SISTEMI ZA UPRAVLJANJE BAZAMA PODATAKA

CLOUD BAZE PODATAKA I DATABASE AS A SERVICE NA PRIMERU AMAZON RDS-A

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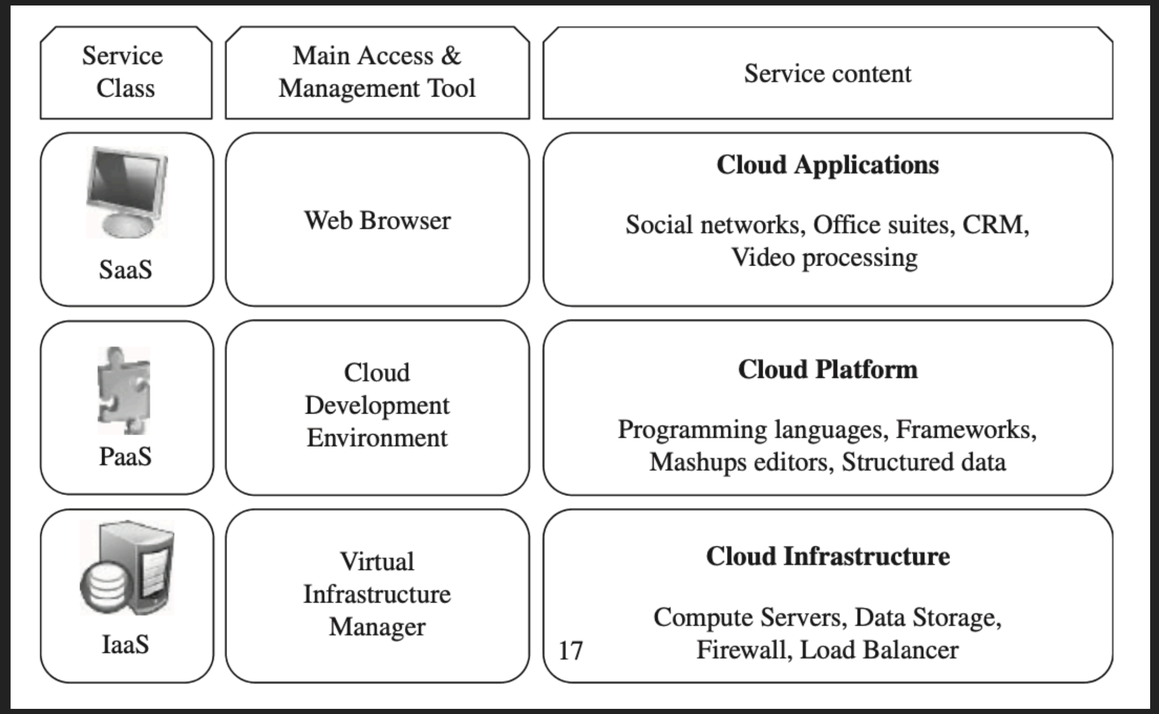
RAČUNARSTVO U OBLAKU

- Skup računarskih resursa na zahtev.
- Karakteristike računarstva u oblaku:
  - Self-service
  - Pay-per-use model
  - Elastičnost
  - Mogućnost podešavanja po potrebi



Slika 1. Slojevi klauda

BAZE PODATAKA U KLAUDU

- Self-managed ili managed database
- Prednosti managed baza:
  - Skalabilnost
  - Isplativost
  - Održavanje i upravljanje
  - Dostupnost
  - Oporavak od katastrofa
  - Optimizacija performansi
  - Bezbednost

- Upravljane baze podataka:
  - Tradicionalne (MySQL, SQL Server,…)
  - Cloud native (Amazon Aurora)

- Tipovi upravljanih baza podataka:
  - Relacione baze (MySQL, Amazon Aurora)
  - Skladišta podataka (Amazon Redshift)
  - Nerelacione baze (Amazon DynamoDB)

AMAZON WEB SERVICES

- AWS je deo Amazon korporacije, koji pruža klaud usluge na zahtev na baze pay-as-you-go modela.
- Rešenja za rad sa bazom:
  - Amazon EC2
  - Amazon RDS

Feature	On-premises management	Amazon EC2 management	Amazon RDS management
Application optimization	Customer	Customer	Customer
Scaling	Customer	Customer	AWS
High availability	Customer	Customer	AWS
Database backups	Customer	Customer	AWS
Database software patching	Customer	Customer	AWS
Database software install	Customer	Customer	AWS
Operating system (OS) patching	Customer	Customer	AWS
OS installation	Customer	Customer	AWS
Server maintenance	Customer	AWS	AWS
Hardware lifecycle	Customer	AWS	AWS
Power, network, and cooling	Customer	AWS	AWS

