

W205 Summer 2022

Project 3 | Team 1

Amanuel Tollosa
Mick Rejniak
Stephen Tan

NoSQL Databases & the Future of AGM

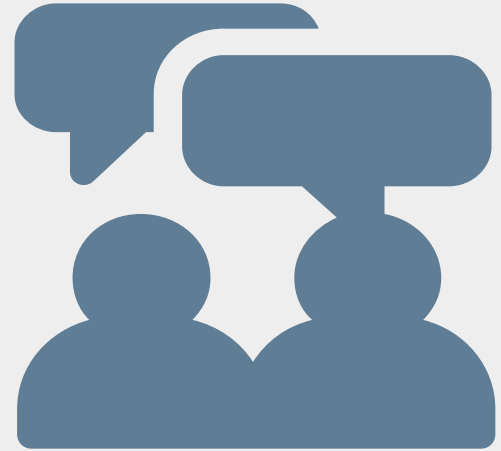
Making use of NoSQL database technology to ensure the data science team's strategic contribution to AGM's future



What we heard

The executive vision

- Additional pickup locations
- BART for delivery
- Delivery drones
- Delivery robots



Technology Overview





Graph



mongoDB



Document



redis

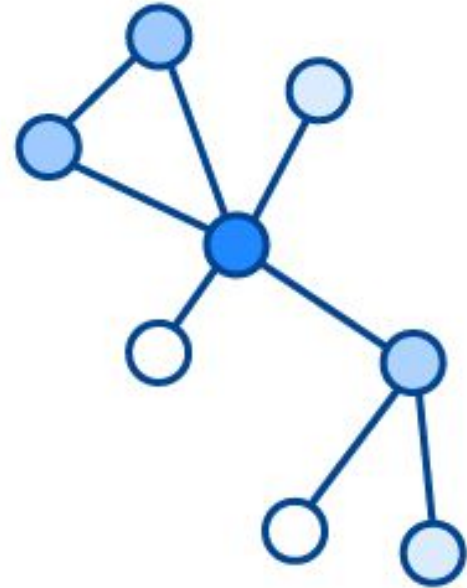


Key-Value



Graph

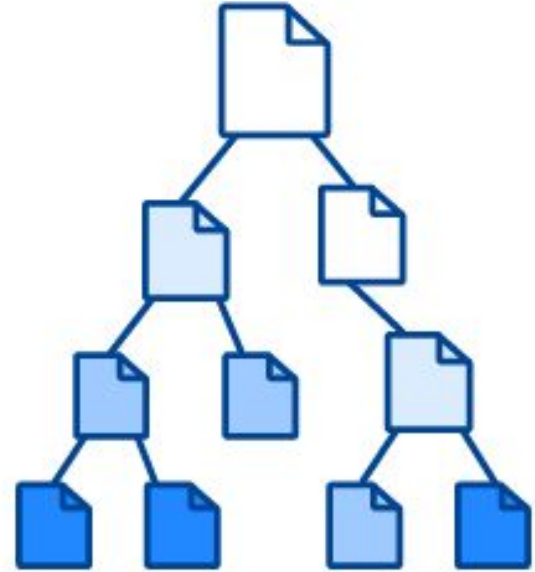
- Relationships between nodes
- Overwhelmingly suited to informing decisions directly related to the Future of AGM





Document DB

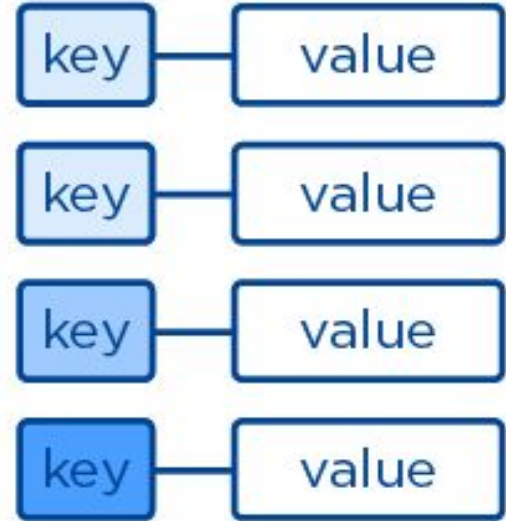
- Large, stored data sets
- Denormalized data
- Flexible schema
- Great for analytics





Key/Value

- In-memory
- Unique key
- Very fast, real-time
- Similar to Python dictionary





**Analyze BART station
relationship to
population density
and other locations**



**Performance
analytics**



**Real-time
order tracking
application**

The Future of AGM

Adding Pick-up Locations at BART Stations

2-phase approach

1. Highly populated areas
2. High traffic stations



Phase 1.

