Lab 5 NoSQL

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1. MongoDB

1.1. Setup

Install MongoDB Community Server:

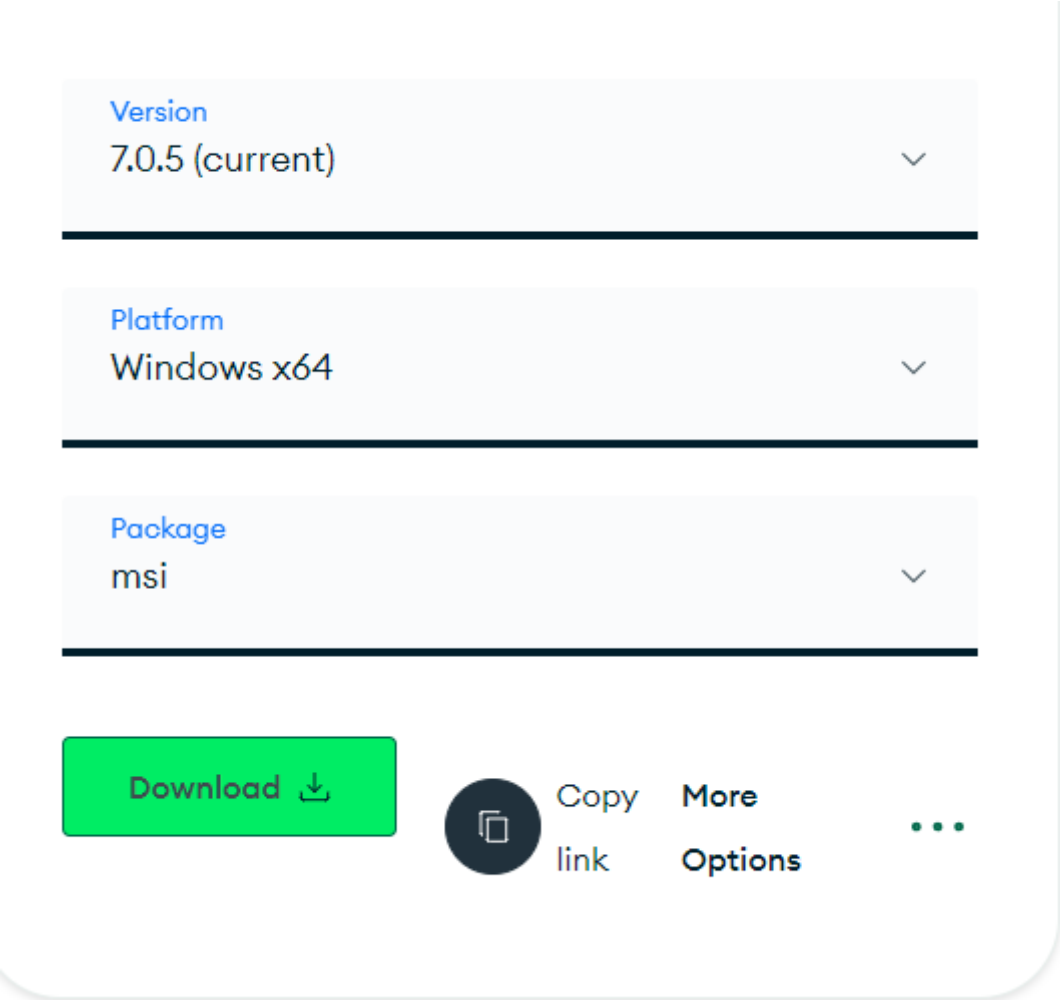

Figure 1. Install Community Server

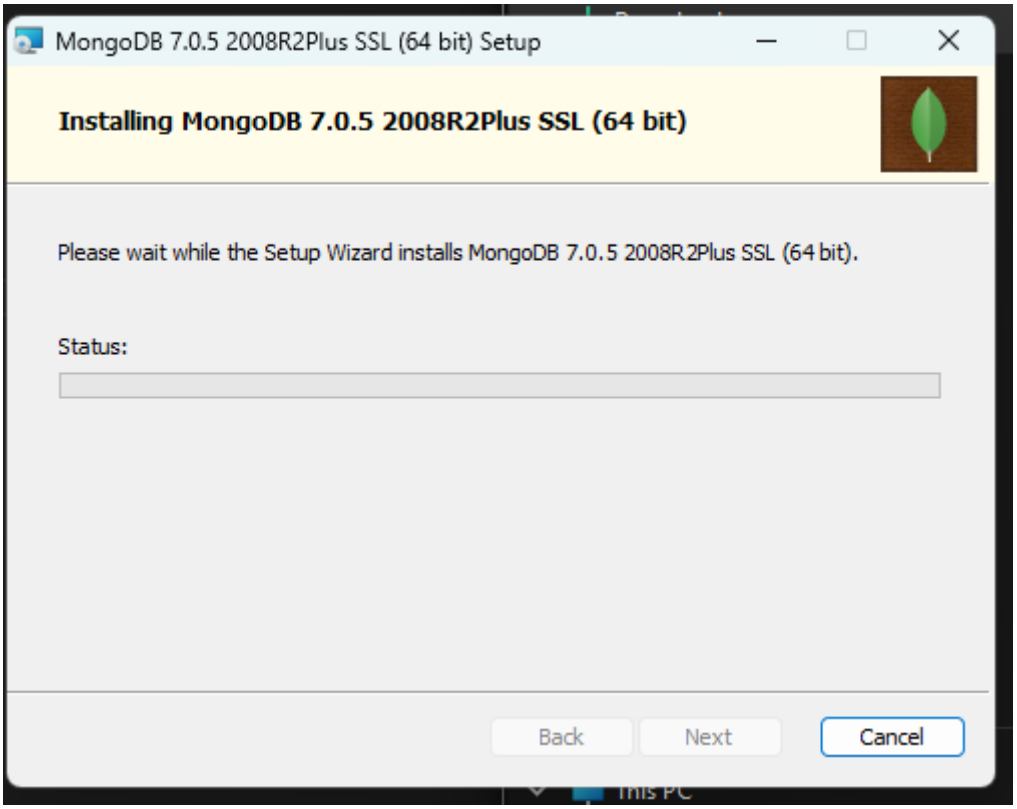

Figure 2. Installation

Install Database Tools with winget:

```
winget install -e --id MongoDB.DatabaseTools
```

Start database with following command from "C:\Program Files\MongoDB\Server\7.0\bin":

```
.\mongod.exe
```

After starting the database we connect via MongoDb Compass:

```
PS C:\Program Files\MongoDB\Server\7.0\bin> .\mongod.exe
{"t":{"$date":"2024-01-22T09:56:56.061+01:00"},"s":"I",  "c":"NETWORK",  "id":4915701, "ctx":"thread1","msg":"Initia
ification","attr":{"spec":{"incomingExternalClient":{"minWireVersion":0,"maxWireVersion":21},"incomingInternalClient
ion":0,"maxWireVersion":21},"outgoing":{"minWireVersion":6,"maxWireVersion":21},"isInternalClient":true}}}
{"t":{"$date":"2024-01-22T09:56:58.796+01:00"},"s":"I",  "c":"CONTROL",  "id":23285,   "ctx":"thread1","msg":"Automa
ng TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2024-01-22T09:56:58.799+01:00"},"s":"I",  "c":"NETWORK",  "id":4648602, "ctx":"thread1","msg":"Implic
 in use."}
{"t":{"$date":"2024-01-22T09:56:58.804+01:00"},"s":"I",  "c":"REPL",     "id":5123008, "ctx":"thread1","msg":"Succes
ed PrimaryOnlyService","attr":{"service":"TenantMigrationDonorService","namespace":"config.tenantMigrationDonors"}}
{"t":{"$date":"2024-01-22T09:56:58.804+01:00"},"s":"I",  "c":"REPL",     "id":5123008, "ctx":"thread1","msg":"Succes
ed PrimaryOnlyService","attr":{"service":"TenantMigrationRecipientService","namespace":"config.tenantMigrationRecipi
{"t":{"$date":"2024-01-22T09:56:58.804+01:00"},"s":"I",  "c":"CONTROL",  "id":5945603, "ctx":"thread1","msg":"Multi
alized"}
{"t":{"$date":"2024-01-22T09:56:58.805+01:00"},"s":"I",  "c":"TENANT_M", "id":7091600, "ctx":"thread1","msg":"Starti
ionAccessBlockerRegistry"}
```

