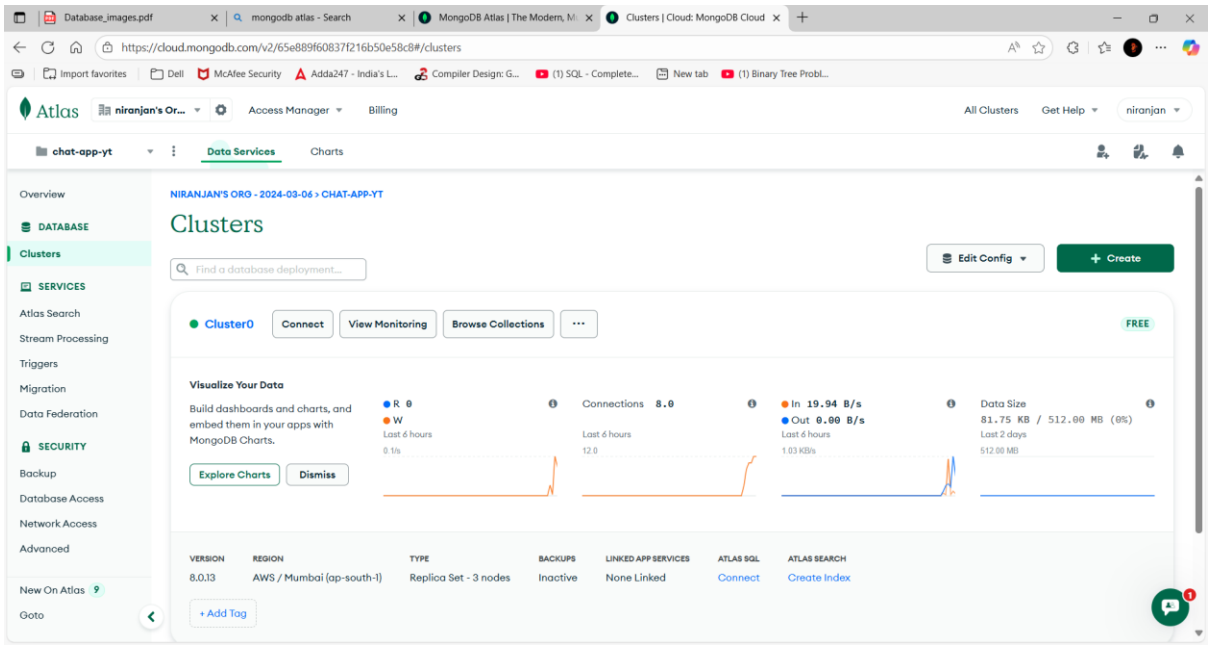
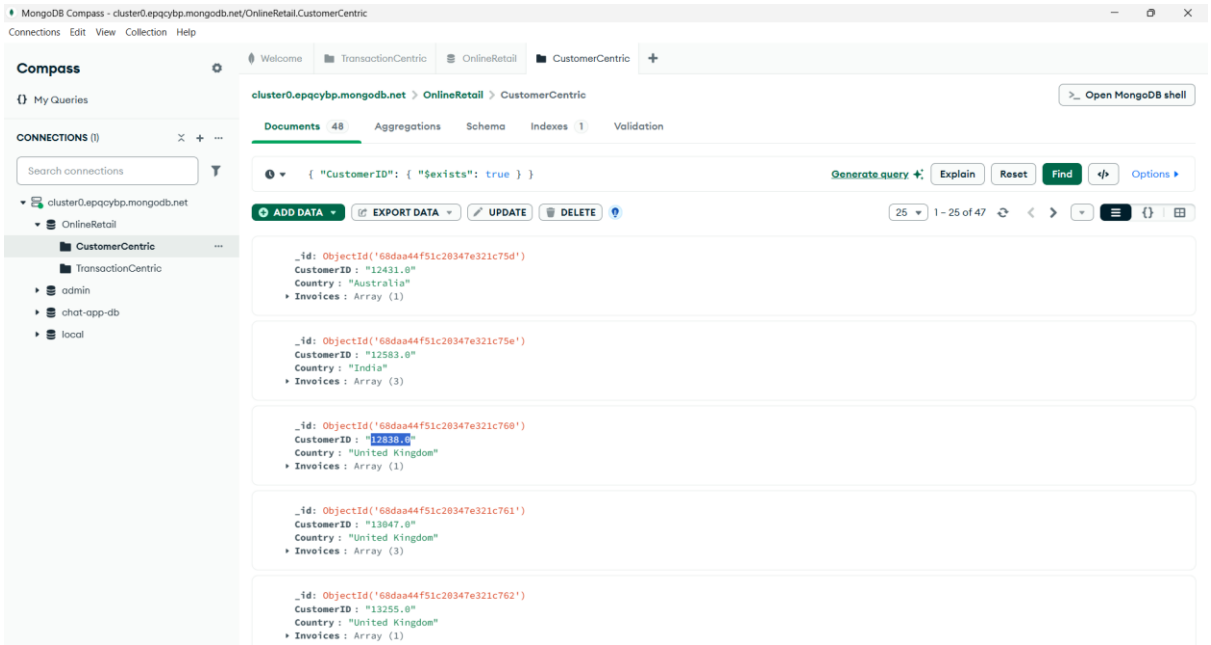
MongoDB Atlas + Compass Connection