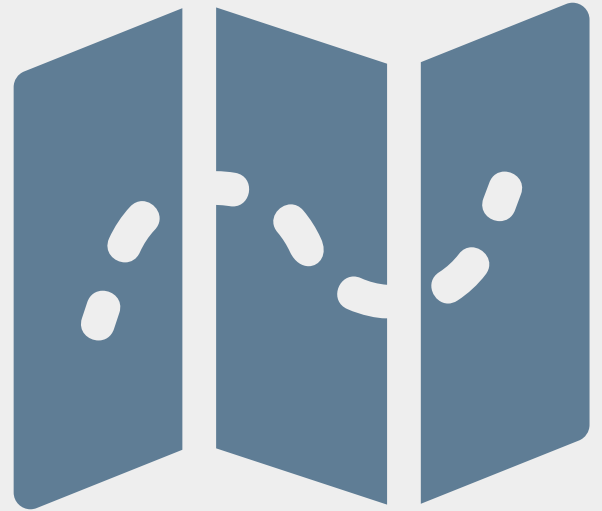
Highly Populated Areas

- Geodesic distances
- Population data



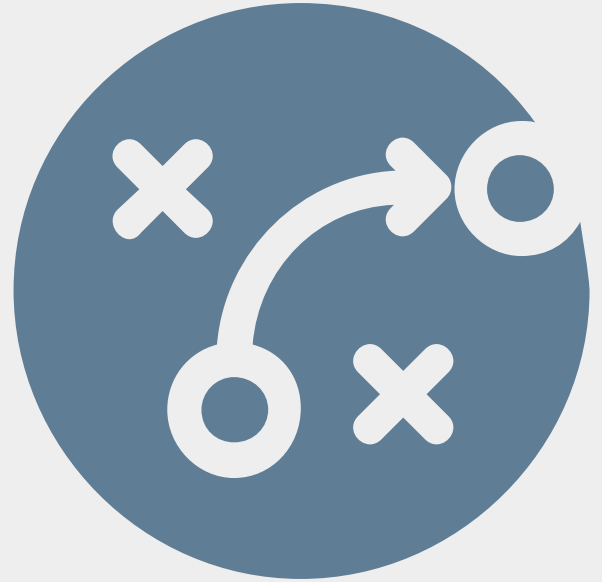
Phase 2. High Traffic Stations

- Graph approach using centrality



Optimize Supply Routes From Kitchen to Pick-up Locations

- Graph approach using shortest path



Performance Analytics

MongoDB database

Location collections

Customer collections

Meal collections

Rider collections



Real Time Pick Up Tracker App

Redis database

Track order status

Communicate with pick up location



Proposed Implementation

Open location at Balboa Park

Highest degree of centrality

Top 5 most populated within 1
mile radius of BART station



Assumptions

Meals pre-ordered the day before

Berkeley AGM makes food

Each location stocked once per day

⇒ 500 meal limit

Pick ups offered Mon. - Fri.



Operations

10% additional meals stocked

Use MongoDB for daily analytics

- Popular orders
- How many additional meals



Per-Location Costs (Monthly)

Permit:	\$60
Worker:	\$3,100
Transport (roundtrip):	\$340

Total = \$3500



Technology Costs (Monthly)

Neo4j:	\$65
MongoDB:	\$57
Redis:	\$7
AWS:	\$87
<u>Total:</u>	\$216



Projected Daily Revenue from Balboa Park Location

Revenue: \$6,000
⇒ 500 meals x \$12 each

Costs: \$6 per meal
\$170 per location

Daily profit: \$2,830



\$2.8k

Projected daily profit
at Balboa Park location

\$764k

Projected annual profit
at Balboa Park location

Conclusion

- Add pickup location at Balboa Park BART
- Use MongoDB to assess performance
 - Open potential brick-and-mortar
 - Expand more pickup locations
- Use Redis for order tracking



References

<https://www.mongodb.com/developer/products/mongodb/map-terms-concepts-sql-mongodb/>