Figure 3. Starting the Database

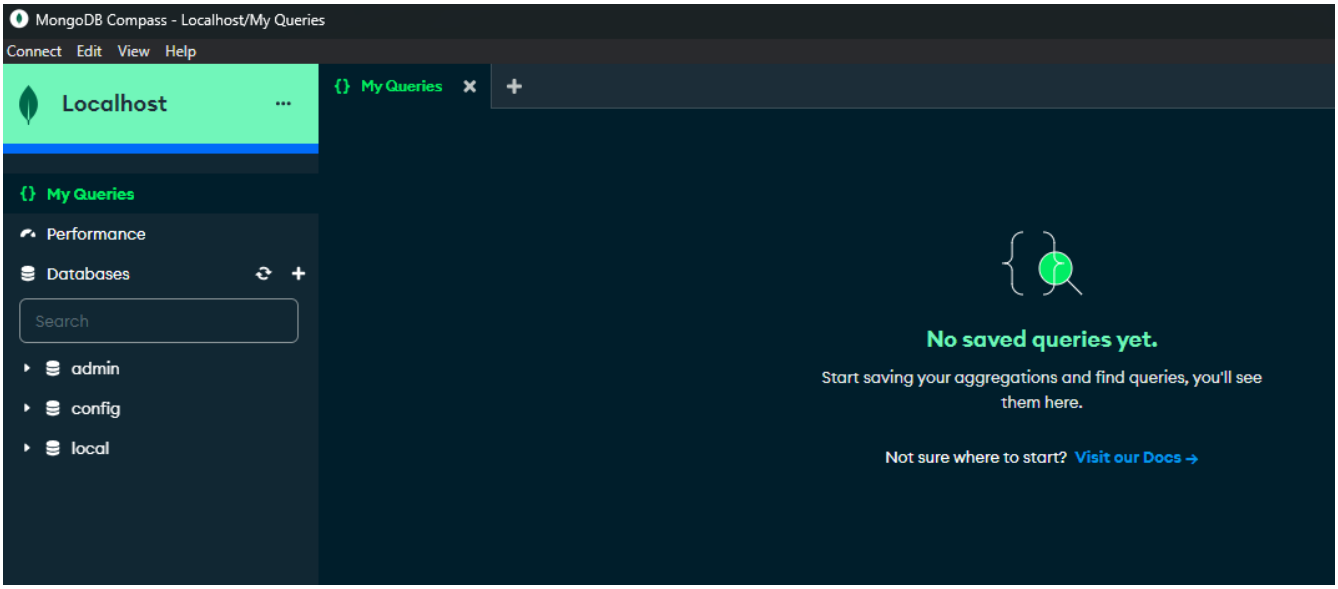

Figure 4. Connected Database

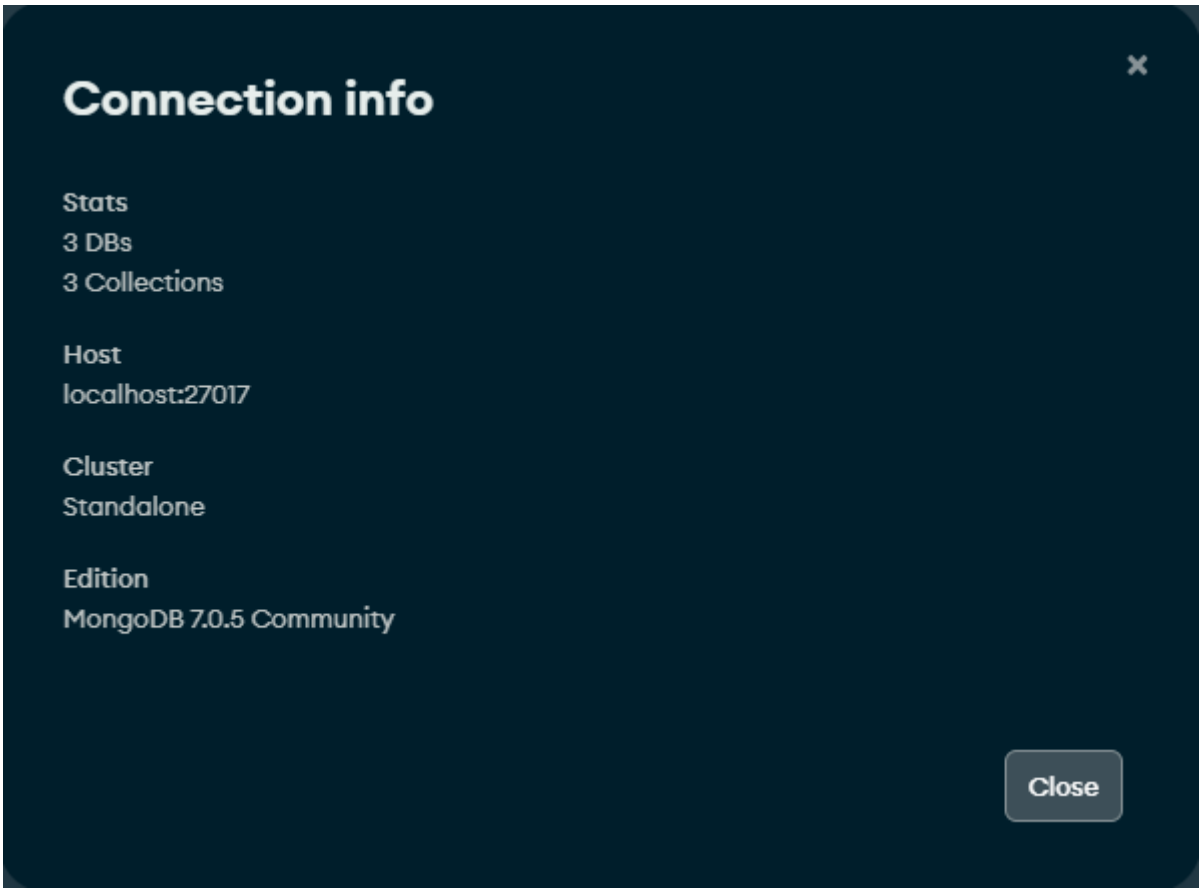

Figure 5. Default connection settings for localhost

Stopping the server is possible with:

```
net stop MongoDB
```

```
PS C:\Users\Andi> net stop MongoDb
The MongoDB Server (MongoDB) service is stopping.
The MongoDB Server (MongoDB) service was stopped successfully.

PS C:\Users\Andi>
```

Figure 6. Stopping the Database

1.2. Import Data

Create new database and collection

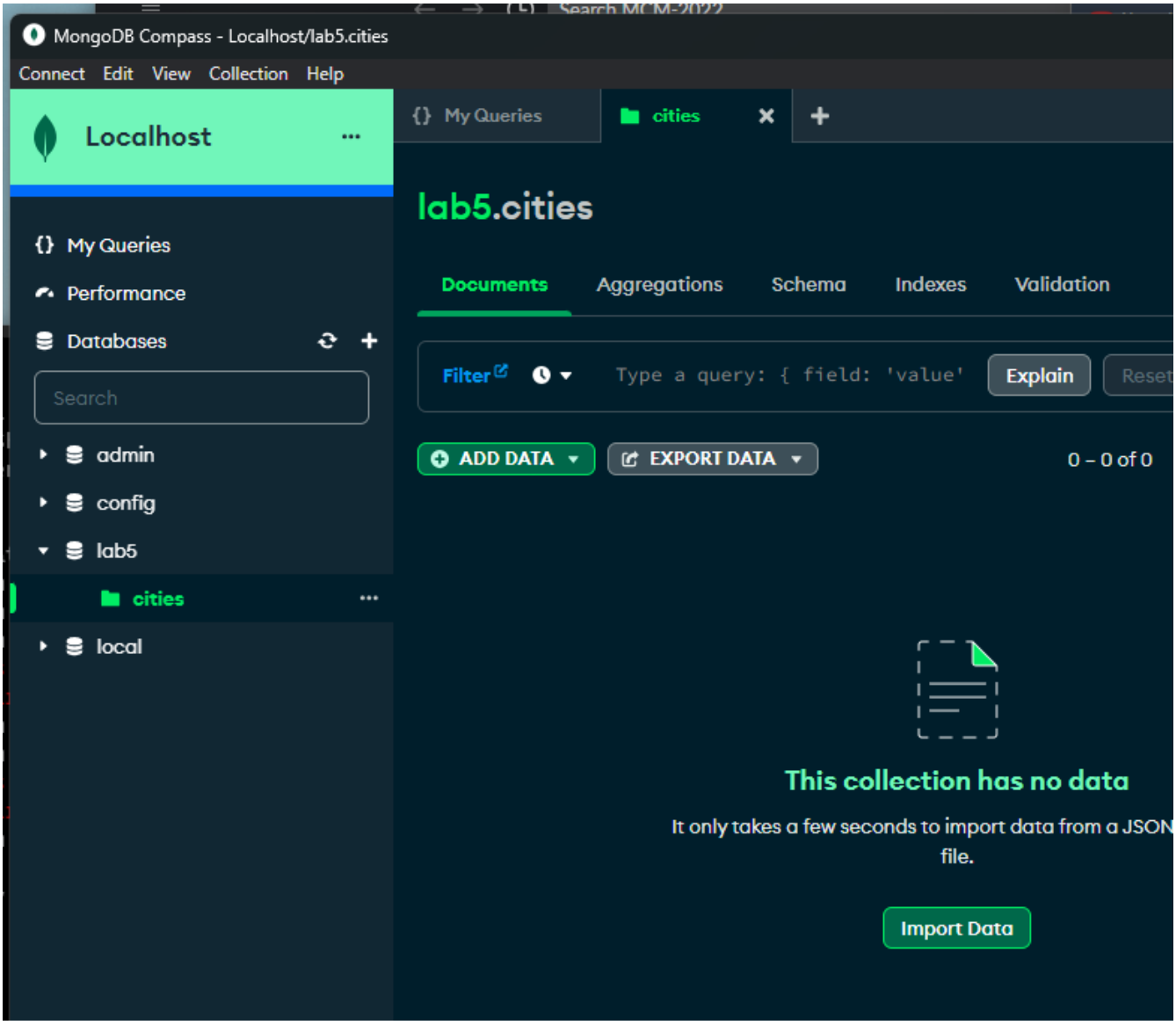

Figure 7. Database

Create missing collections and add corresponding data from "dataset.zip".

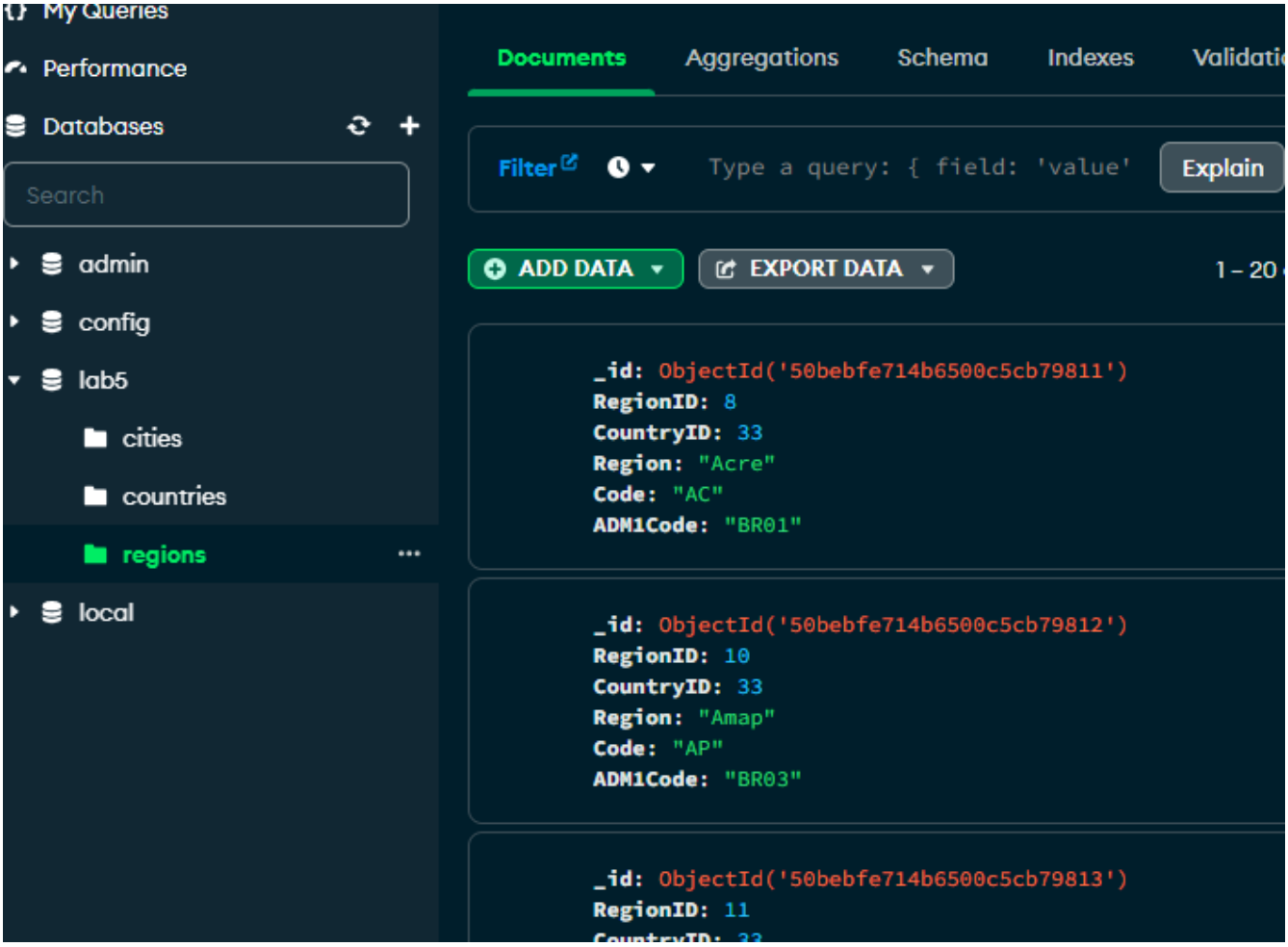

Figure 8. Imported data

1.3. Query Data

Connect via `mongosh`. Switch database with `use lab5`.