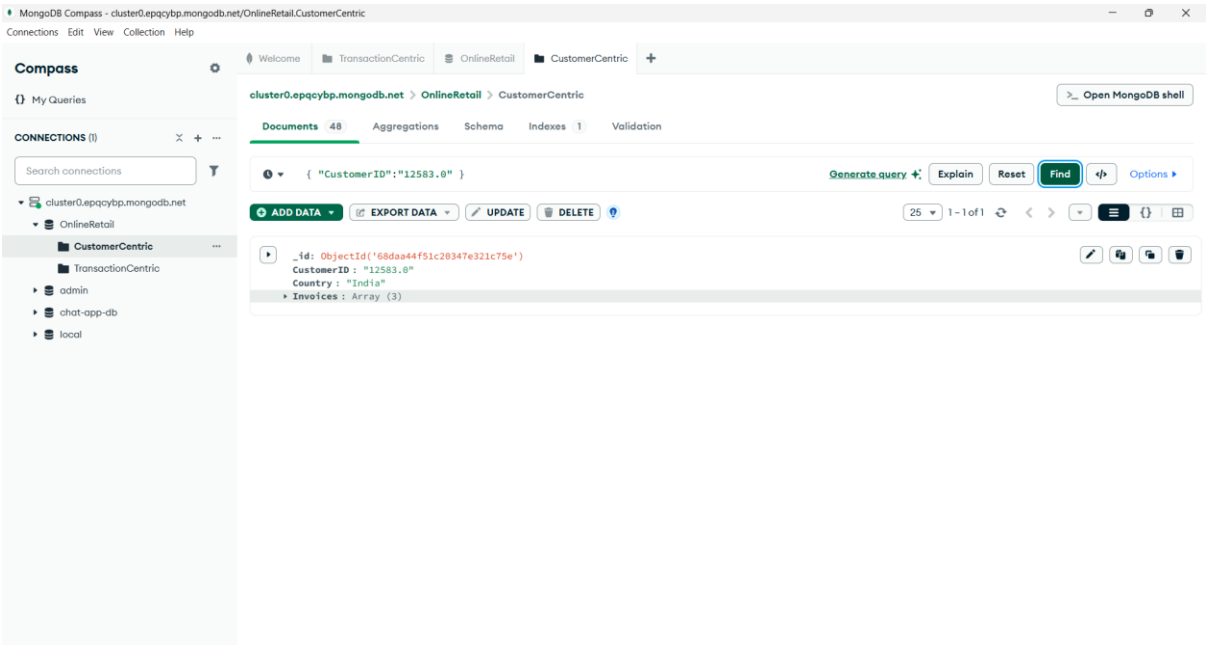
MongoDB (OnlineRetail) Database With Collections