Slika 2. Odgovornost korisnika/provajdera kod različitih rešenja hostovanja baze

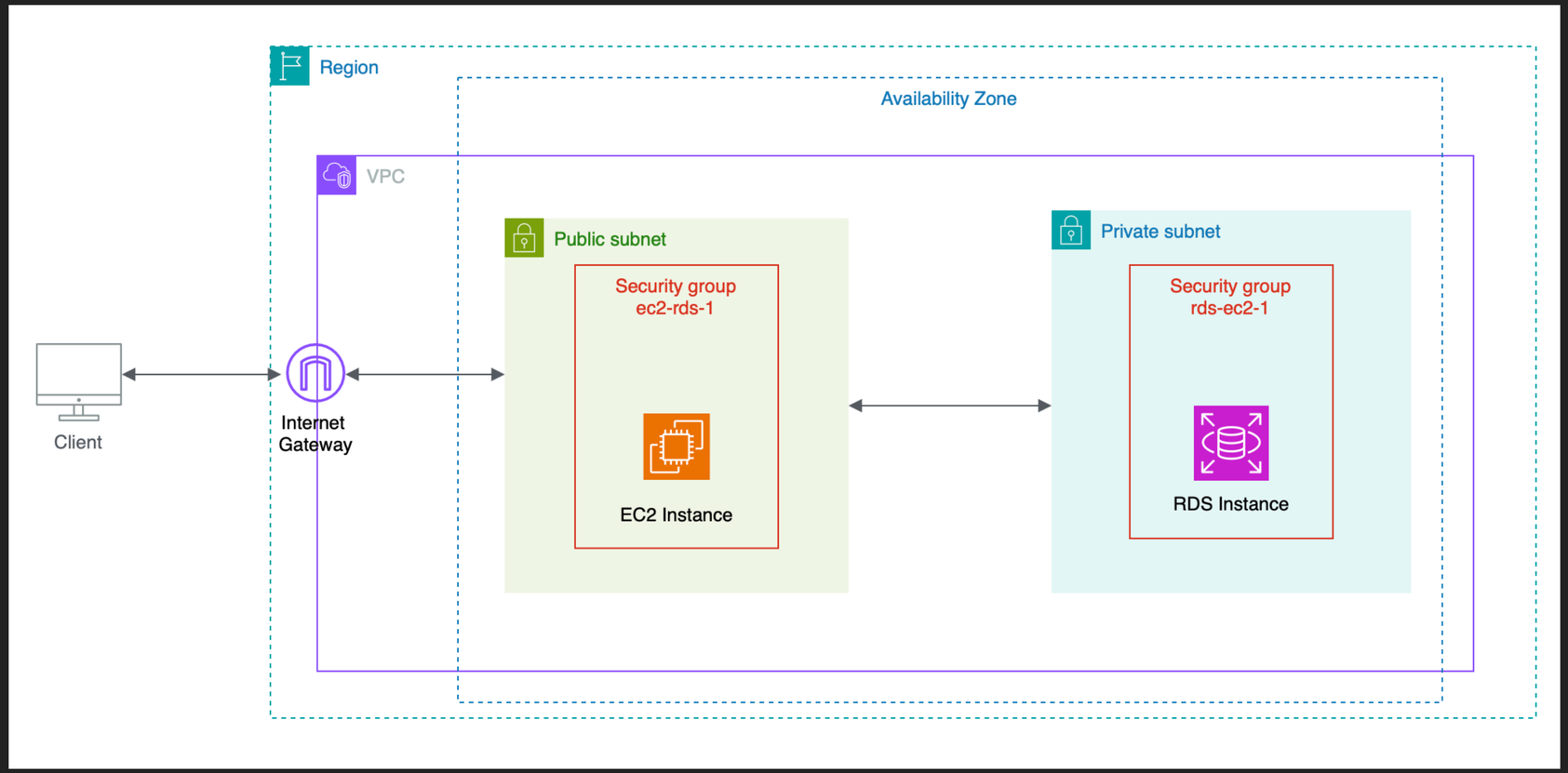
AMAZON RDS INSTANCA

- Osnovni gradivni blok Amazon RDS
- Izolovano okruženje baze u AWS klaudu
- U pozadini se kreira virtuelna mašina na EC2, a EBS se koristi za skladištenje.

POVEZIVANJE SA RDS INSTANCOM

- RDS instanca se smešta u VPC, koji kontroliše virtuelno mrežno okruženje.
- Bezbednosne grupe kontrolišu pristup instanci unutar VPC.
- Scenariji pristupa bazi u VPC:
  - Sa EC2 instance u istom VPC
  - Sa EC2 instance iz drugog VPC
  - Klijentska aplikacija kroz internet
  - Sa privatne mreže