1.3.1. Select all Austrian cities (countryID = 15)!

```
lab5> db.cities.find({CountryID: 15})
[
  {
    _id: ObjectId("50bebc7714b6500c5cb78ffe"),
    CityId: 3352,
    CountryID: 15,
    RegionID: 1083,
    City: 'Abtenau',
    Latitude: 47.54999923706055,
    Longitude: 13.35000038146973,
```

Figure 9. All Austrian cities

1.3.2. Select all Austrian cities in ascending order!

```
]
Type "it" for more
lab5> db.cities.find({CountryID: 15}).sort({City: 1})
[
  {
    _id: ObjectId("50bebc7714b6500c5cb78ffe"),
    CityId: 3352,
    CountryID: 15,
    RegionID: 1083,
    City: 'Abtenau',
    Latitude: 47.54999923706055,
    Longitude: 13.35000038146973,
    TimeZone: '+01:00',
    DmaId: 0,
    Code: 'ABTE'
  },
  {
```

Figure 10. Ascending

1.3.3. Select all Austrian cities in descending order!

```
Type "it" for more
lab5> db.cities.find({CountryID: 15}).sort({City: -1})
[
  {
    _id: ObjectId("50bebe6014b6500c5cb79482"),
    CityId: 13801,
    CountryID: 15,
    RegionID: 1077,
    City: 'Zwettl ',
    Latitude: 48.61700057983398,
    Longitude: 15.16699981689453,
    TimeZone: '+01:00',
    DmaId: 0,
    Code: 'ZWET'
  },
  {
    _id: ObjectId("50bebe3314b6500c5cb79414"),
    CityId: 12867,
    CountryID: 15,
```

Figure 11. Descending

1.3.4. Select the number of Austrian cities that are included in the dataset!

```
Type "it" for more
lab5> db.cities.find({CountryID: 15}).count()
54
```

Figure 12. Count

1.3.5. Select solely the city names of all Austrian cities!

```
lab5> db.cities.find({CountryID: 15}, {City: 1})
[
  { _id: ObjectId("50bebc7714b6500c5cb78ffe"), City: 'Abtenau' },
  { _id: ObjectId("50bebc7714b6500c5cb78fff"), City: 'Graz' },
  { _id: ObjectId("50bebc7814b6500c5cb79000"), City: 'Kitzbuhel' },
  { _id: ObjectId("50bebc7814b6500c5cb79001"), City: 'Lilienfeld' },
  { _id: ObjectId("50bebc7814b6500c5cb79002"), City: 'Linz' },
  { _id: ObjectId("50bebc7914b6500c5cb79003"), City: 'Salzburg' },
  { _id: ObjectId("50bebc7914b6500c5cb79004"), City: 'Solden' },
  { _id: ObjectId("50bebc7914b6500c5cb79005"), City: 'Stegersbach' },
  { _id: ObjectId("50bebc7a14b6500c5cb79006"), City: 'Steyr' },
  { _id: ObjectId("50bebde014b6500c5cb79340"), City: 'Innsbruck' },
  { _id: ObjectId("50bebde014b6500c5cb79341"), City: 'Vienna' },
  { _id: ObjectId("50bebe1d14b6500c5cb793db"), City: 'Hohenems' },
  { _id: ObjectId("50bebe1f14b6500c5cb793e1"), City: 'Bregenz' },
  { _id: ObjectId("50bebe2314b6500c5cb793e9"), City: 'Baden' },
  { _id: ObjectId("50bebe2414b6500c5cb793ea"), City: 'D' },
  { _id: ObjectId("50bebe3314b6500c5cb79414"), City: 'Zirl' },
  { _id: ObjectId("50bebe3914b6500c5cb79422"), City: 'W' },
  { _id: ObjectId("50bebe4b14b6500c5cb79451"), City: 'Korneuburg' },
  { _id: ObjectId("50bebe4d14b6500c5cb79457"), City: 'Wieselburg' },
  { _id: ObjectId("50bebe4f14b6500c5cb7945d"), City: 'Pinkafeld' }
]
```

Figure 13. City names

1.3.6. Select all countries, which exhibit a population between 15 and 20 millions of people!

Figure 14. Population

1.4. Update Data

1.4.1. Increase the population of Austria (countryID = 15) by 3 persons.

```
lab5> db.countries.updateOne({CountryId: 15}, {$inc: {Population: 3}})
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
lab5>
```

Figure 15. Increased population

1.4.2. Decrease the population of Austria by 3 persons.

```
lab5> db.countries.updateOne({CountryId: 15}, {$inc: {Population: -3}})
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
```

Figure 16. Decreased population

2. Azure Cosmos DB

2.1. Setup Cosmos DB

Select Azure Cosmos DB for MongoDB.

