## Innovating in Food Delivery

Or: How I learned to stop worrying and love the drone

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#### Problem Statement/Opportunity

Support AGM long term growth through different environmentally friendly deliveries in the Bay Area

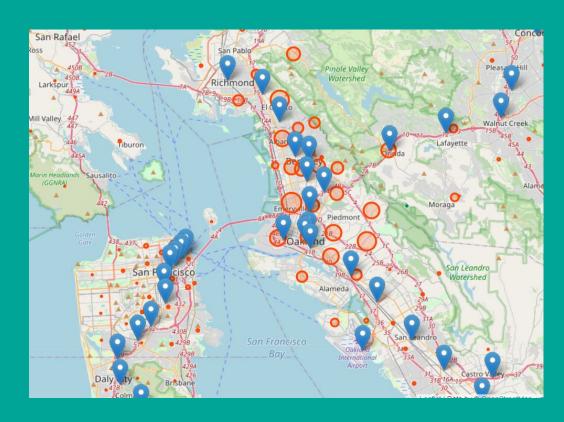
Hybrid approach solution: BART and Delivery Drones\*

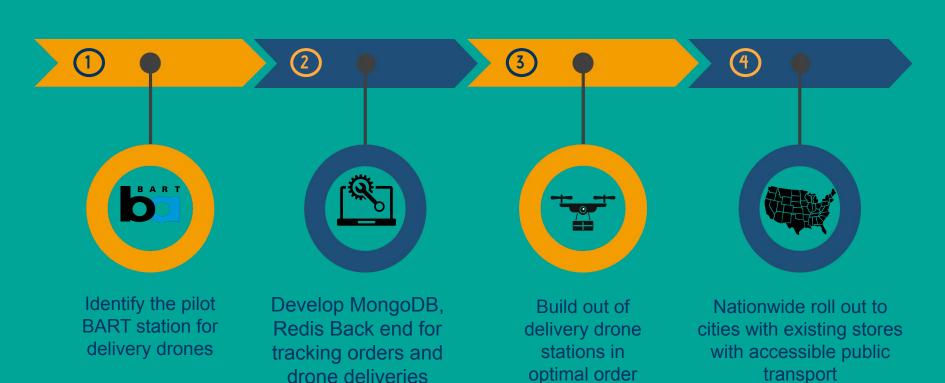
#### **Delivery Potential**

• Population of 4,000,000+

• 300,000+ current customers

 ~80% of population live within 1.5 miles of a BART station



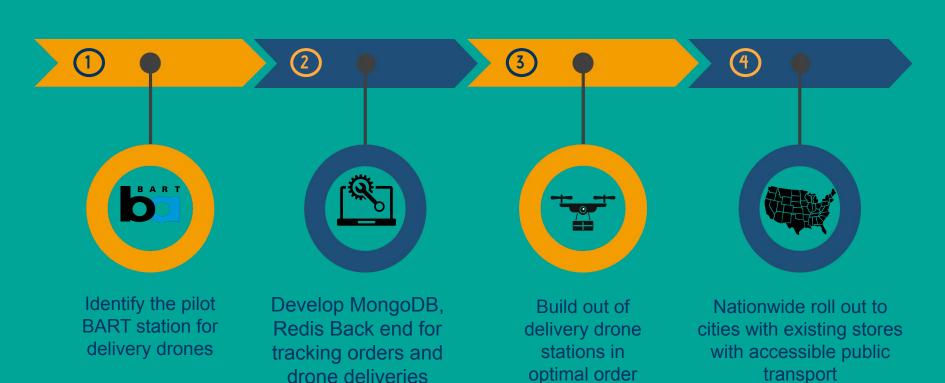


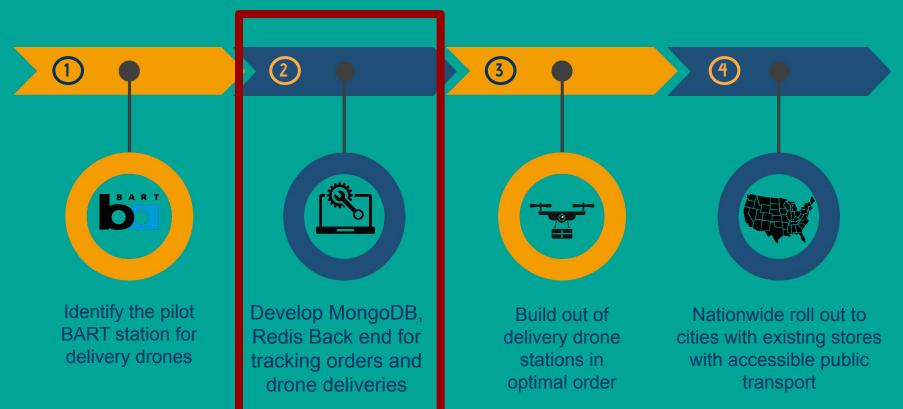


### Choosing "pilot" drone delivery station (near Berkeley) 🔊

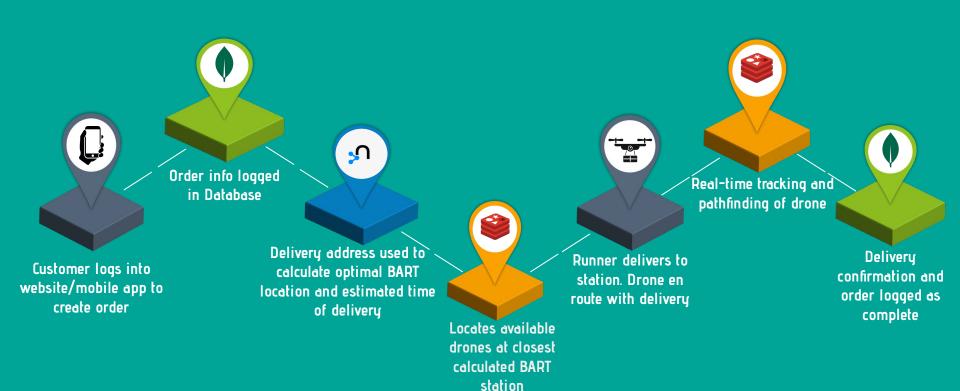


Station	"Betweenness" Composite Score
MacArthur	6.13
Ashby	6.08
Civic Center	5.14
North Berkeley	5.10
Downtown Berkeley	4.89