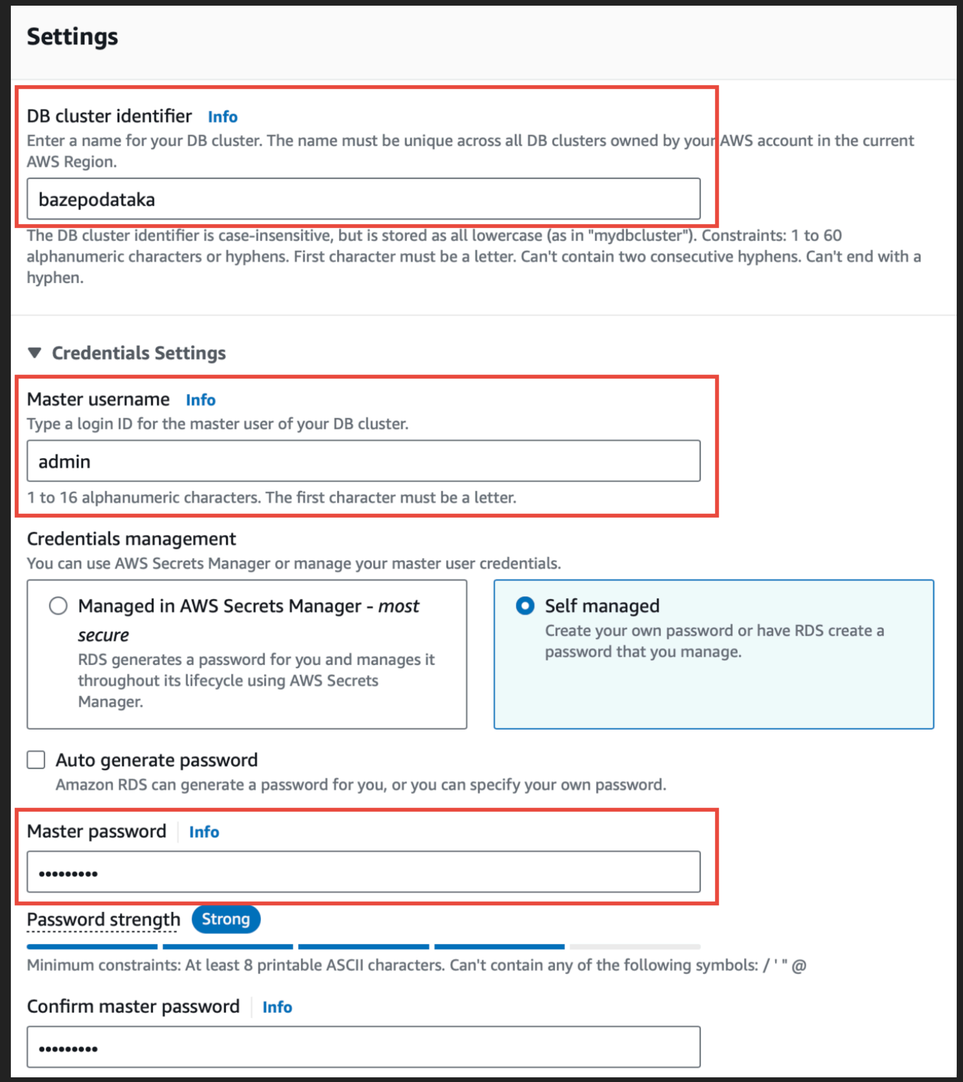
ARHITEKTURA SISTEMA



Slika 3. Arhitektura sistema

KORACI U KREIRANJU RDS INSTANCE

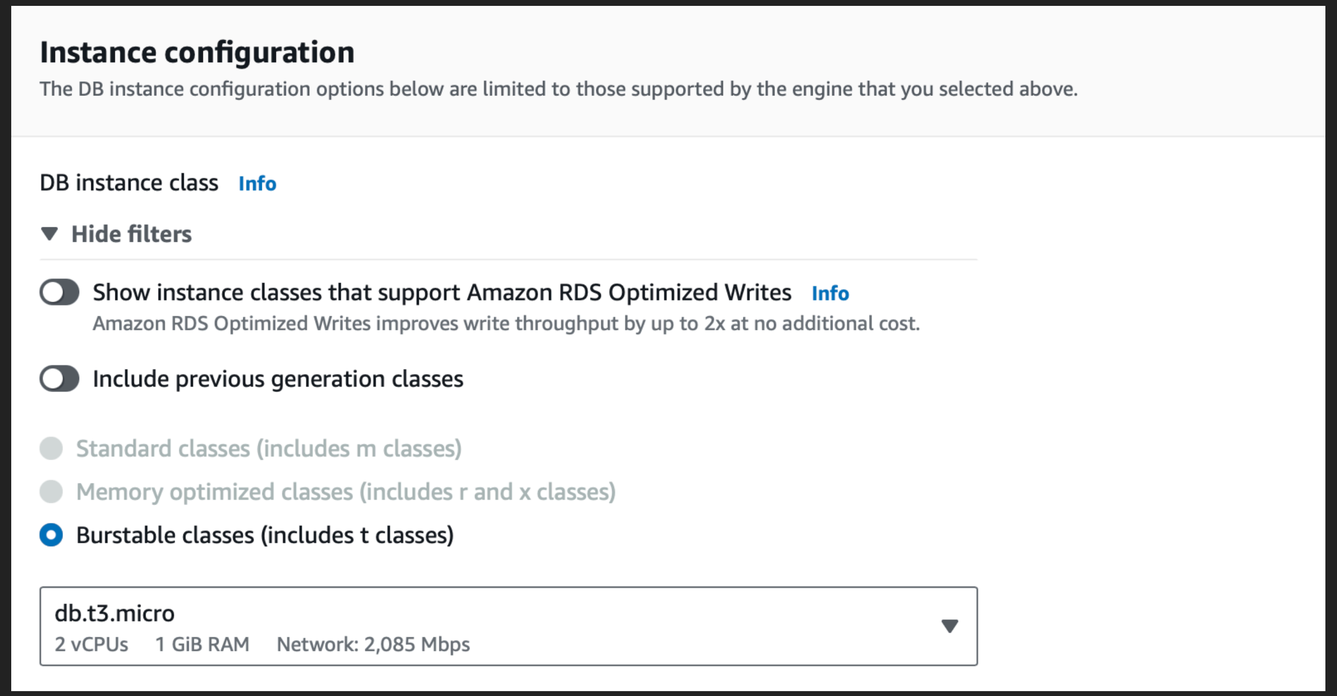
- Izbor tipa i verzije engine-a
- Izbor šablona (Production, Dev/Test, Free Tier)
- Availability & durability
  - Multi-AZ DB Cluster
  - Multi-AZ DB Instance
  - Single DB Instance
- Identifikator instance
- Kreiranje glavnog korisnika