CustomerCentric

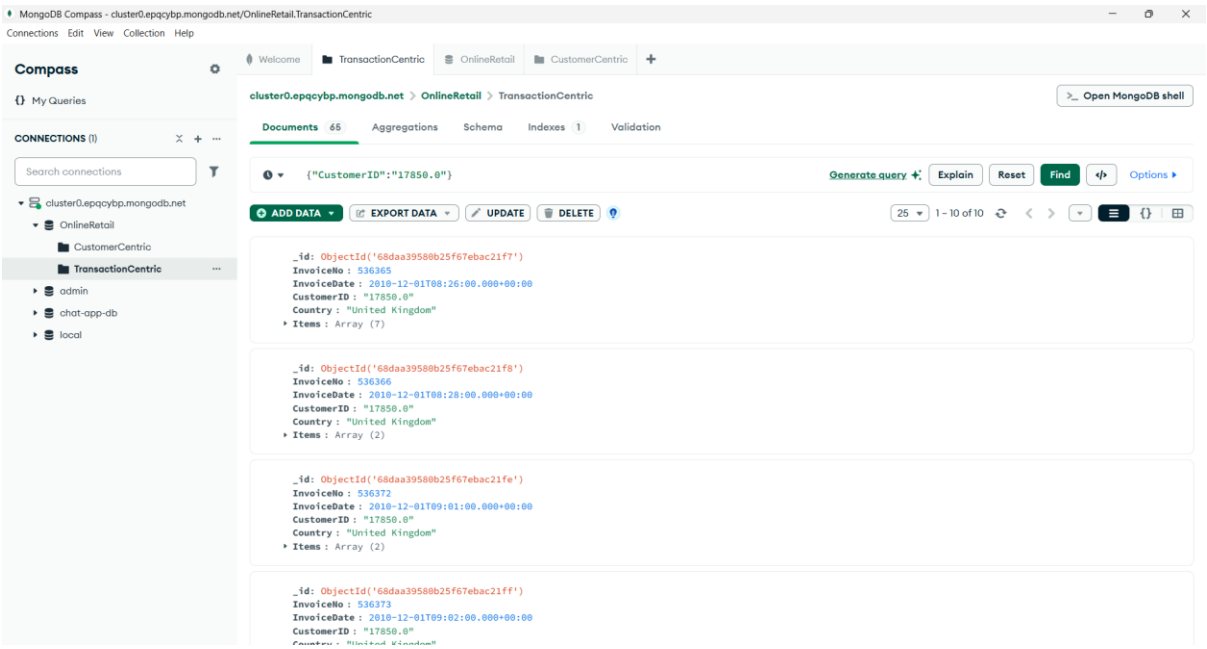
TransactionCentric



Filter Query in CustomerCentric Component