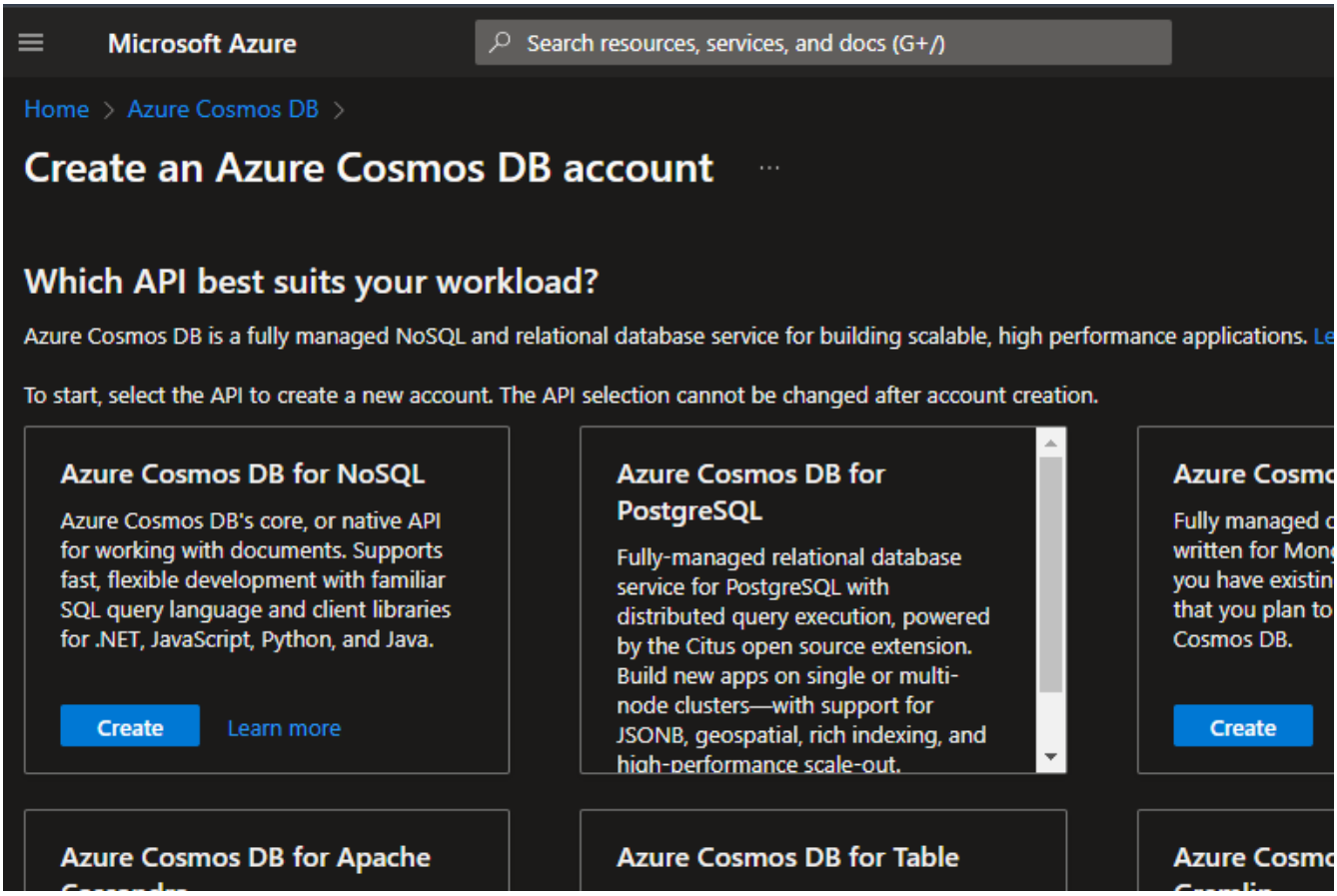

Figure 17. Select database

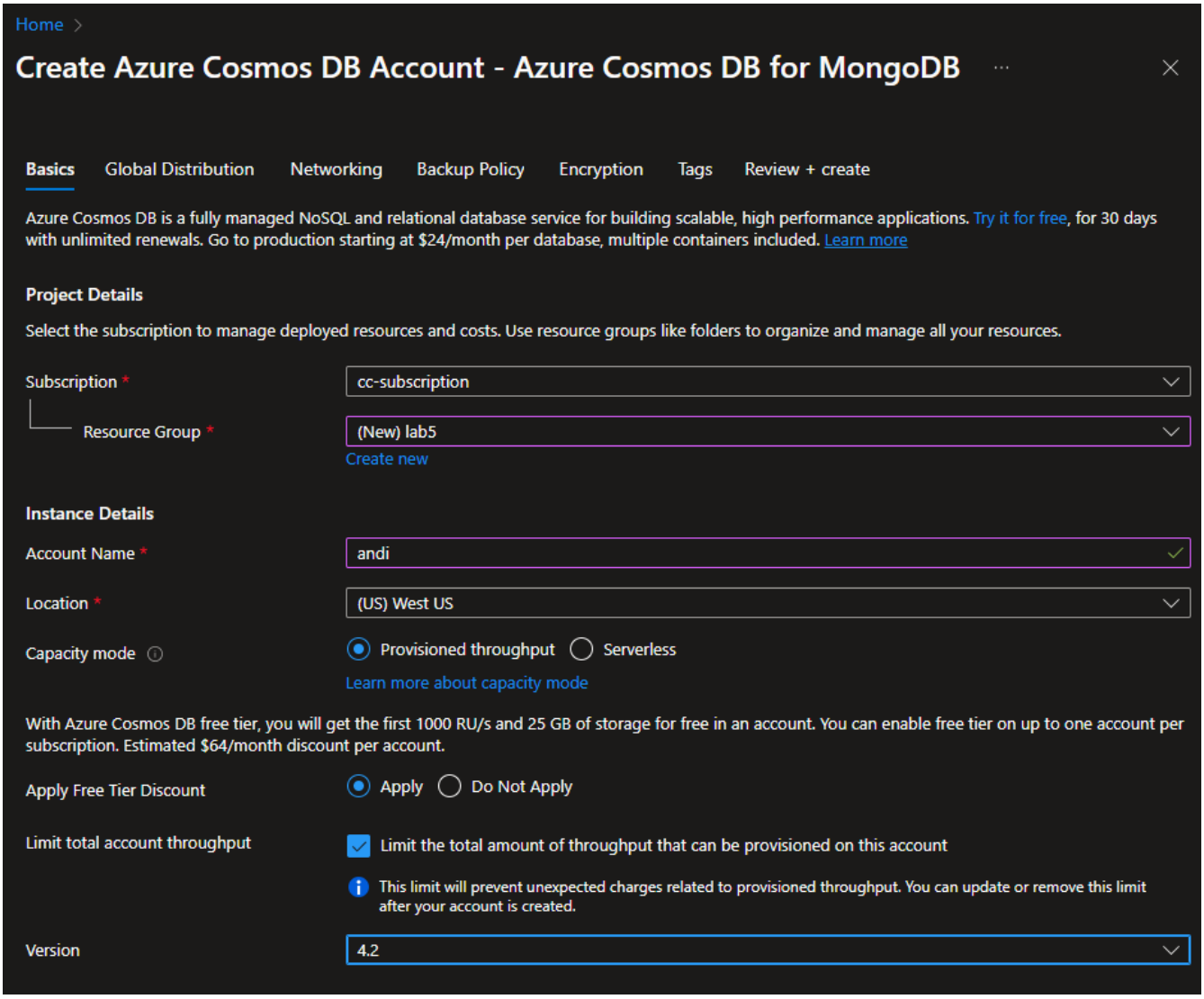

Figure 18. Azure Cosmos DB Configuration

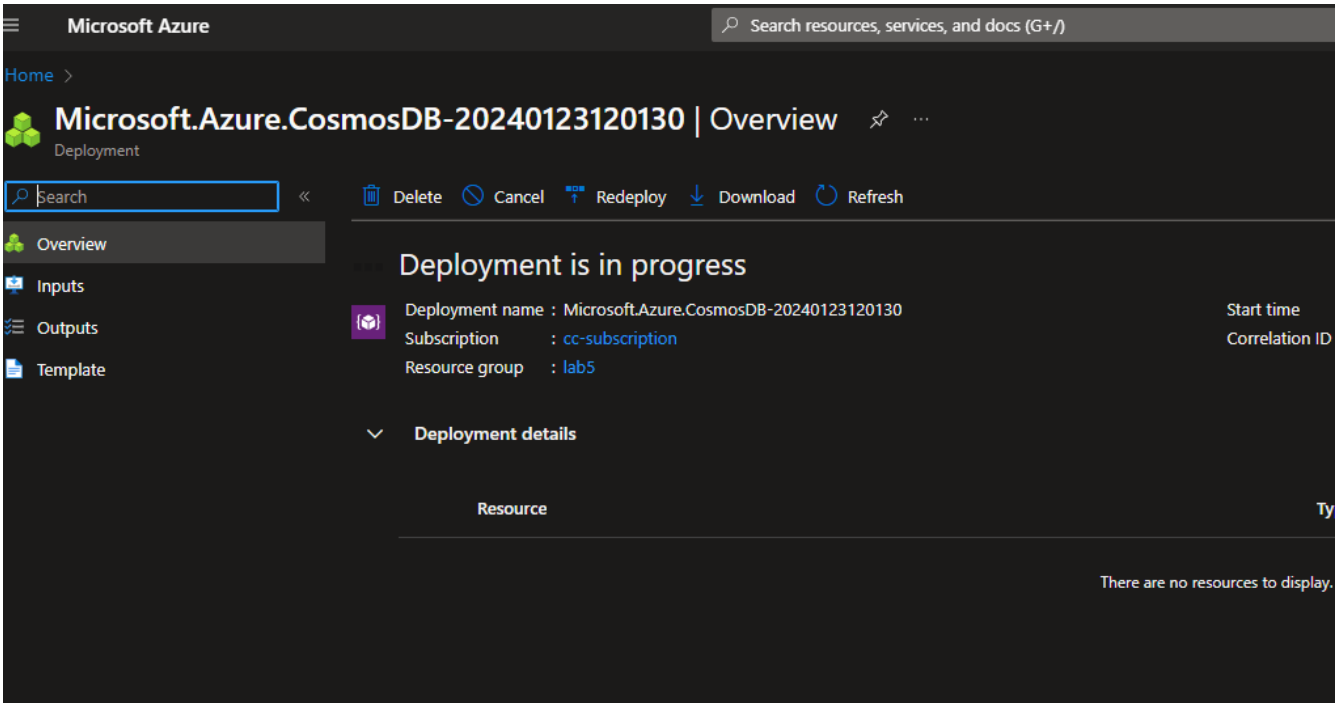

Figure 19. Created Azure Cosmos DB

2.2. Migrate Data

2.2.1. Export Data from MongoDB

```
PS C:\Users\Andi> cd .\Documents\Github\fh-mc-cc\e05
PS C:\Users\Andi\Documents\Github\fh-mc-cc\e05> mongodump.exe
2024-01-23T12:00:34.706+0100    writing admin.system.version to dump\admin\system.version.bson
2024-01-23T12:00:34.710+0100    done dumping admin.system.version (1 document)
2024-01-23T12:00:34.712+0100    writing lab5.countries to dump\lab5\countries.bson
2024-01-23T12:00:34.712+0100    writing lab5.regions to dump\lab5\regions.bson
2024-01-23T12:00:34.713+0100    writing lab5.cities to dump\lab5\cities.bson
2024-01-23T12:00:34.719+0100    done dumping lab5.countries (115 documents)
2024-01-23T12:00:34.730+0100    done dumping lab5.regions (1548 documents)
2024-01-23T12:00:34.739+0100    done dumping lab5.cities (2000 documents)
PS C:\Users\Andi\Documents\Github\fh-mc-cc\e05>
```

Figure 20. Dump

2.2.2. Upload all the files to a Storage Account

Create storage account and upload dump. Change access and find storage url.