Slika 4. Izbor identifikatora i kreiranje korisnika

KORACI U KREIRANJU RDS INSTANCE – NASTAVAK

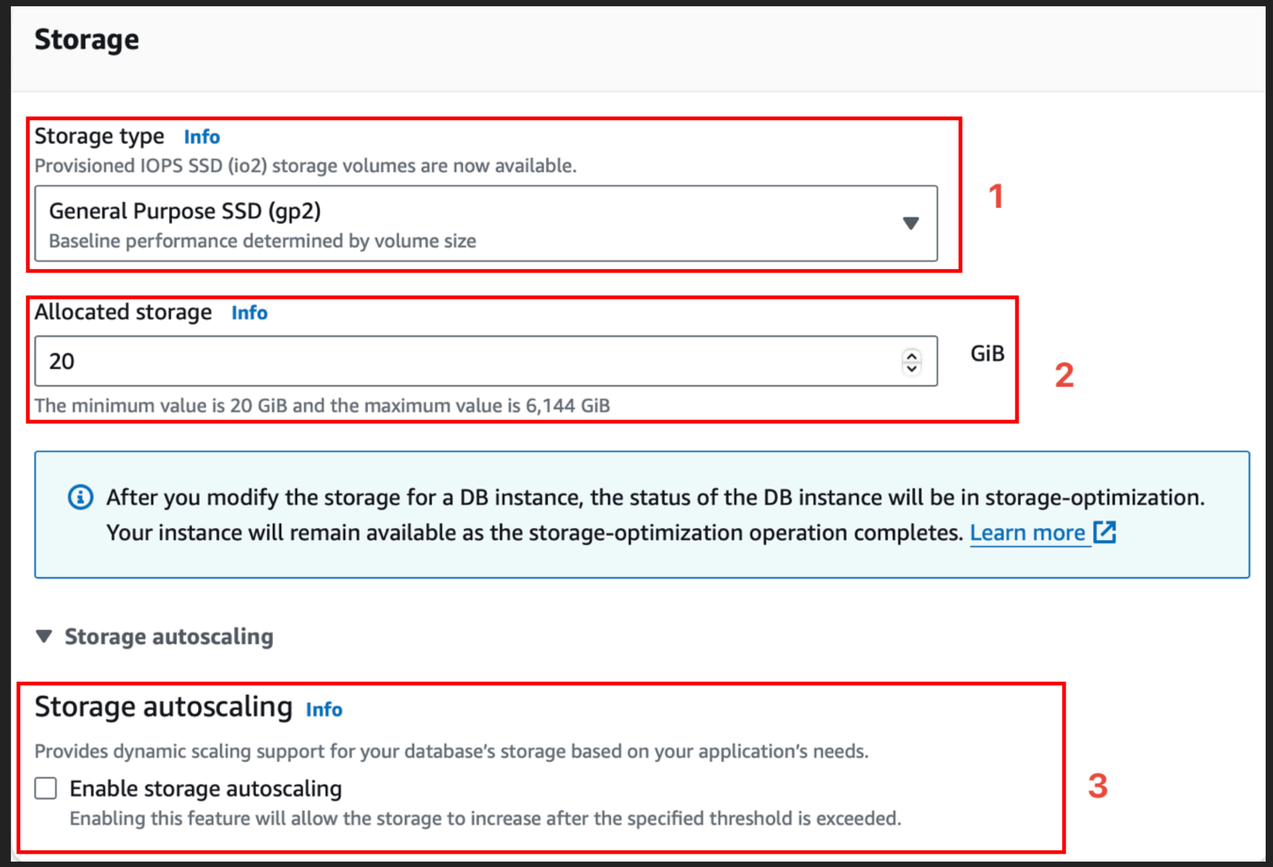
- Klasa instance
  - General purpose (db.m*)
  - Memory optimized (db.z* db.x* db.r*)
  - Compute optimized (db.c*)
  - Burstable performace (db.t*)
  - Optimized reads (db.r*)