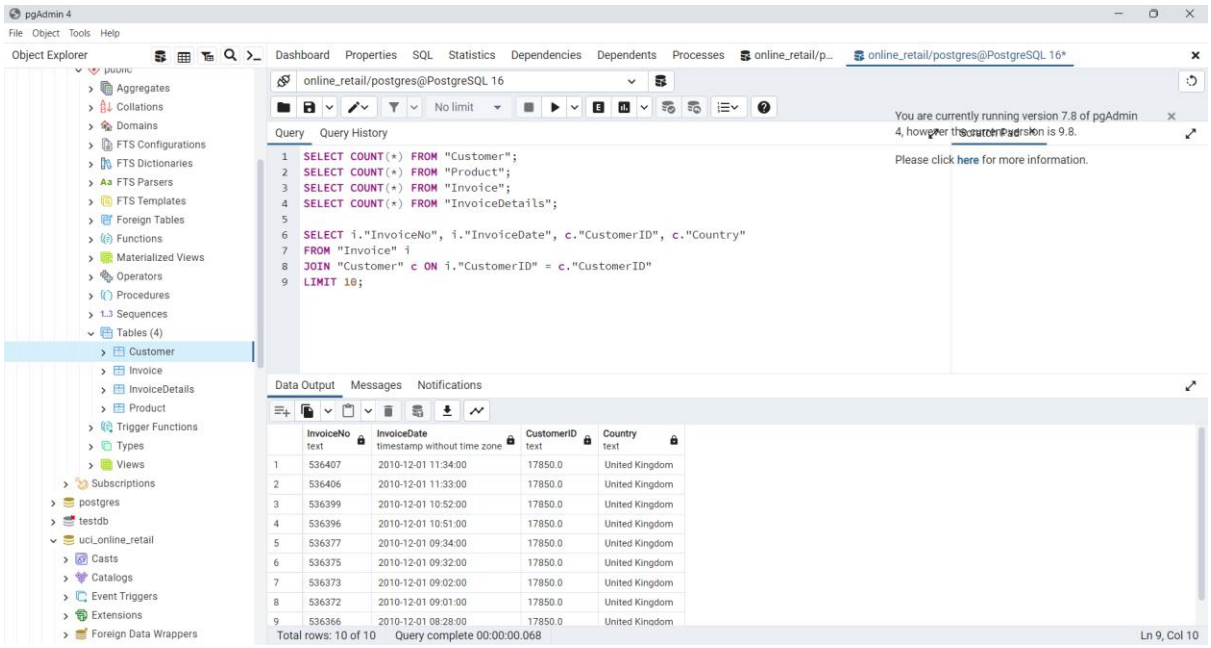


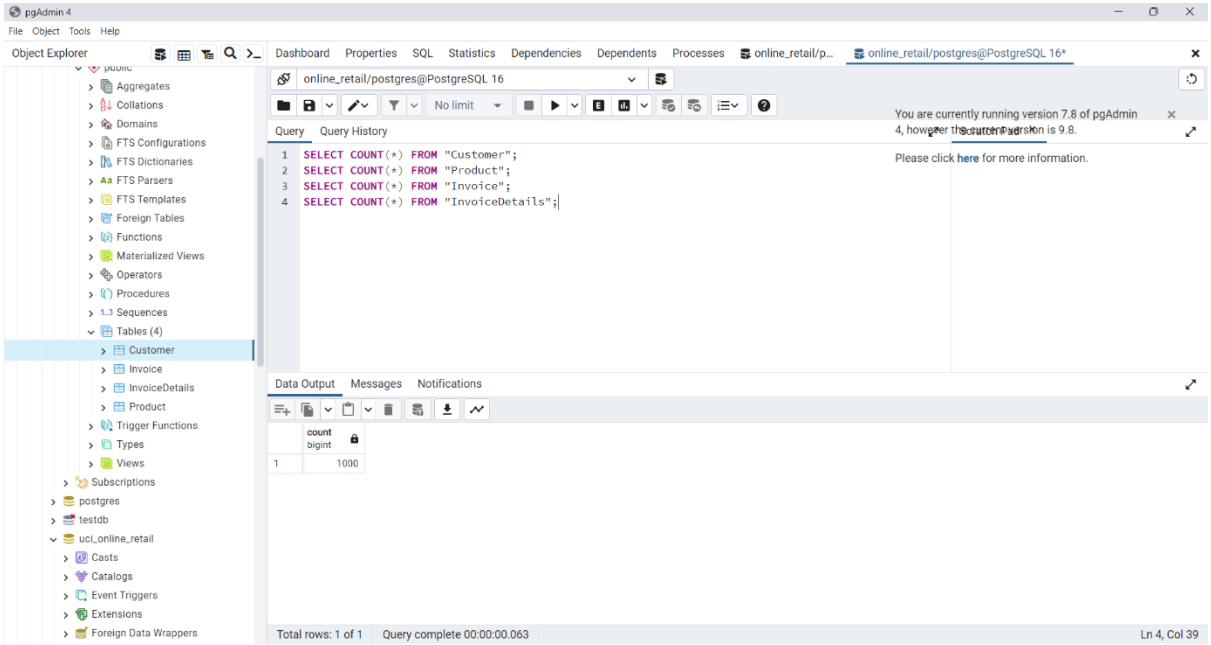
Filter Query in Transaction Centric:



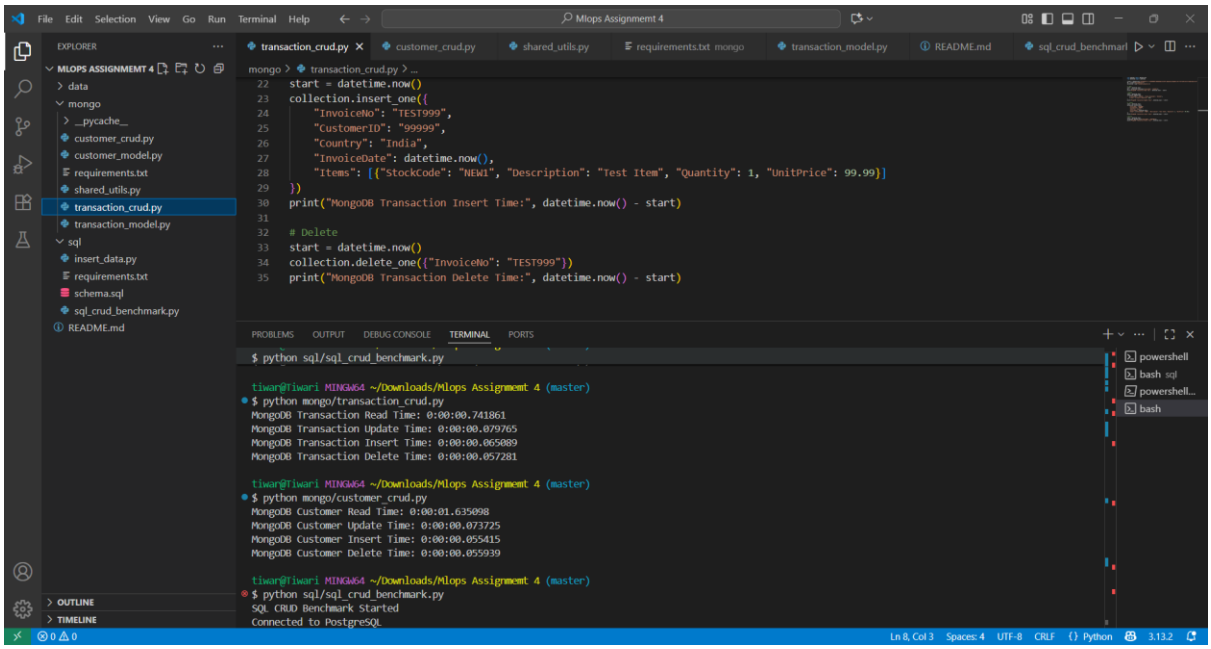
PostgreSQL : Database (online_retail)