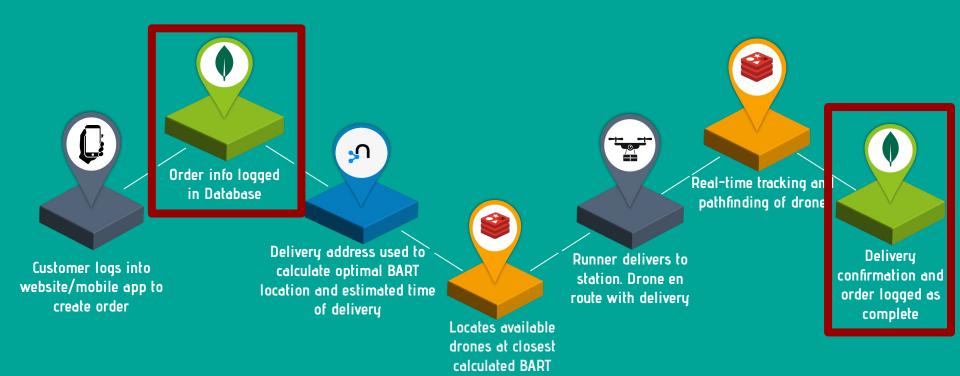




#### Example Process Overview



#### Considering MongoDB

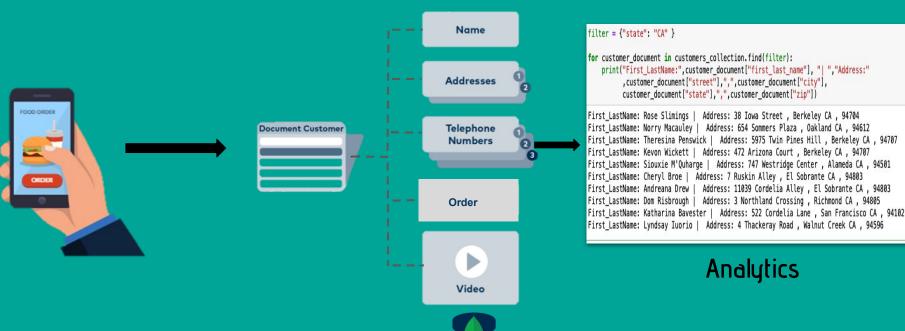


station

#### Business Application MongoDB



mongo DB

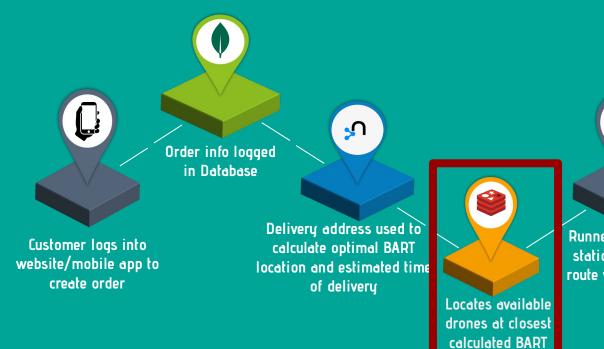


```
for customer_document in customers_collection.find(filter):
   print("First_LastName:",customer_document["first_last_name"], "| ","Address:"
          ,customer_document["street"],",",customer_document["city"],
          customer document["state"],",",customer document["zip"])
First_LastName: Rose Slimings | Address: 38 Iowa Street , Berkeley CA , 94704
First LastName: Norry Macauley | Address: 654 Sommers Plaza , Oakland CA , 94612
First LastName: Theresina Penswick | Address: 5975 Twin Pines Hill , Berkeley CA , 94707
First_LastName: Kevon Wickett | Address: 472 Arizona Court , Berkeley CA , 94707
First_LastName: Siouxie M'Quharge | Address: 747 Westridge Center , Alameda CA , 94501
First_LastName: Cheryl Broe | Address: 7 Ruskin Alley , El Sobrante CA , 94803
First_LastName: Andreana Drew | Address: 11039 Cordelia Alley , El Sobrante CA , 94803
First_LastName: Dom Risbrough | Address: 3 Northland Crossing , Richmond CA , 94805