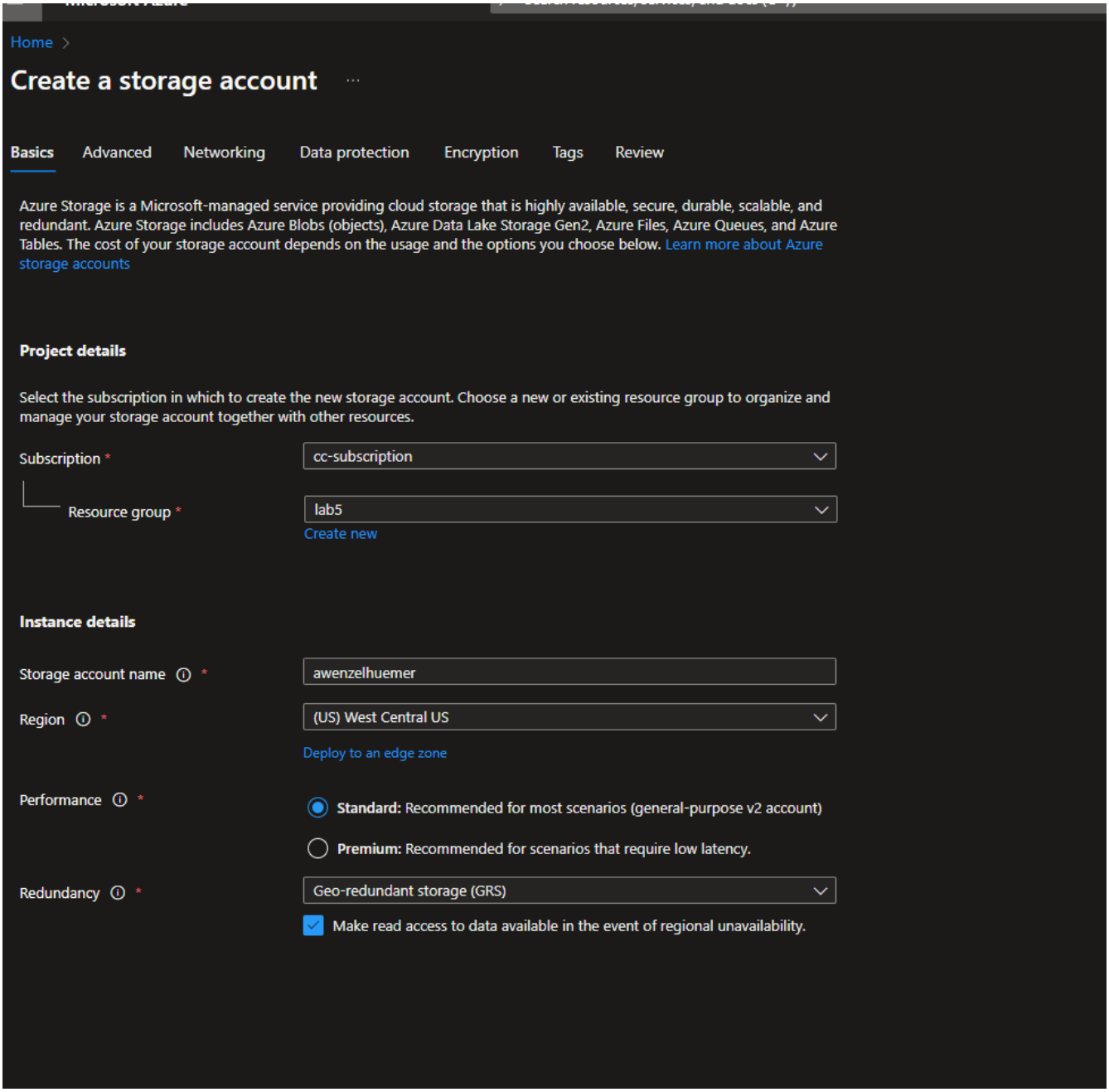

Figure 21. Create Storage account

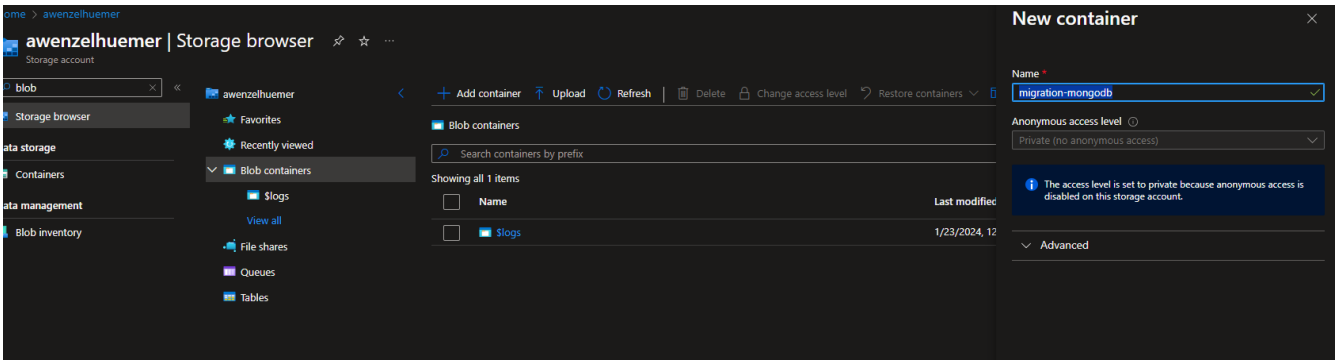

Figure 22. Add blob storage container

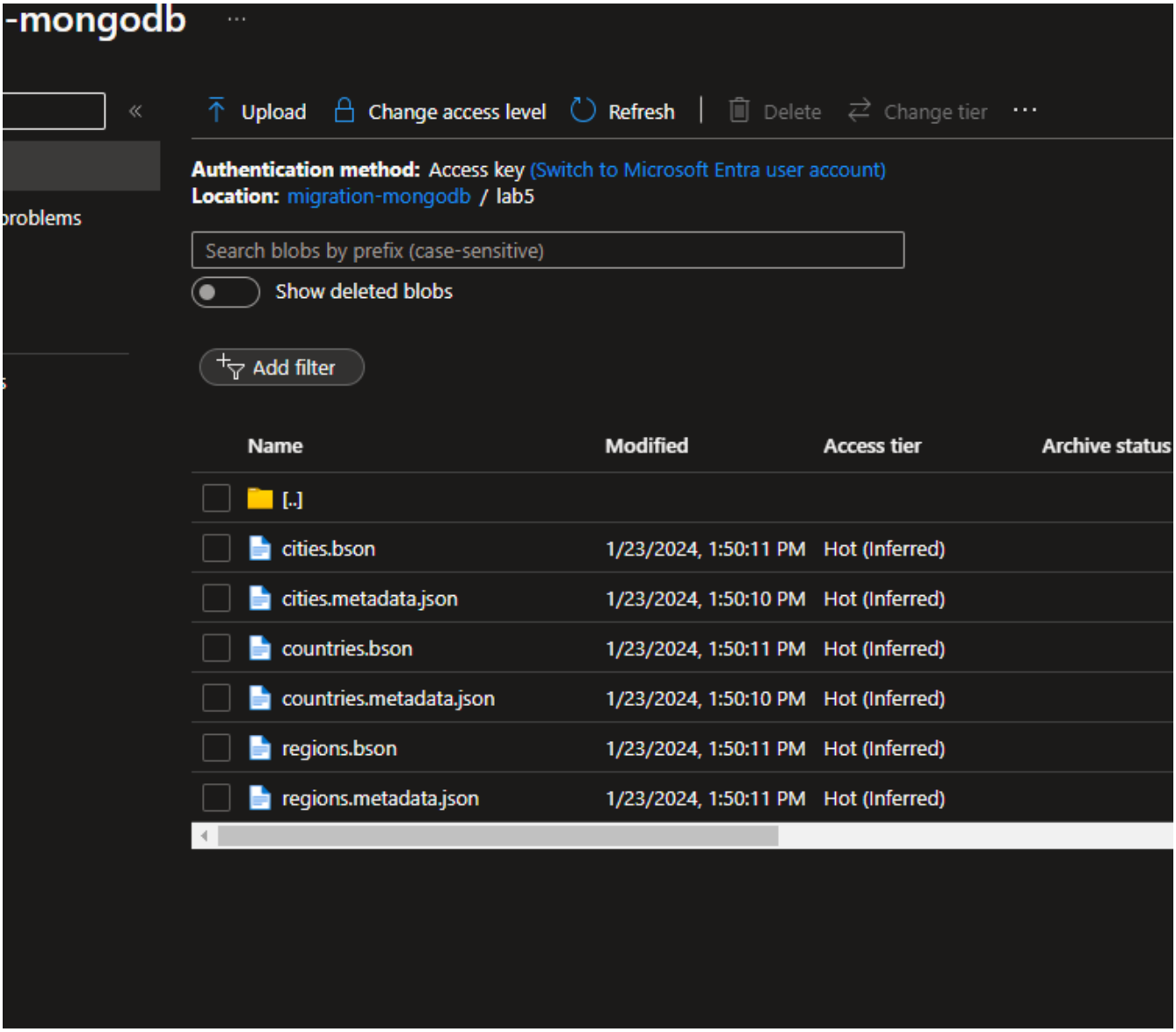

Figure 23. Upload dump

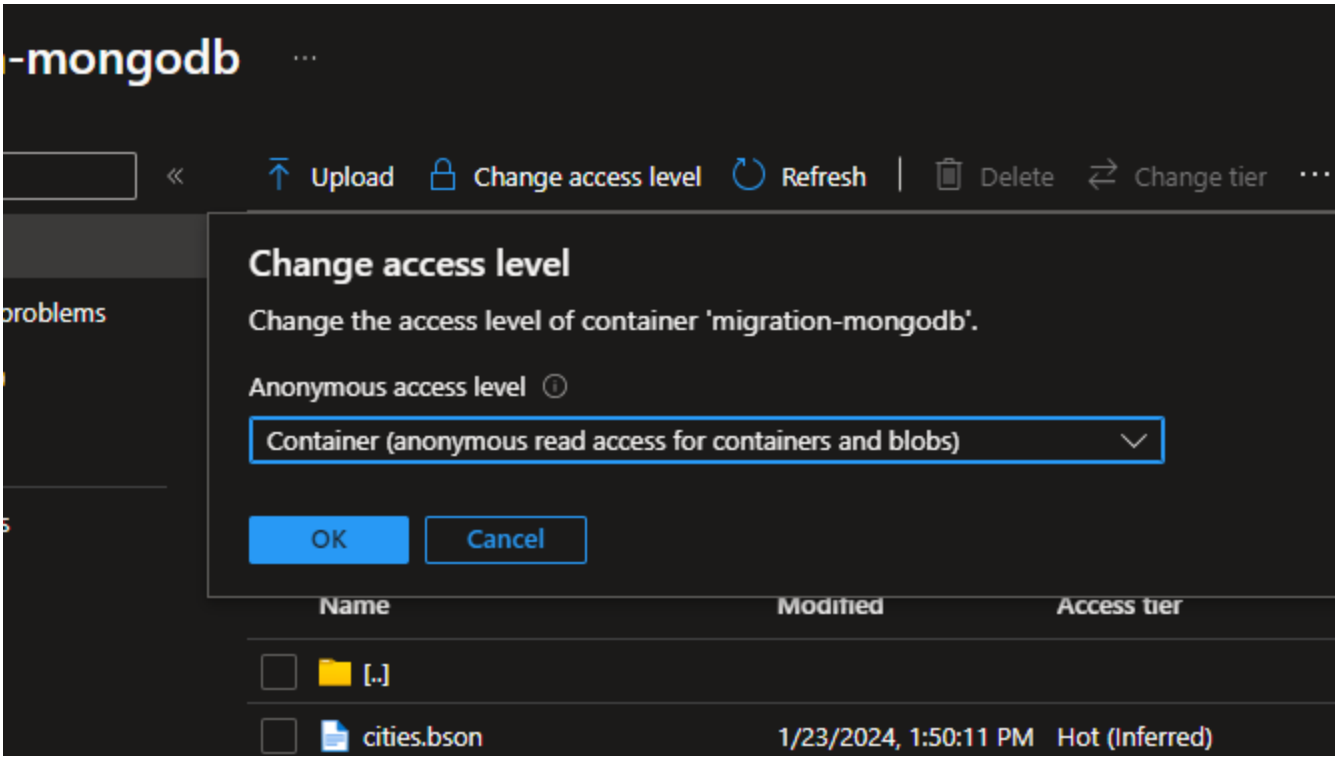

Figure 24. Enable public access

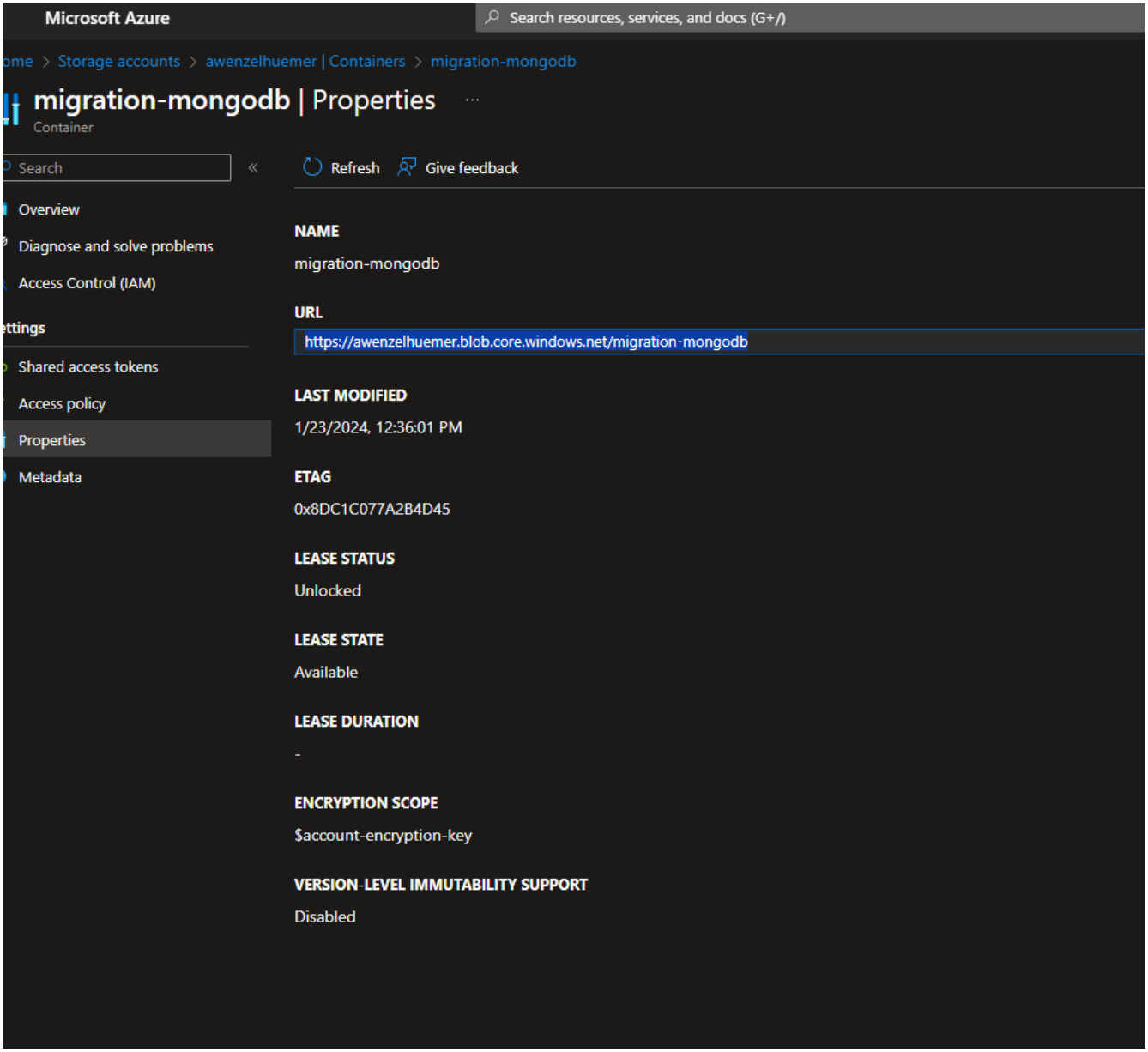

Figure 25. Find storage url

2.2.3. Azure Database Migration Service (offline)

Create migration service, add a new project and upload the dump from the storage account.