Running Queries

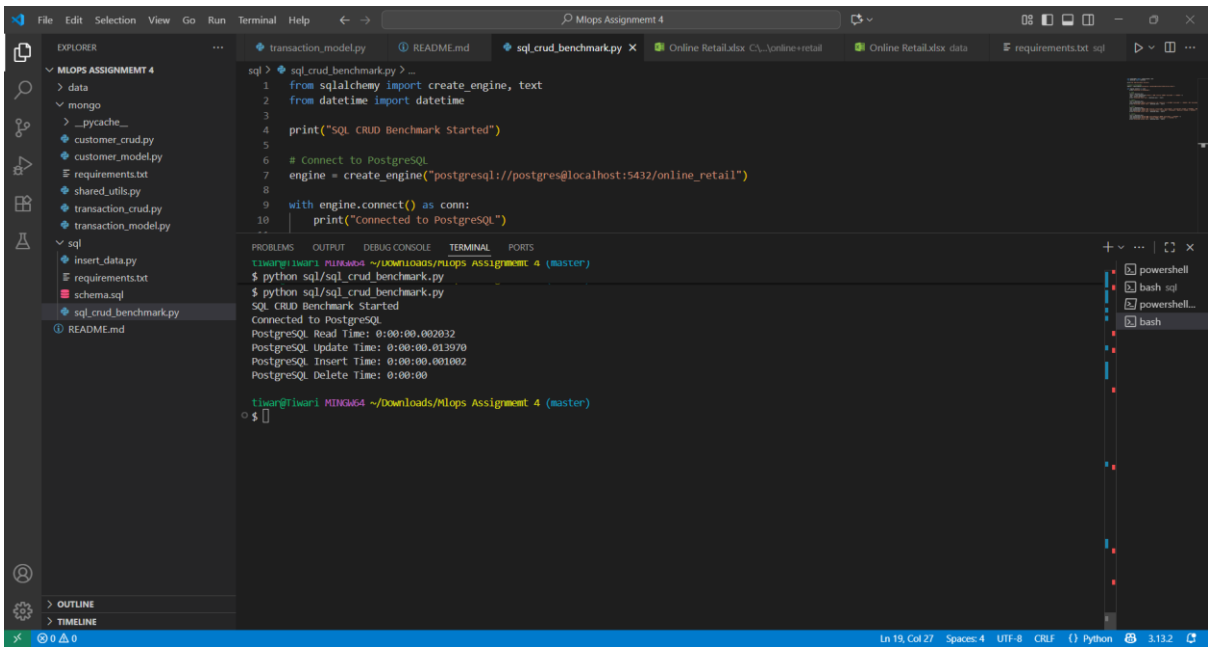




MongoDB: Execution Time (TransactionCentric and CustomerCentric)



PostgreSQL: Execution Time of CRUD Operations



Summary Table of Execution time

Operation	MongoDB (Transaction-Centric)	MongoDB (Customer-Centric)	PostgreSQL
Read	"0:00:00.741861"	"0:00:01.635098"	"0:00:00.002032"
Update	"0:00:00.079765"	"0:00:00.073725"	"0:00:00.013970"
Insert	"0:00:00.065089"	"0:00:00.055415"	"0:00:00.001002"
Delete	"0:00:00.057281"	"0:00:00.055939"	"0:00:00.000000"

Analysis of CRUD Performance

The benchmark results reveal clear differences in execution time across MongoDB and PostgreSQL for each CRUD operation:

Read Operation

- **PostgreSQL** is significantly faster (~0.002s) due to indexed relational access and flat schema.
- **MongoDB Transaction-Centric** takes longer (~0.74s) but is still efficient for flat documents.
- **MongoDB Customer-Centric** is slowest (~1.63s) due to nested document traversal and larger payloads.

Update Operation

- All models perform well, with **MongoDB** slightly faster (~0.07s) due to direct document targeting.
- **PostgreSQL** update (~0.013s) is fast but involves table-level locking and constraint checks.

Insert Operation

- **PostgreSQL** is fastest (~0.001s) due to optimized bulk insert paths.
- **MongoDB** performs well (~0.05–0.06s) but includes overhead for document validation and indexing.

Delete Operation

- **PostgreSQL** deletion is near-instant (~0.000s) for indexed rows.
- **MongoDB** deletion (~0.05s) is consistent across models.

Insight: SQL's transactional engine handles deletes efficiently; MongoDB's performance is stable but slightly slower.