Slika 5. Klasa instance

KORACI U KREIRANJU RDS INSTANCE – NASTAVAK

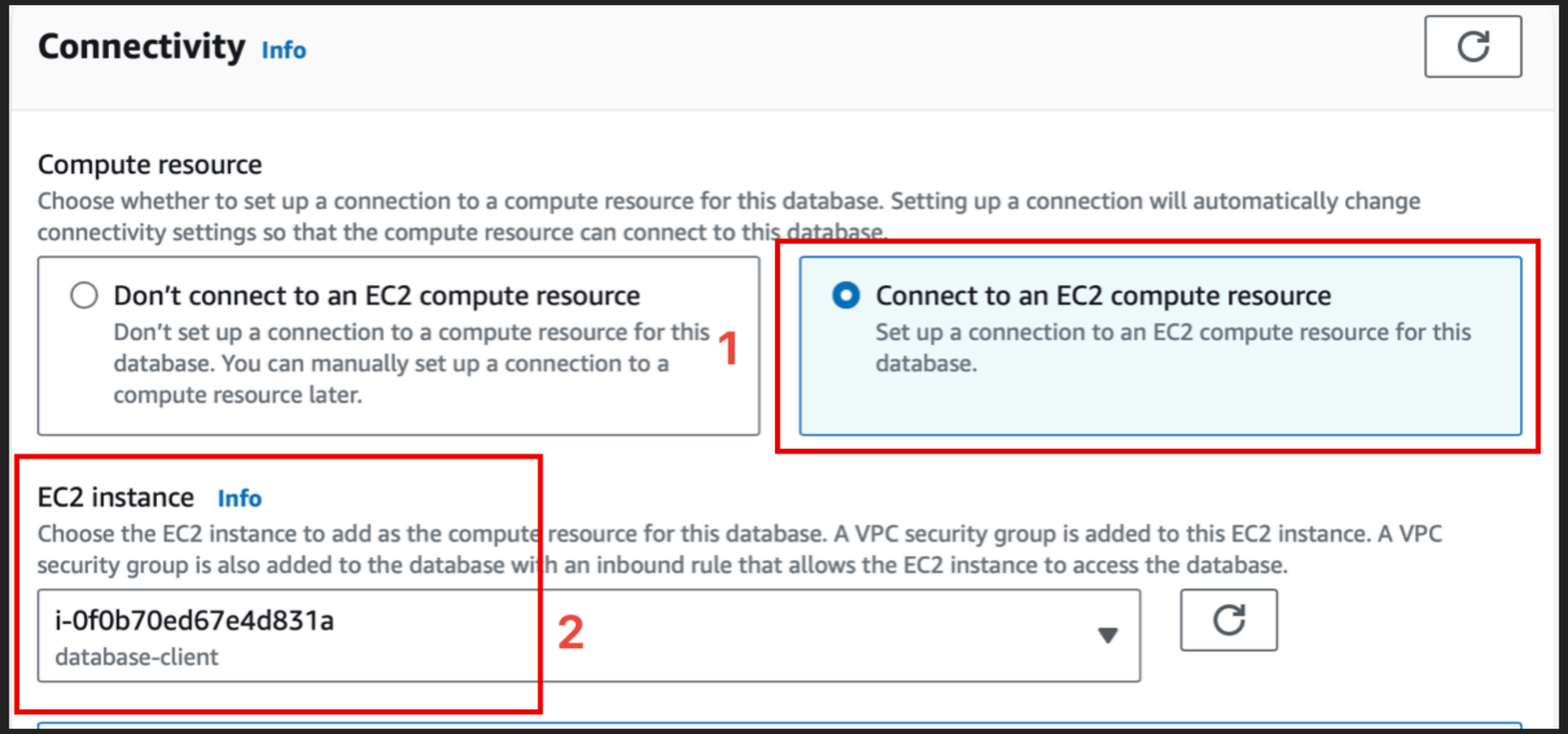
- Tip skladišta:
  - General purpose SSD
  - Provisioned IOPS
  - Magnetic



Slika 6. Tip i kapacitet skladišta

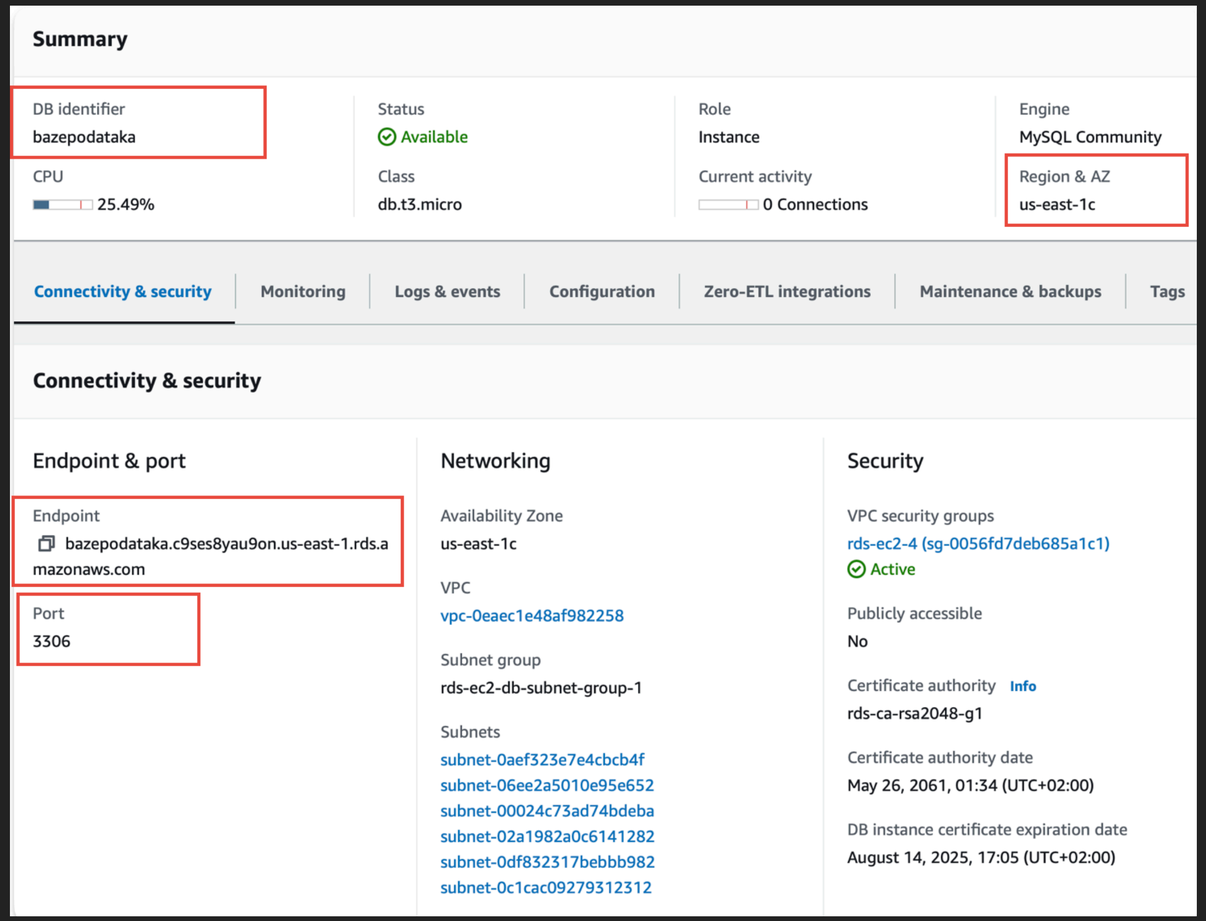
KORACI U KREIRANJU RDS INSTANCE – NASTAVAK

