

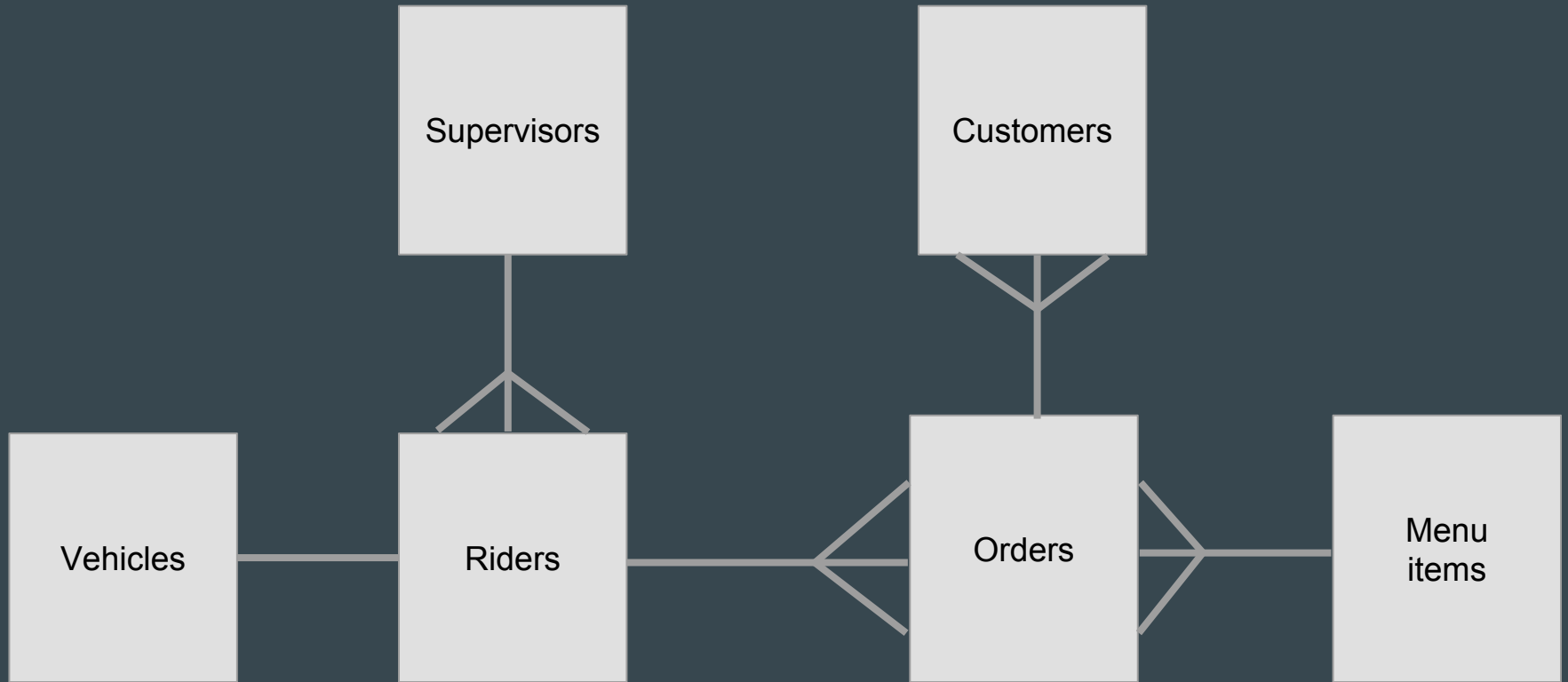
NoSQL



Data modeling & solutions
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Data model



RDBMS

Find all riders for manager

```
SELECT riders.name, managers.name  
FROM riders, managers  
WHERE manager="123"  
AND  
managers.id = riders.managerId
```

NoSQL

Managers

```
{  
  "id": "123",  
  "name": "Imran Khan",  
  "status": "active"  
}
```

Riders

```
{  
  "id": "456",  
  "name": "Naseer Ahmed",  
  "status": "active"  
}
```

NoSQL

Managers

```
{
  "id": "123",
  "name": "Imran Khan",
  "status": "active"
  "riders": [
    {
      "id": "456",
      "name": "Naseer Ahmed",
      "status": "active"
    }
  ]
}
```

NoSQL

Managers

```
{  
  "id": "123",  
  "name": "Imran Khan",  
  "status": "active"  
  "riders": [  
    "123"  
  ]  
}
```

Riders

```
{  
  "id": "456",  
  "name": "Naseer Ahmed",  
  "status": "active"  
}
```

NoSQL

Managers

```
{  
  "id": "123",  
  "name": "Imran Khan",  
  "status": "active"  
}
```

Managers Vs Riders

```
{  
  "managerId": "123",  
  "riderId": "456"  
}
```

Riders

```
{  
  "id": "123",  
  "name": "Naseer Ahmed",  
  "status": "active"  
}
```

Issues

- No join
- Group by may be not available
- Reads may be expensive
- Document limit size

Approach

- Write queries first
- Which collections MAY need to be updated
- Which collection WILL NEVER be updated
- How frequently are cross collection lookups (joins) required

Example: agriculture sensor data

- Sample queries:

Find all records for humidity
sensor named
“HUM-SINDH-01-02” from
Jan-12-2019 to Mar-11-2019

Find highest temperature ever
reported by
“TEMP-KPK-01-02”

- Is Time Series
- Sensor data WILL NEVER be changed
after recording

Sensor reading

```
{  
  name: string,  
  location: geocoordinates,  
  timestamp: datetime,  
  type: string,  
  value: object  
}
```

Example: CRM

- Sample queries:

Find all riders for manager

Change manager for rider

Change spelling of rider's name

- CRM data MAY be changed after recording

Example: Get list of riders for manager and their names

```
{
  name: "Imran Khan",
  riders: ["123" ]
}
{
  "id": "123",
  "name": "Naseer Ahmed",
  "status": "active"
}
```

```
{
  name: "Imran Khan",
  riders: [{ "id": "123",
    "name": "Naseer Ahmed",
    "status": "active"
  }]
}
```

```
{
  name: "Imran Khan",
  riders: [{ "id": "123",
    "name": "Naseer Ahmed"
  }]
}
```

```
{
  "id": "123",
  "name": "Naseer Ahmed",
  "status": "active"
}
```

Example: Get list of riders for manager and their names

```
{  
  "id": "123",  
  "name": "Imran Khan",  
  "status": "active"  
}
```

```
{  
  "id": "123",  
  "name": "Naseer Ahmed",  
  "status": "active"  
}
```

```
{  
  "managerId": "123",  
  "riderId": "456"  
}
```

Vendors and solutions

Firestore: Free quota, then \$0.6 per 1M reads e.g.

MongoDB Atlas: Depends on VM size - starts at \$9 per month

Azure CosmosDB: \$24 per collection + \$0.25 per GB

Limitations and idiosyncrasies

Firestore: Doesn't support (count) operator, querying embedded objects

MongoDB: Costs become prohibitive for time series data

Azure: Costs skyrocket on additional collections, better to pack all collections in one and use identifier for each collection - Partly MongoDB compliant drivers available

Q&A?