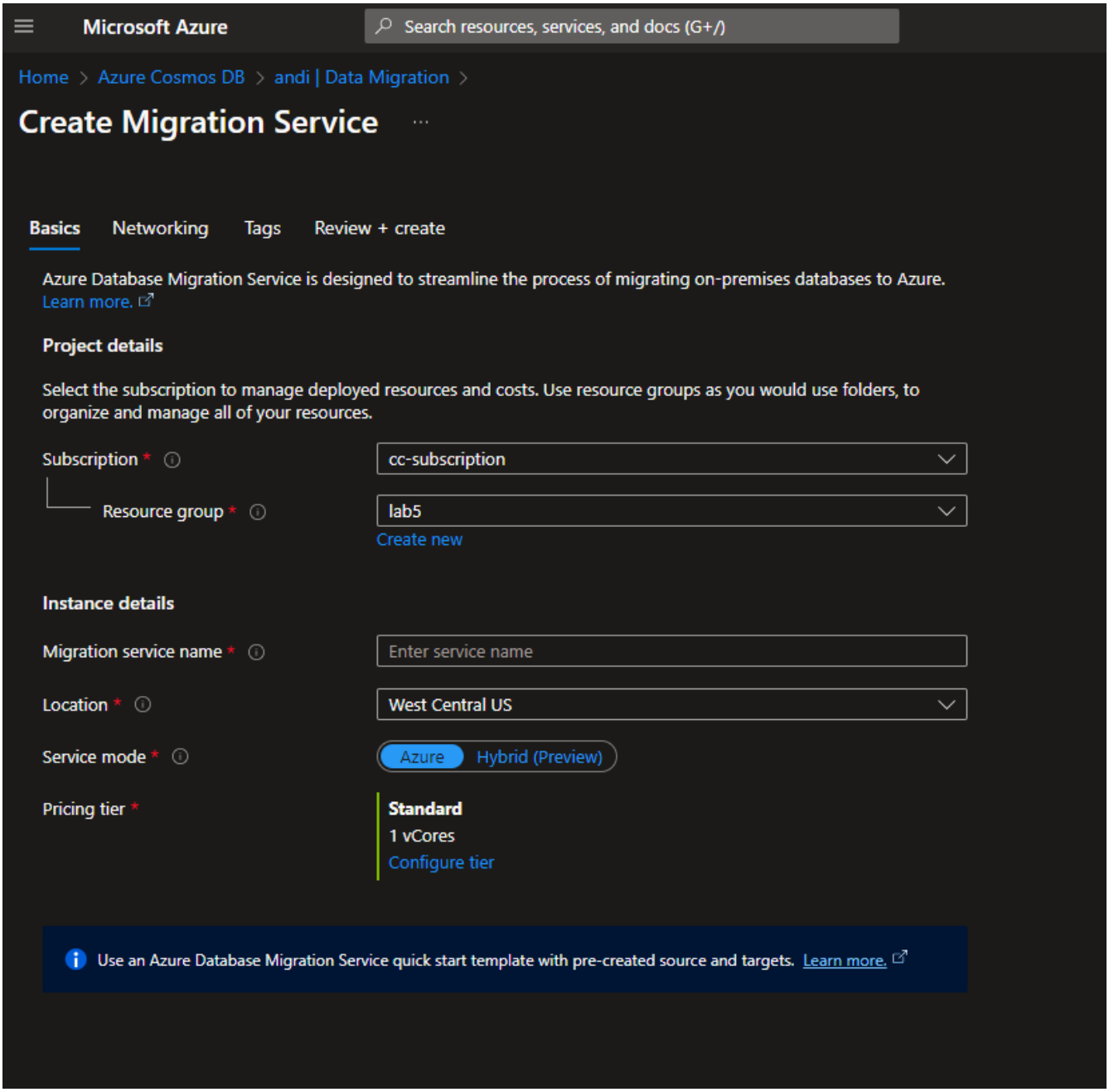

Figure 26. Create Azure Database Migration Service

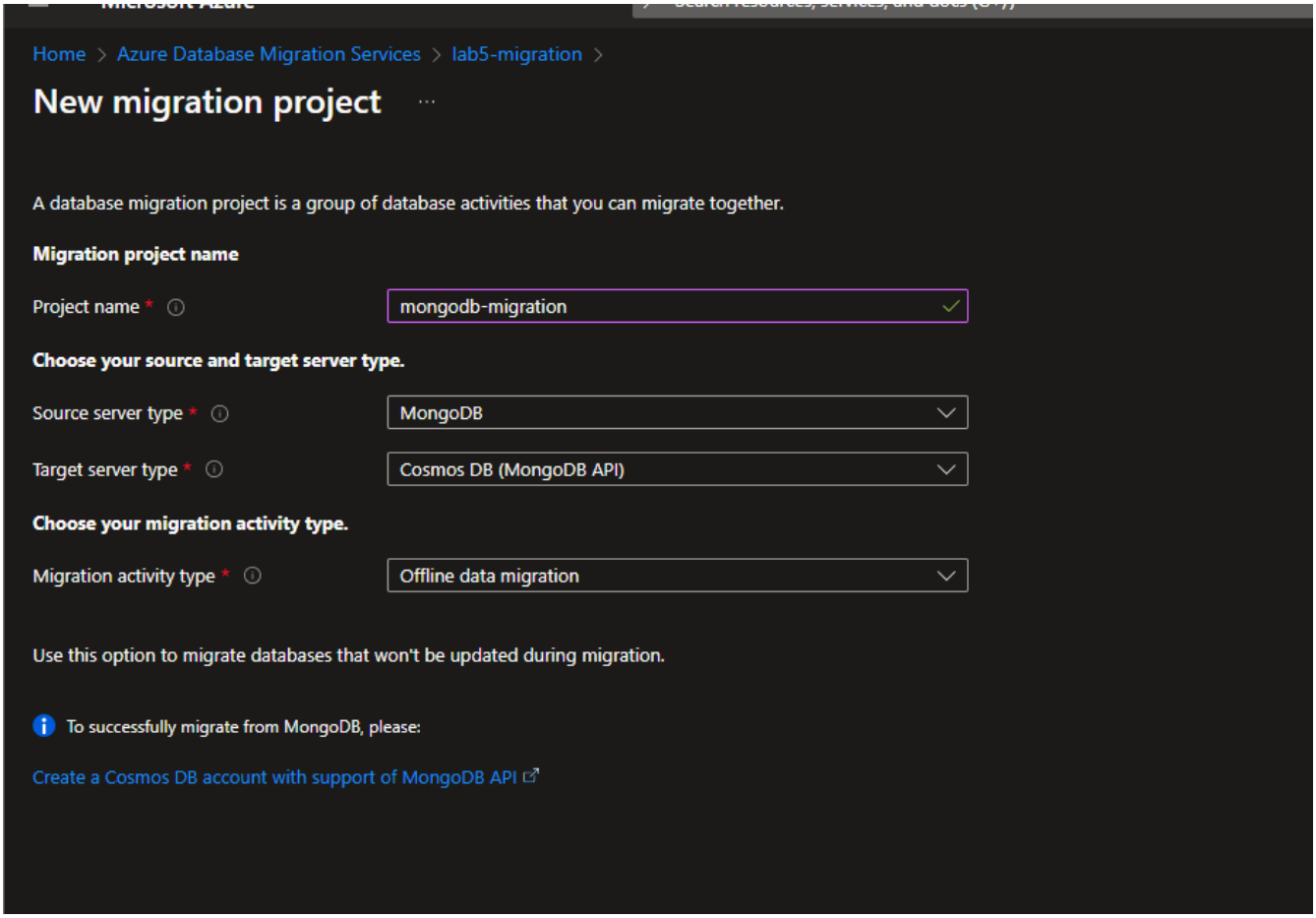

Figure 27. Create Azure Database Migration Project

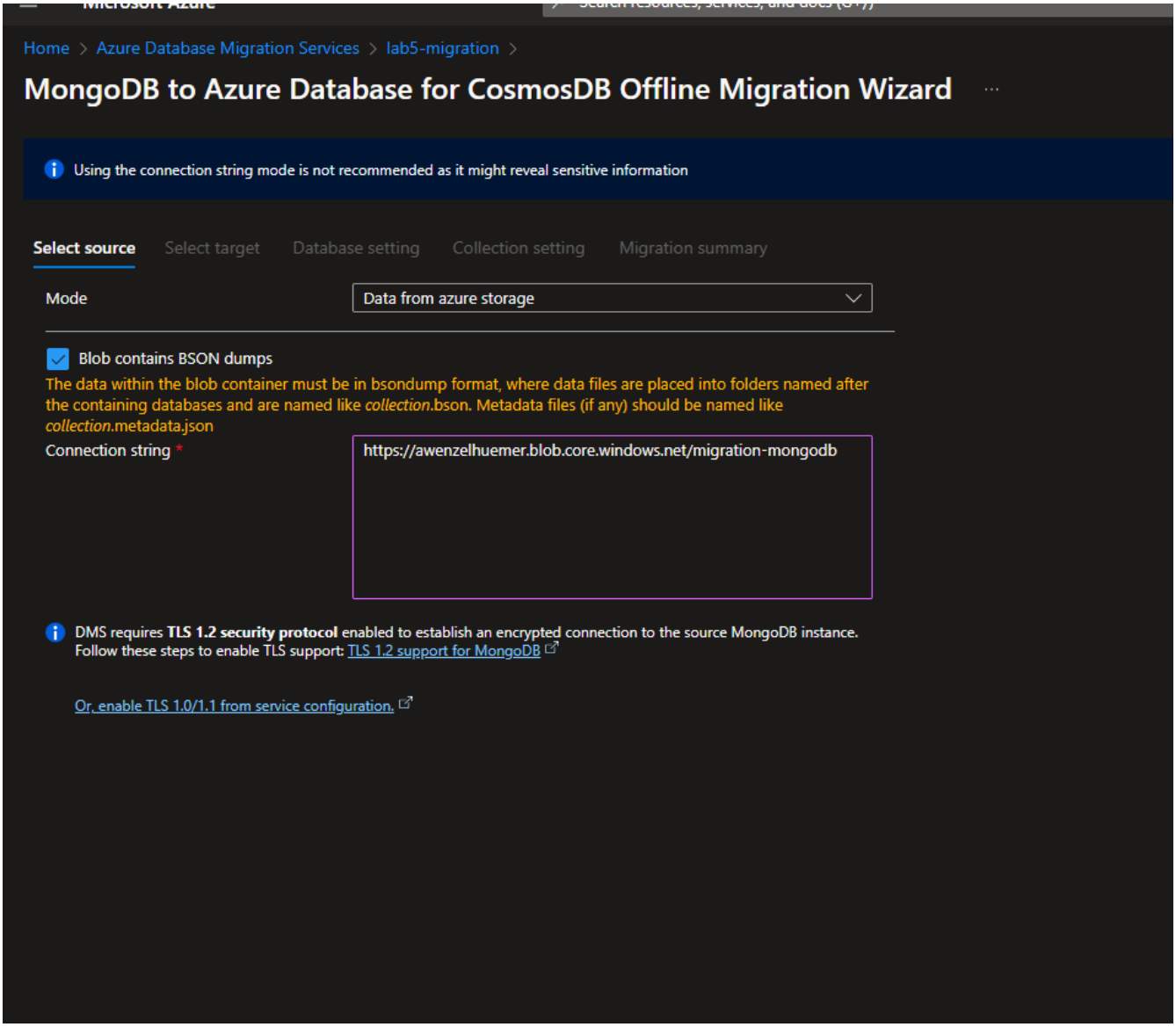