- Povezivanje sa EC2
- Kreiranje SSL sertifikata
- Podešavanje porta
- Podešavanje autentifikacije

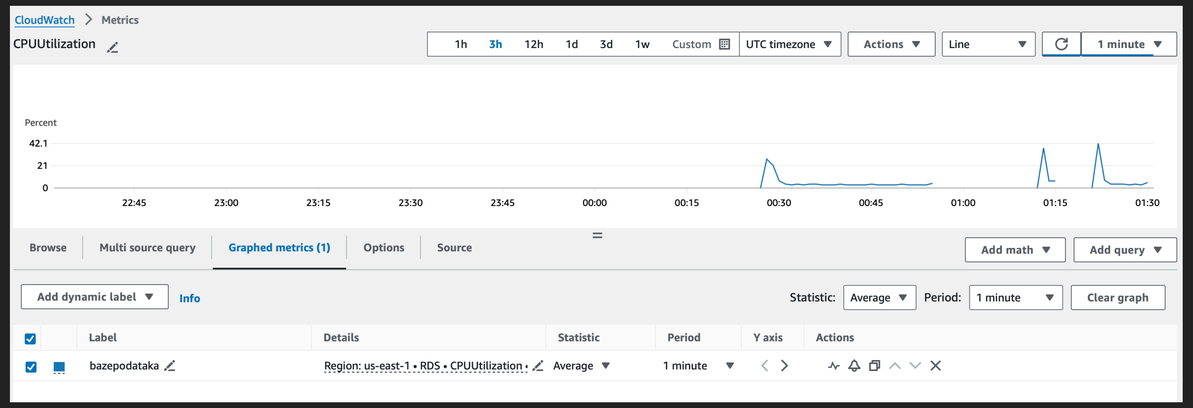


Slika 7. Povezivanje sa EC2 instancom

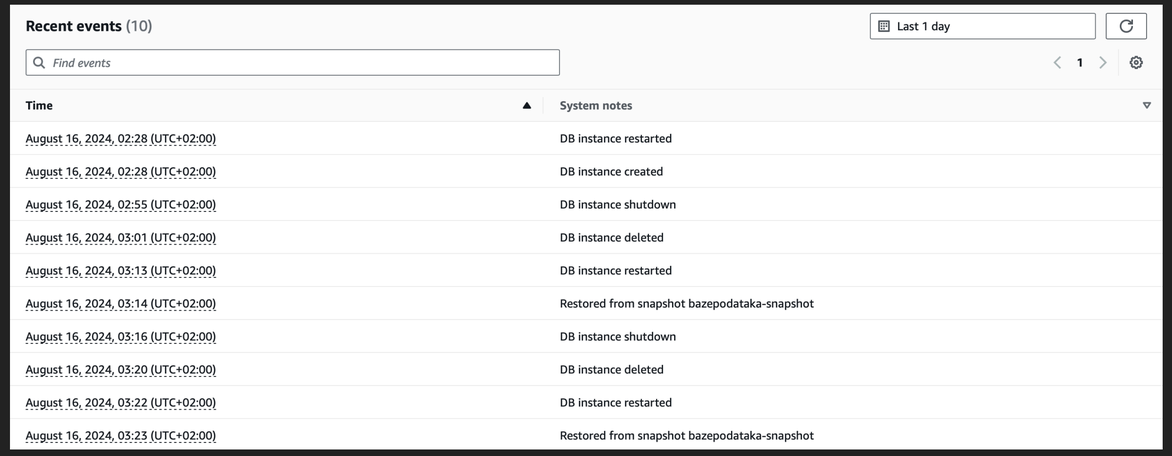
KARAKTERISTIKE RDS INSTANCE



Slika 8. RDS Instance Summary

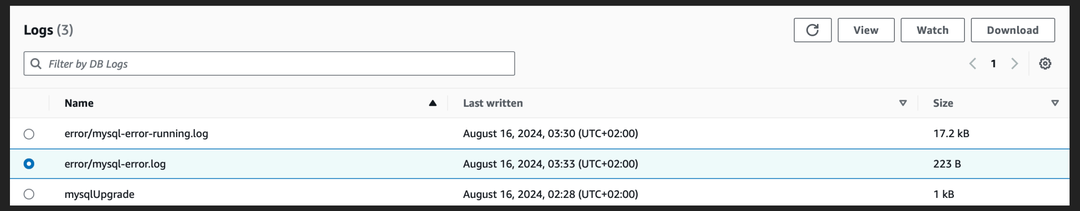


Slika 9. Monitoring

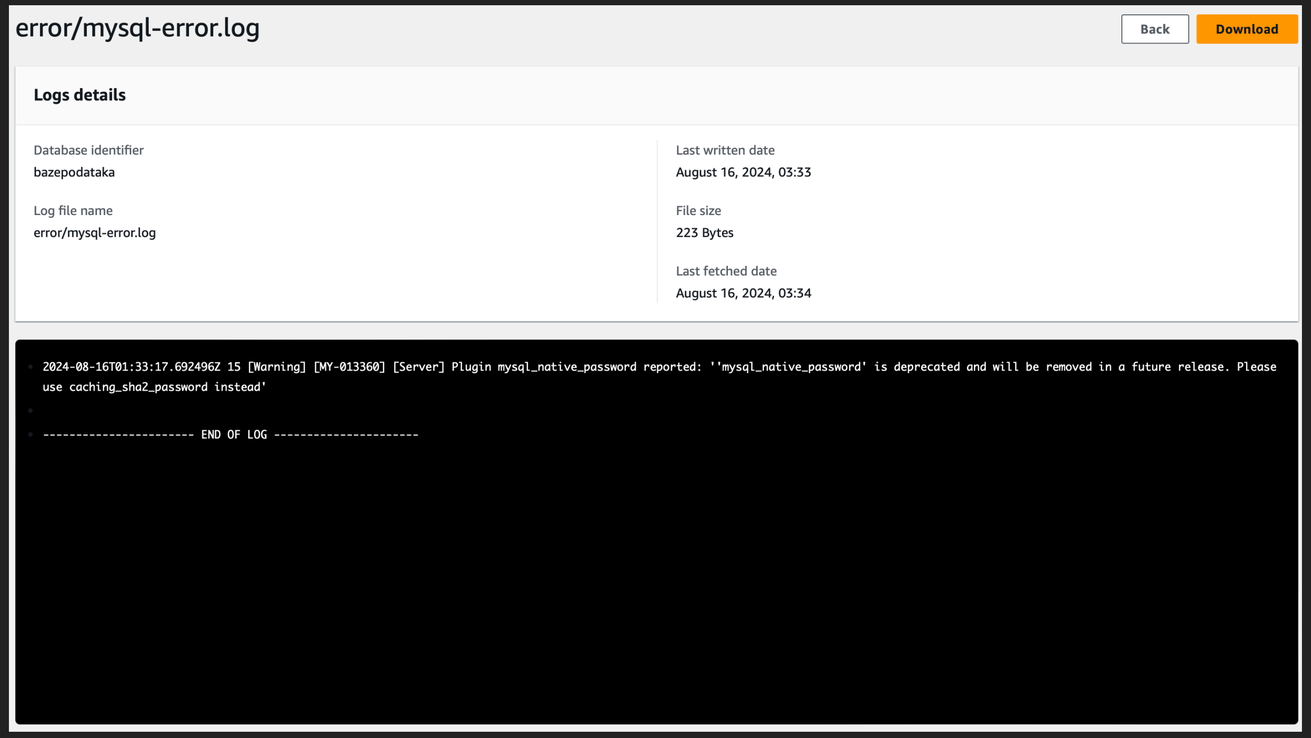


Slika 10. Events