```

#### **Analytics**

#### Considering Redis

station





Runner delivers to station. Drone en route with delivery Delivery confirmation and order logged as complete

### Business Application (Redis)





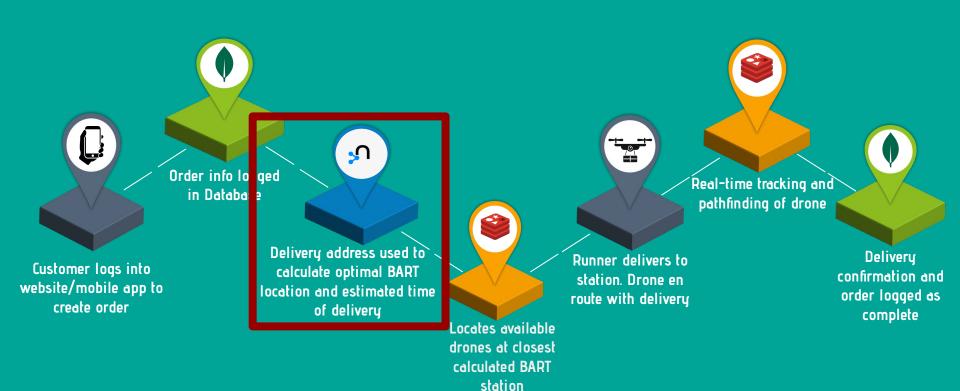
```
for key in stations_drone_db.keys():
    print("key:", key, "value:", stations drone db.get(key))
stations drone db.set("12th Street", "Hubsan FPV X4 Plus")
stations_drone_db.set("12th Street", "Hubsan FPV X4 Plus")
stations_drone_db.set("19th Street", "FPV Drone F807")
stations_drone_db.set("24th Street Mission", "Hubsan X4 H108")
stations drone db.set("Antioch", "Nano Quad CX-10D")
stations_drone_db.set("Ashby", "Hubsan FPV Spy Hawk")
stations_drone_db.set("Balboa Park", "Blade Nano OX RTF")
stations_drone_db.set("Bay Fair", "Hubsan X4 Spider")
stations drone db.set("Berryessa", "Dexterity X100")
stations_drone_db.set("Castro Valley", "Raider XL")
```



#### **Drone information display system (DIDS)**

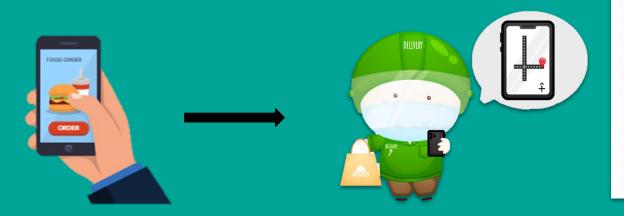


#### Considering Neo4j



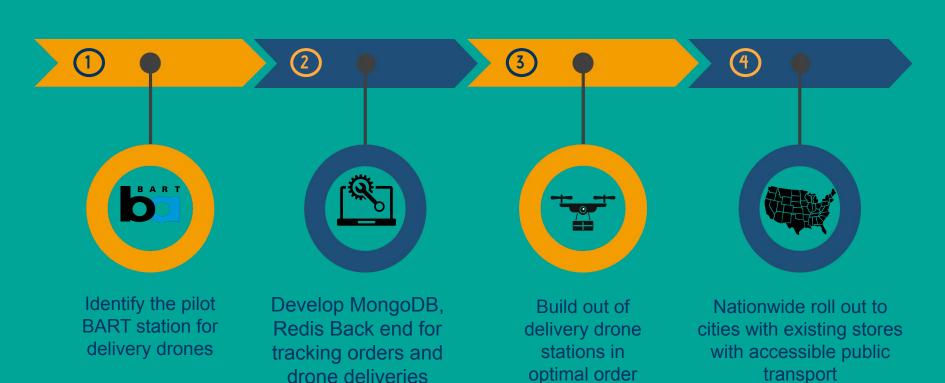
#### Choosing optimal BART routes to customer

