": "us", "startTime": "03:00", "transactionLogRetentionDays": 7}}
```

Patching Cloud SQL instance...done.

Updated [https://sqladmin.googleapis.com/sql/v1beta4/projects/bustling-cosmos-318123/instances/mysql1135].

```
eonrokk123@cloudshell:~ (bustling-cosmos-318123)$
```

Prikaz informacija o kopijama

```
eonrokk123@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql backups list --instance mysql1135
```

ID	WINDOW_START_TIME	ERROR	STATUS	INSTANCE
1624752832852	2021-06-27T00:13:52.852+00:00	-	SUCCESSFUL	mysql1135

```
eonrokk123@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql backups describe 1624752832852 --instance mysql1135
```

backupKind: SNAPSHOT

description: Taking a backup after instance creation

endTime: '2021-06-27T00:14:33.489Z'

enqueuedTime: '2021-06-27T00:13:52.852Z'

id: '1624752832852'

instance: mysql1135

kind: sql#backupRun

location: us-central1

selfLink: https://sqladmin.googleapis.com/sql/v1beta4/projects/bustling-cosmos-318123/instances/mysql1135/backups/1624752832852

startTime: '2021-06-27T00:13:52.853Z'

status: SUCCESSFUL

type: ON_DEMAND

windowStartTime: '2021-06-27T00:13:52.852Z'

Kreiranje replike za čitanje

Provera uslova za kreiranje replike

```
eonrokkrl123@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql instances describe mysql1135
backendType: SECOND_GEN
connectionName: bustling-cosmos-318123:us-central1:mysql1135
databaseVersion: MYSQL_8_0
etag: c769840669719d8d607c3fb14622971a2e26a225abeecd8bd718923e30288474
failoverReplica:
  available: true
gceZone: us-central1-f
instanceType: CLOUD_SQL_INSTANCE
ipAddresses:
- ipAddress: 34.133.255.102
  type: PRIMARY
  ..
backupConfiguration:
  backupRetentionSettings:
    retainedBackups: 7
    retentionUnit: COUNT
  binaryLogEnabled: true
  enabled: true
```

Kreiranje replike

```
eonrokkrl123@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql instances create testreplica --master-instance-name=mysql1135
WARNING: Starting with release 233.0.0, you will need to specify either a region or a zone to create an instance.
Creating Cloud SQL instance...done.
Created [https://sqladmin.googleapis.com/sql/v1beta4/projects/bustling-cosmos-318123/instances/testreplica].
```

NAME	DATABASE_VERSION	LOCATION	TIER	PRIMARY_ADDRESS	PRIVATE_ADDRESS	STATUS
testreplica	MYSQL_8_0	us-central1-f	db-custom-4-26624	34.132.55.238	-	RUNNABLE

Visoka dostupnost i preusmeravanje



HA konfiguracija

```
eonrokkrl23@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql instances patch mysql1135 --availability-type REGIONAL --enable-bin-log --backup-start-time 02:00

The following message will be used for the patch API method.
{"name": "mysql1135", "project": "bustling-cosmos-318123", "settings": {"availabilityType": "REGIONAL", "backupConfiguration": {"backupRetentionSettings": {"retainedBackups": 7, "retentionUnit": "COUNT"}, "binaryLogEnabled": true, "enabled": true, "location": "us", "startTime": "02:00", "transactionLogRetentionDays": 7}}}
Patching Cloud SQL instance...done.
Updated [https://sqladmin.googleapis.com/sql/v1beta4/projects/bustling-cosmos-318123/instances/mysql1135].
```



Iniciranje preusmeravanja

```
eonrokkrl23@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql instances failover mysql1135
Failover will be initiated. Existing connections to the master instance will break and no new connection can be established during the failover.

Do you want to continue (Y/n)? Y

Failing over Cloud SQL instance...done.
eonrokkrl23@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql connect mysql1135 --user=root --quiet
Allowlisting your IP for incoming connection for 5 minutes...done.
Connecting to database with SQL user [root].Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 95
Server version: 8.0.18-google (Google)

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Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> 
```


Simuliranje DR procesa



Provera zaostajanja replike



Zaustavljanje primarne instance



Unapređenje međuregionalne replike za čitanje



Pokretanje nove primarne instance

```
eonrokkrl23@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql instances patch testreplica --no-enable-database-replic;
The following message will be used for the patch API method.
{"name": "testreplica", "project": "bustling-cosmos-318123", "settings": {"databaseReplicationEnabled": false}}
WARNING: This patch modifies a value that requires your instance to be
restarted. Submitting this patch will immediately restart your
instance if it's running.
```

Do you want to continue (Y/n)? Y

Patching Cloud SQL instance...done.

Updated [https://sqladmin.googleapis.com/sql/v1beta4/projects/bustling-cosmos-318123/instances/testreplica].