RDS INSTANCE LOGOVI



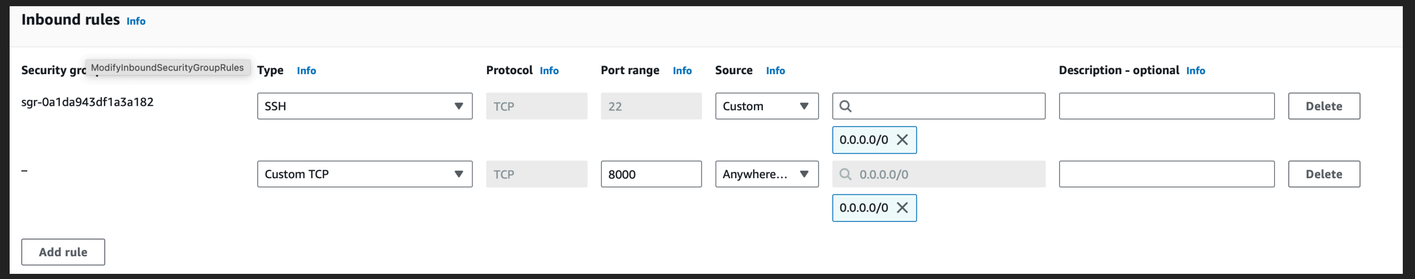
Slika 11. RDS Instance logs



Slika 12. Error/mysql-error.log

PODEŠAVANJE EC2 INSTANCE

- Kopiranje fajlova
- Povezivanje putem SSH
- Instaliranje paketa
- Povezivanje sa bazom, kreiranje korisnika, dodela privilegija
- Izvršenje skripte za generisanje i upis podataka u bazu
- Dodavanje bezbednosnog pravila
- Startovanje http servera



