

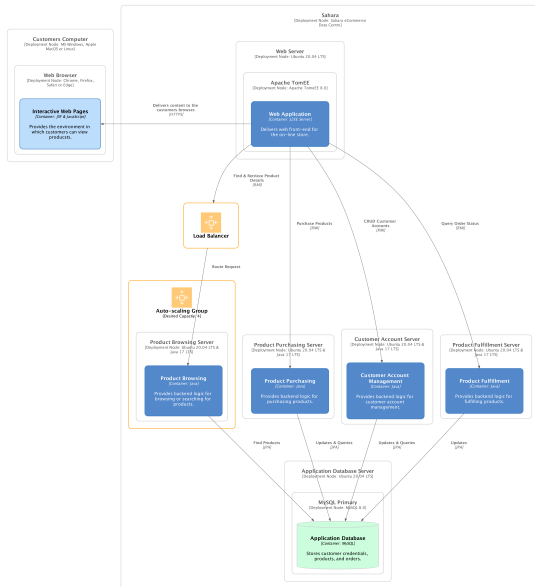
# Distributed Computing II

CSSE6400

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April 4, 2022

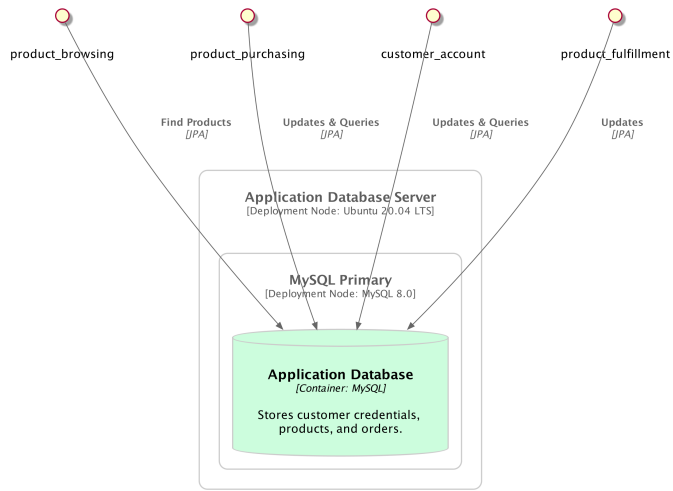
# Previously in CSSE6400...



Things start going wrong

What is the likely cause?

# Database



Legend

Question

How do we fix database scaling issues?

## Question

How do we fix database scaling issues?

## Answer

- Replication
- Partitioning (or sharding)
- Independent databases

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Question

What is *replication*?



### Definition 1. Replication

Data copied across multiple different machines.

## Definition 2. Replica

Database node which stores a copy of the data.

Question

What are the advantages of *replication*?

### Question

What are the advantages of *replication*?

### Answer

- Scale out our database to cope with load.

### Question

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### Answer

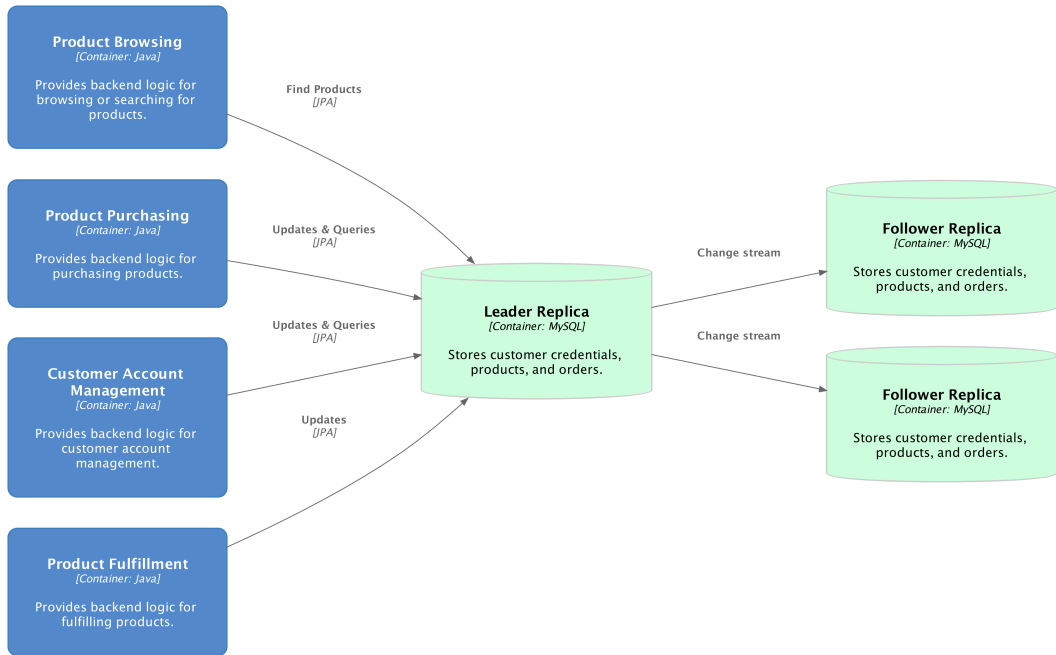
- Scale out our database to cope with load.
- Provide fault tolerance from a single database instance failure.

### Question

What are the advantages of *replication*?

### Answer

- Scale out our database to cope with load.
- Provide fault tolerance from a single database instance failure.
- Locate databases closer to end-users.



## Leader-based Replication

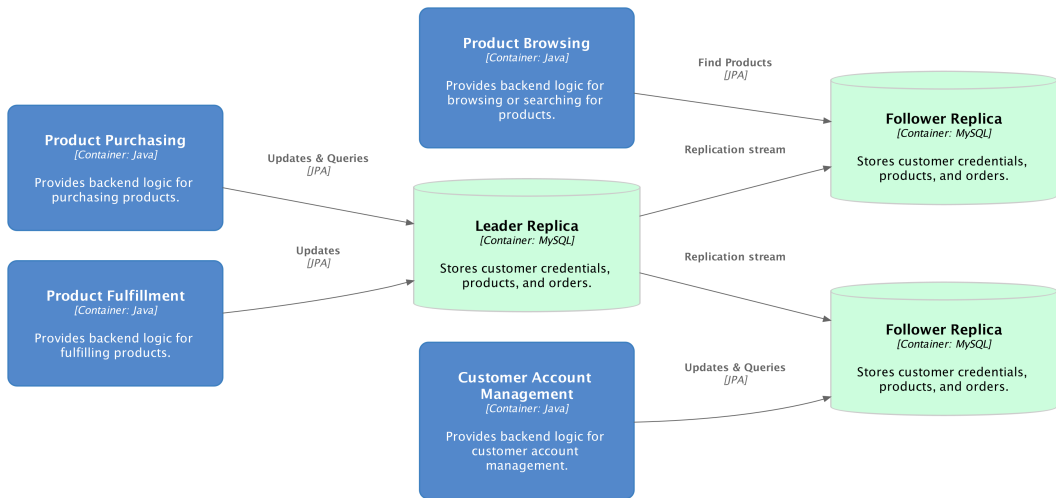
**On write** Writes sent to leader, change is propagated via change stream.



## Leader-based Replication

**On write** Writes sent to leader, change is propagated via change stream.

**On read** Any replica can be queried.



Propogating changes

*Synchronous* **vs.** *Asynchronous*

When things go wrong

# Handling outages

Followers failure

Leader failure

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