Figure 28. Offline Migration

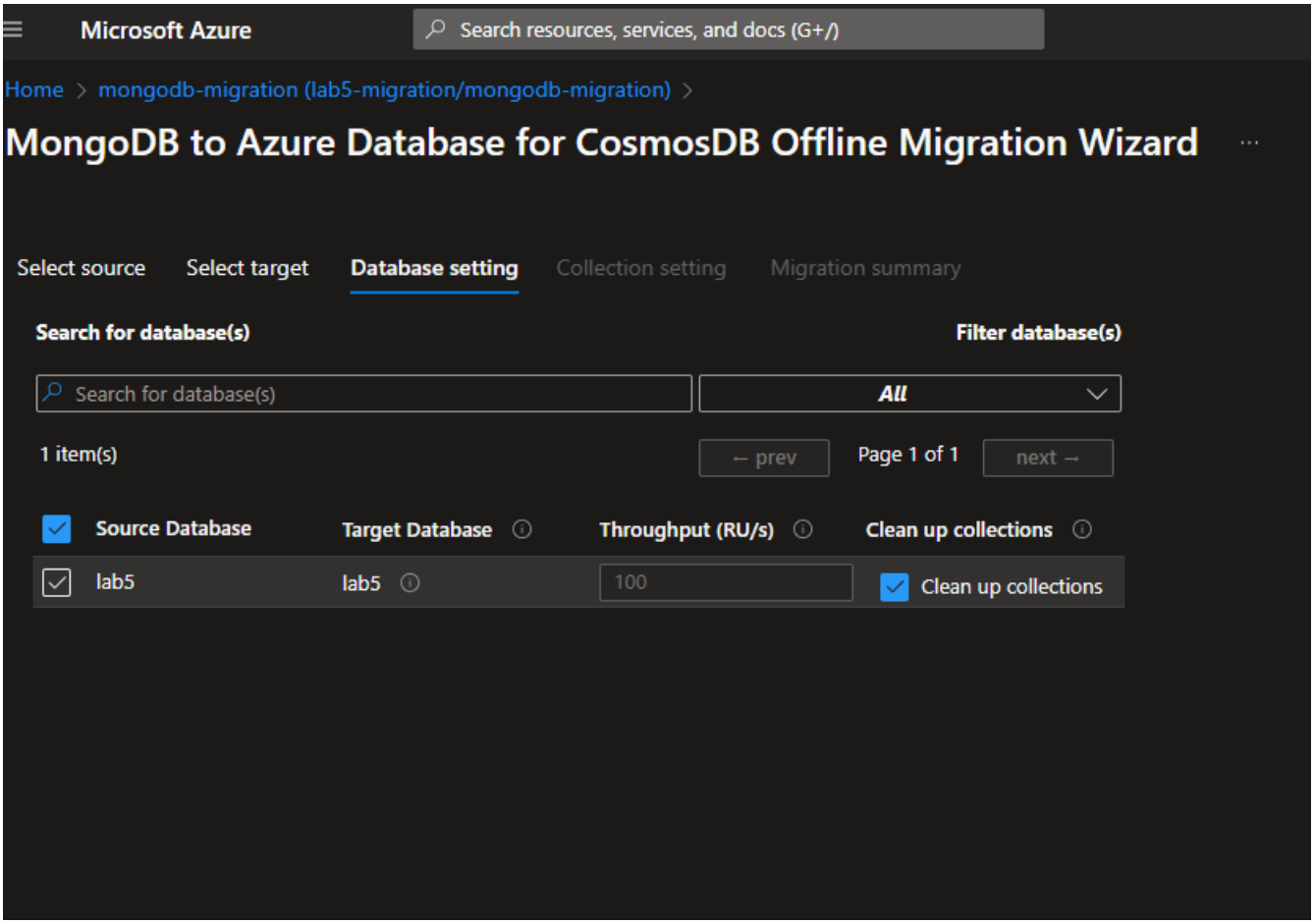

Figure 29. Database Selection

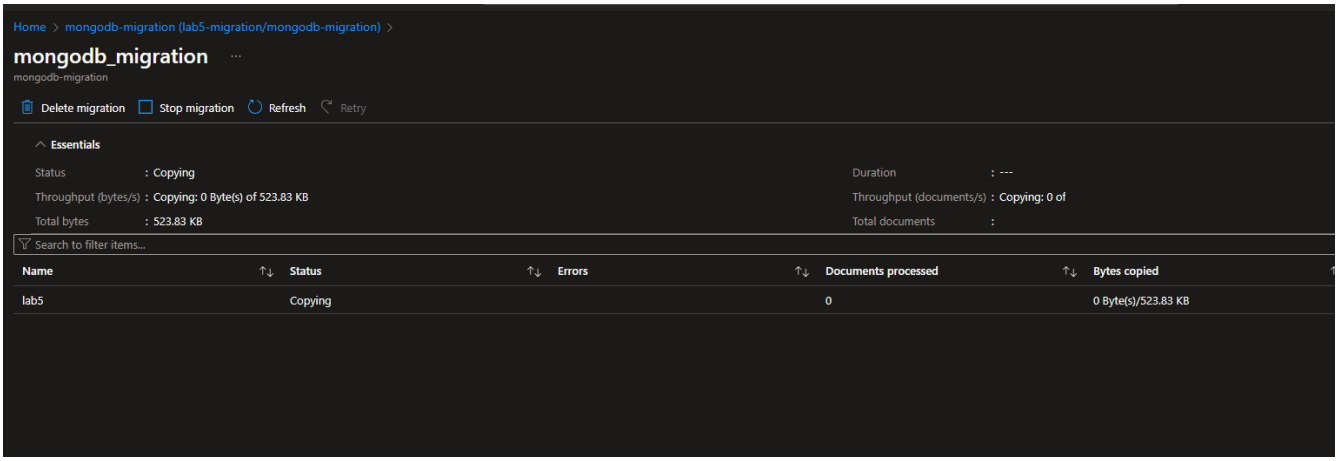

Figure 30. Running Migration

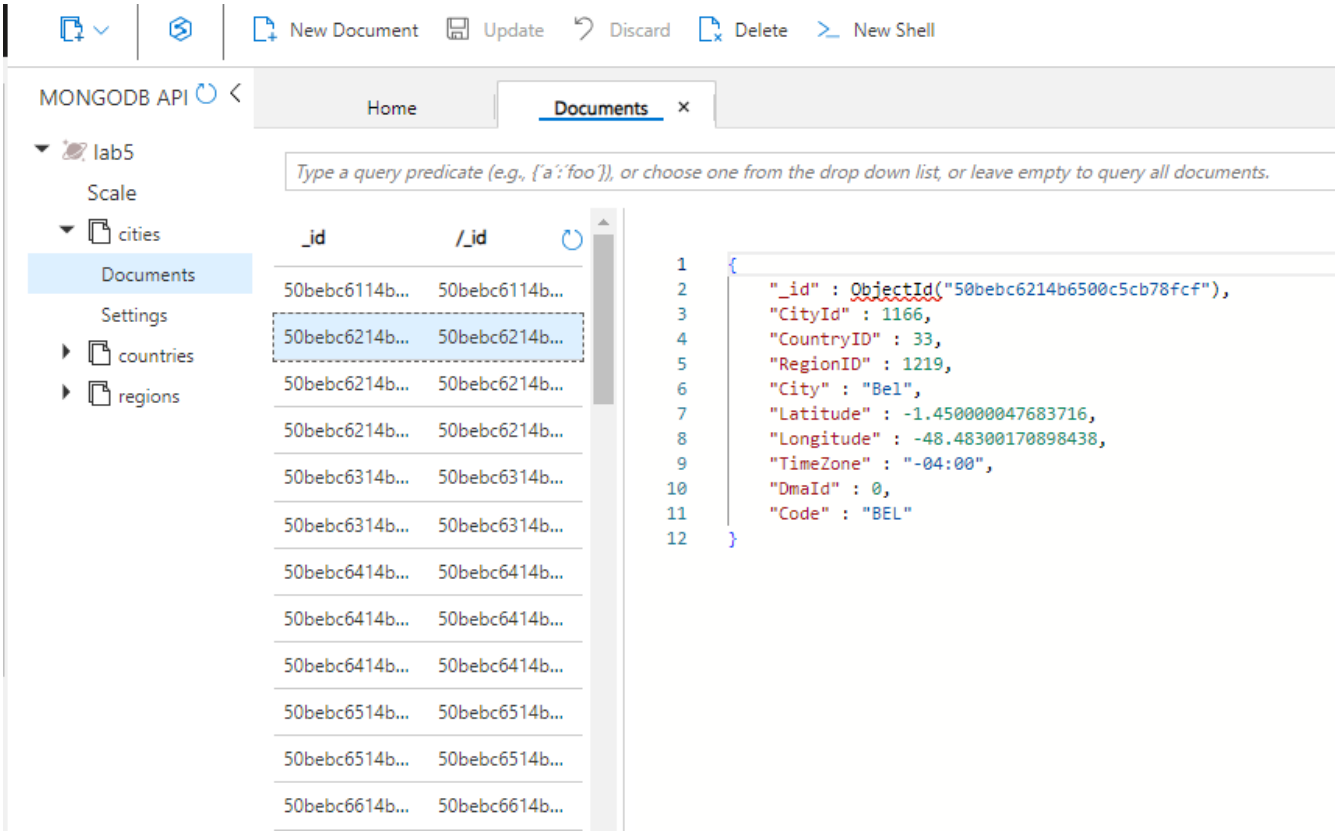

Figure 31. Imported Data