Slika 13. EC2 security group inbound rules

VRAĆANJE PODATAKA IZ BAZE

```
svetlanamancic@Svetlanas-MBP Downloads % curl 'http://34.234.90.186:8000/everyone/'
{"results":[[1,"Megan","Chang","gwilliams@example.com","Hullport","Lesotho","+3778242194892411","2012-11-20"],[2,"Gabriella","Kennedy","gomezles
lie@example.net","New Thomas","Tonga","+8880801609753513","2014-12-31"],[3,"Jeffrey","Pratt","lindawest@example.org","Nancyfort","Botswana","+38
31858398947196","1945-05-26"],[4,"John","White","antoniozavala@example.com","Jonesberg","Turkey","+201868483396947","1965-10-09"],[5,"Danielle",
"Graves","christopher91@example.com","Meganbury","Andorra","+44 76243525601230989","1987-07-28"]]}%
```

Slika 14 Curl /everyone

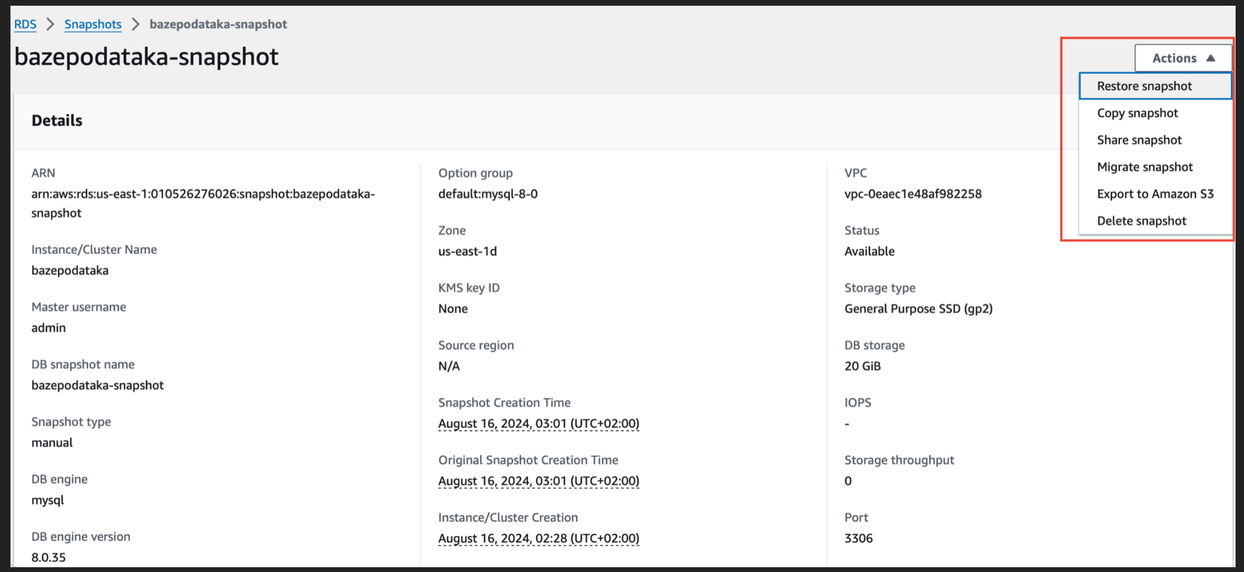
```
svetlanamancic@Svetlanas-MBP Downloads % curl 'http://34.234.90.186:8000/by-firstname/?first_name=John'
{"results":[[4,"John","White","antoniozavala@example.com","Jonesberg","Turkey","+201868483396947","1965-10-09"]]}%
```

Slika 15. Curl /by-firstname

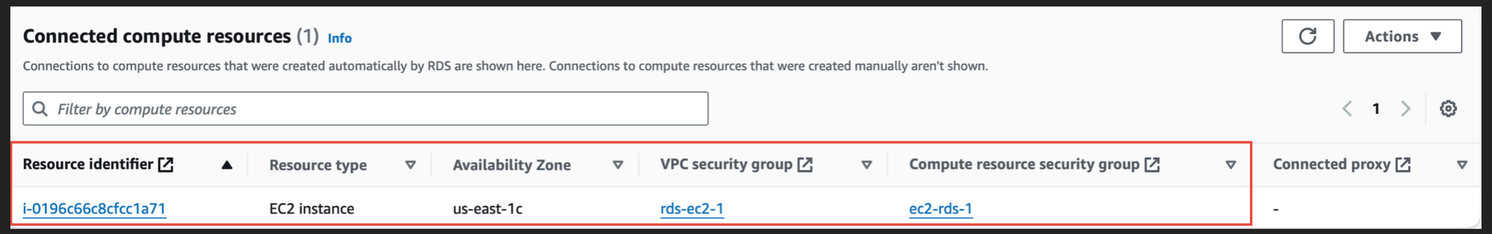
```
svetlanamancic@Svetlanas-MBP Downloads % curl 'http://34.234.90.186:8000/by-lastname/?last_name=Chang'
{"results":[[1,"Megan","Chang","gwilliams@example.com","Hullport","Lesotho","+3778242194892411","2012-11-20"]]}
```

Slika 16. Curl /by-lastname

VRAĆANJE BAZE IZ SNAPSHOT-A



Slika 17. Snapshot baze



Slika 18. Konekcija sa EC2

HVALA NA PAŽNJI!