```
eonrokkrl23@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql instances patch mysql1135 --activation-policy NEVER
```

The following message will be used for the patch API method.

```
{"name": "mysql1135", "project": "bustling-cosmos-318123", "settings": {"activationPolicy": "NEVER"}}
```

Patching Cloud SQL instance...done.

Updated [https://sqladmin.googleapis.com/sql/v1beta4/projects/bustling-cosmos-318123/instances/mysql1135].

```
eonrokkrl23@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql instances promote-replica testreplica
Promoting a read replica stops replication and converts the instance
to a standalone primary instance with read and write capabilities.
This can't be undone. To avoid loss of data, before promoting the
replica, you should verify that the replica has applied all
transactions received from the primary.
```

Learn more:

<https://cloud.google.com/sql/docs/mysql/replication/manage-replicas#promote-replica>

Do you want to continue (Y/n)? Y

Promoting Cloud SQL replica...

```
eonrokkrl23@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql instances patch testreplica --activation-policy ALWAYS
```

The following message will be used for the patch API method.

```
{"name": "testreplica", "project": "bustling-cosmos-318123", "settings": {"activationPolicy": "ALWAYS"}}
```

Patching Cloud SQL instance...done.

Updated [https://sqladmin.googleapis.com/sql/v1beta4/projects/bustling-cosmos-318123/instances/testreplica].

Simuliranje DR procesa

Provera statusa instanci

```
eonrokkri123@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql instances describe testreplica
backendType: SECOND_GEN
connectionName: bustling-cosmos-318123:us-central1:testreplica
databaseVersion: MYSQL_8_0
etag: 78d53422ff18dd355af0c0c2889b7b5abda264a2edb0be84358c122641a12c6c
gceZone: us-central1-f
instanceType: CLOUD_SQL_INSTANCE
ipAddresses:
- ipAddress: 34.132.55.238
  type: PRIMARY
eonrokkri123@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql instances describe mysql1135
...
tier: db-custom-4-26624
state: STOPPED
```

Sada je primarna instanca!

Podešavanje nove primarne instance

Brisanje stare primarne instance

```
eonrokkri123@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql instances patch testreplica --availability-type REGIONAL --enable-bin-log --backup-start-time=02:00
The following message will be used for the patch API method.
{"name": "testreplica", "project": "bustling-cosmos-318123", "settings": {"availabilityType": "REGIONAL", "backupConfiguration": {"backupRetentionSettings": {"retainedBackups": 7, "retentionUnit": "COUNT"}, "binaryLogEnabled": true, "enabled": true, "startTime": "02:00", "transactionLogRetentionDays": 7}}}
Patching Cloud SQL instance...done.

Updated [https://sqladmin.googleapis.com/sql/v1beta4/projects/bustling-cosmos-318123/instances/testreplica].
eonrokkri123@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql instances create drreplica --master-instance-name=testreplica --region=us-east4
Creating Cloud SQL instance...done.

Created [https://sqladmin.googleapis.com/sql/v1beta4/projects/bustling-cosmos-318123/instances/drreplica].
NAME          DATABASE_VERSION  LOCATION  TIER          PRIMARY_ADDRESS  PRIVATE_ADDRESS  STATUS
drreplica     MYSQL_8_0         us-east4-b  db-custom-4-26624  34.150.217.180   -                RUNNABLE
eonrokkri123@cloudshell:~ (bustling-cosmos-318123)$ gcloud sql instances delete mysql1135
All of the instance data will be lost when the instance is deleted.

Do you want to continue (Y/n)? Y

Deleting Cloud SQL instance...done.
Deleted [https://sqladmin.googleapis.com/sql/v1beta4/projects/bustling-cosmos-318123/instances/mysql1135].
```

HA konfiguracija

Kreiranje međuregionalne replike za čitanje

Brisanje originalne primarne instance

Zaključak

04

Zaključak

01

Cloud SQL DbaaS omogućava upotrebu relacionih baza podataka bez instaliranja hardvera ili softvera.

02

Cloud SQL je skalabilan, visokodostupan sistem, omogućava kreiranje replika i rezervnih kopija, ima proces oporavka od katastrofe.

03

Lako i intuitivno upravljanje bazama podataka pomoću *gcloud* naredbi ili GCP platforme.

The background is a dark blue field decorated with a pattern of small, colorful squares (pink, teal, orange, and white) and thin, vertical white lines of varying lengths, creating a modern, minimalist aesthetic.

Hvala na pažnji!