2.2.4. Query/Update Data

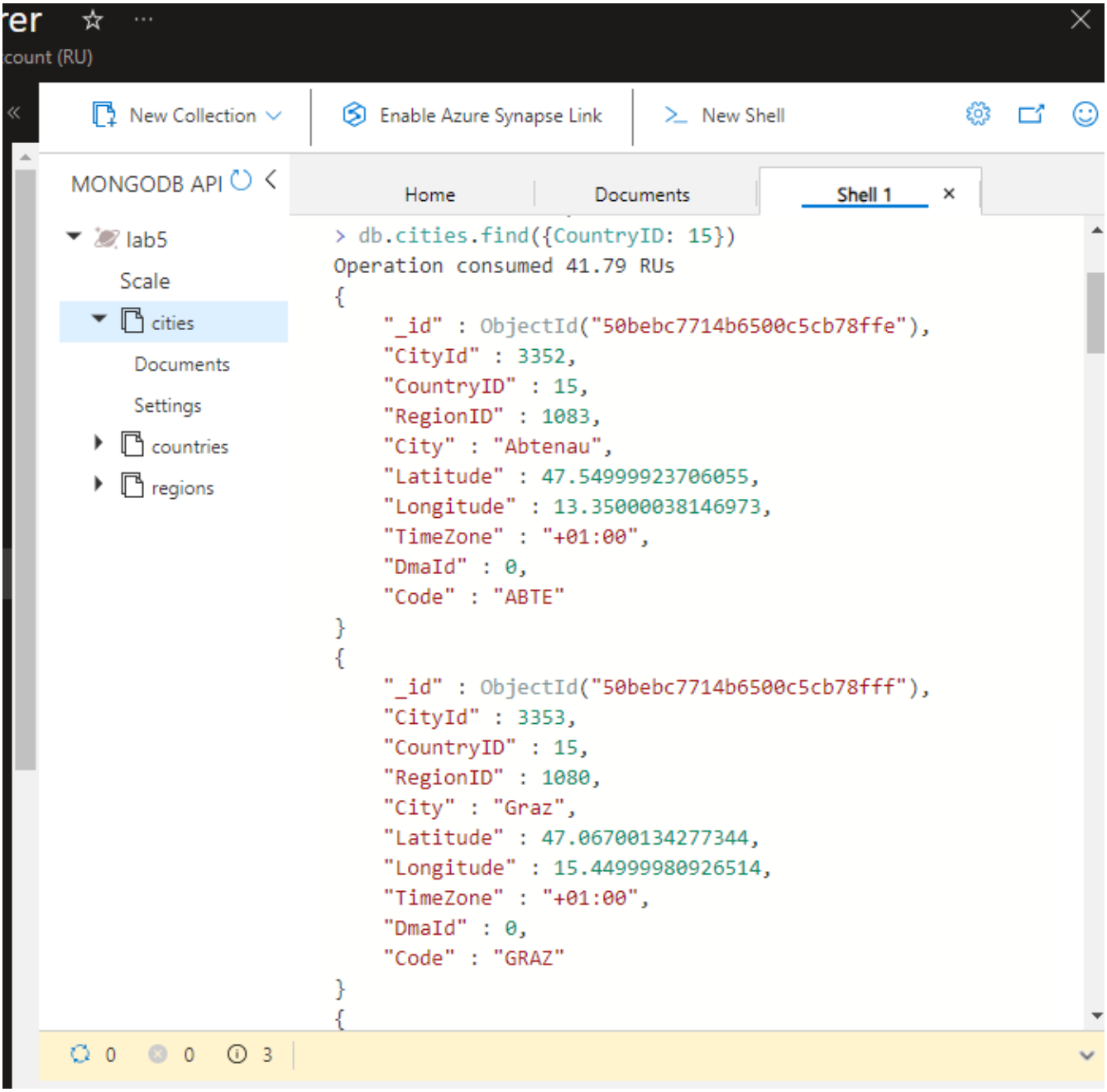

Figure 32. Query for all Austrian cities

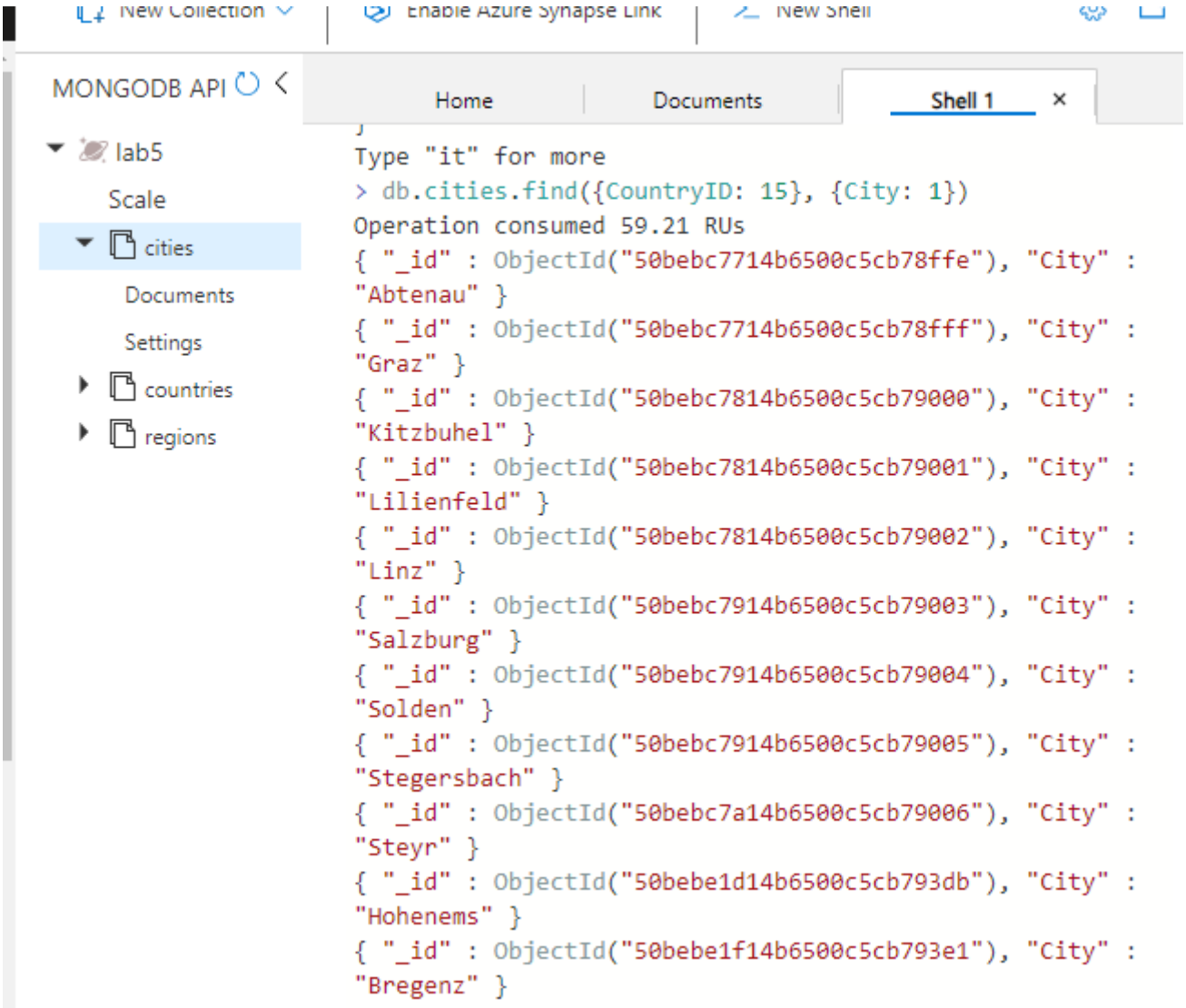

Figure 33. List cities

Executing a couple times

Figure 34. Update population