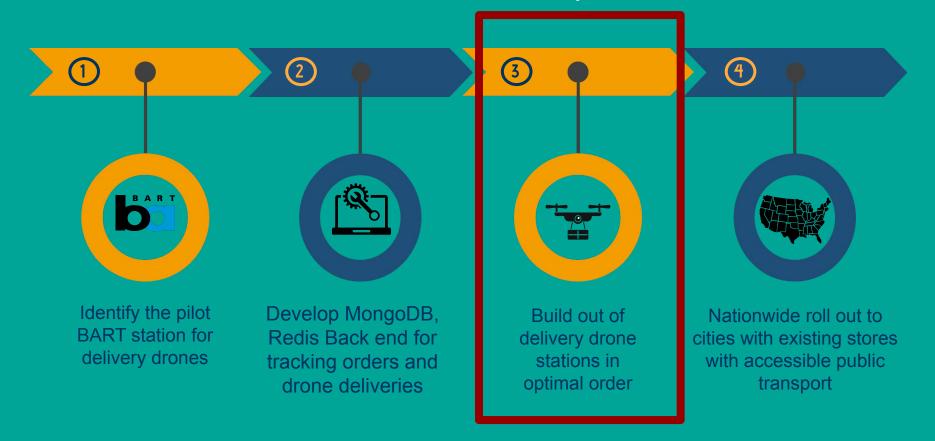




Total Cost: 2034 Minutes: 33.9

depart Ashby, 0, 0 orange Ashby, 0, 0 orange MacArthur, 240, 240 orange 19th Street, 180, 420 orange 12th Street, 120, 540 orange Lake Merritt, 180, 720 orange Fruitvale, 300, 1020 orange Coliseum, 240, 1260 blue Coliseum, 54, 1314 blue San Leandro, 240, 1554 blue Bay Fair, 240, 1794 blue Castro Valley, 240, 2034 arrive Castro Valley, 0, 2034

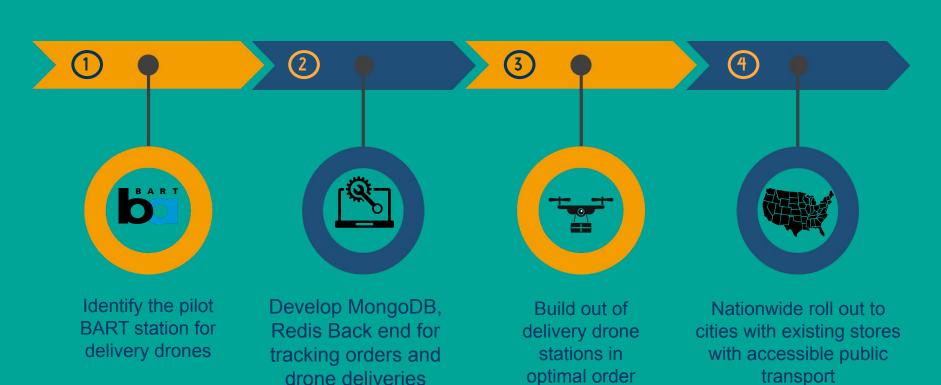


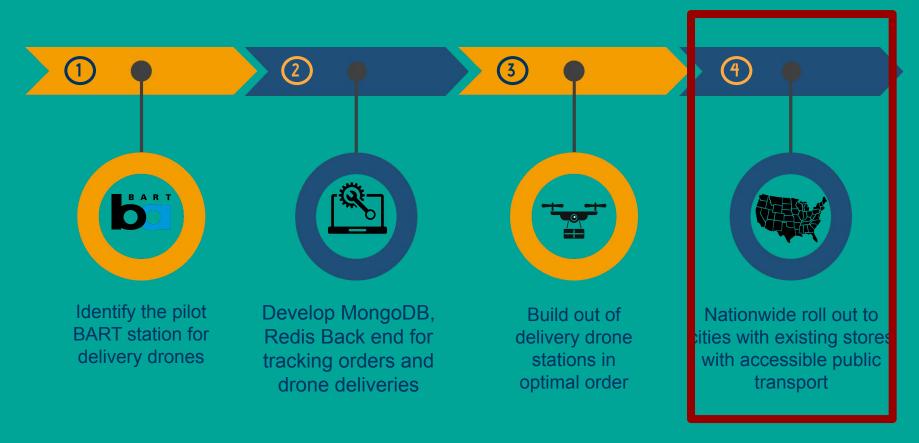


#### Choosing future stations for product roll out (SF) 🔊

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Station	"Closeness" Composite Score
Civic Center	4.68
16th Street Mission	4.66
Powell Street	4.04
Glen Park	3.96
Montgomery Street	3.49







# Questions?