Project Presentation Stage 1

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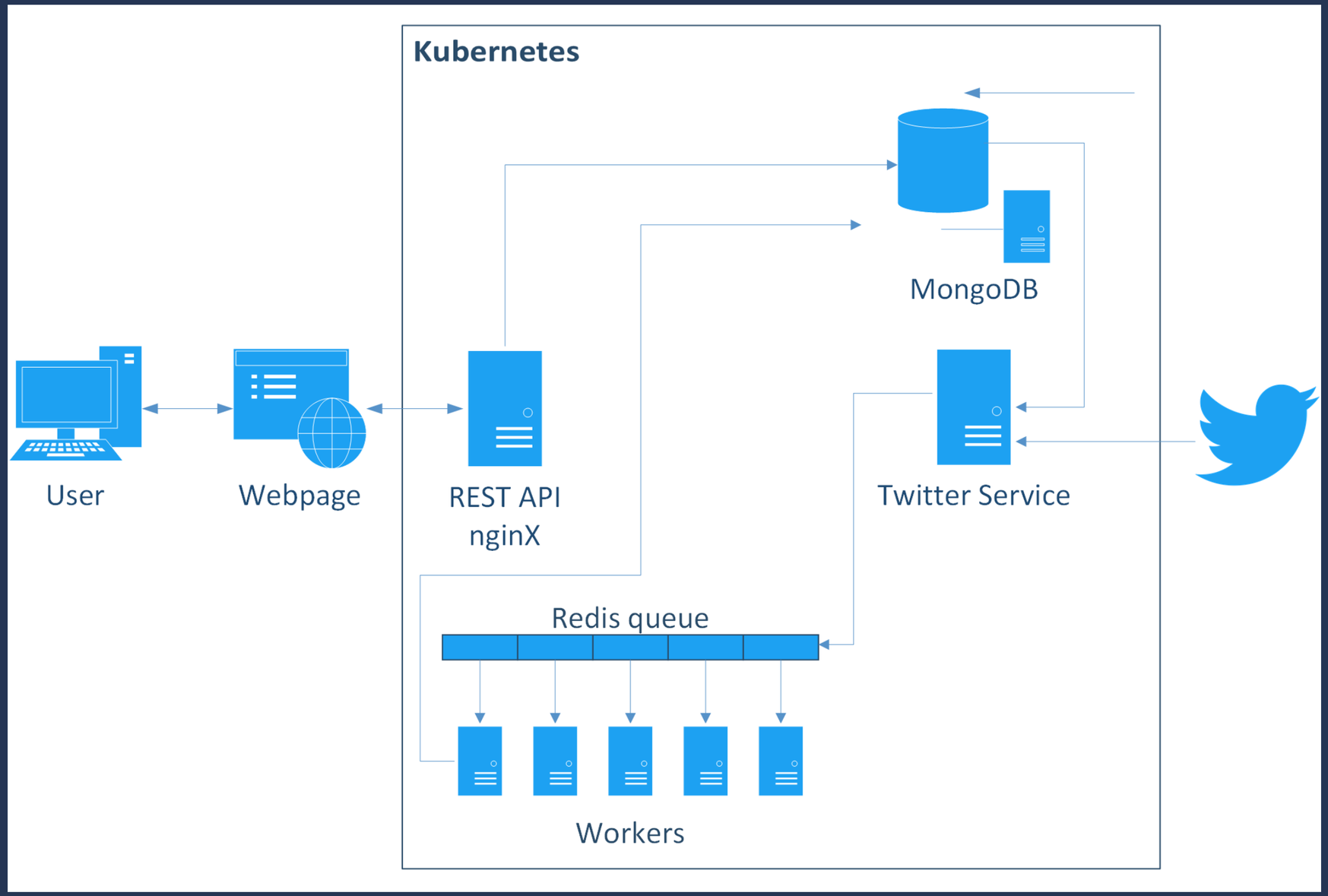
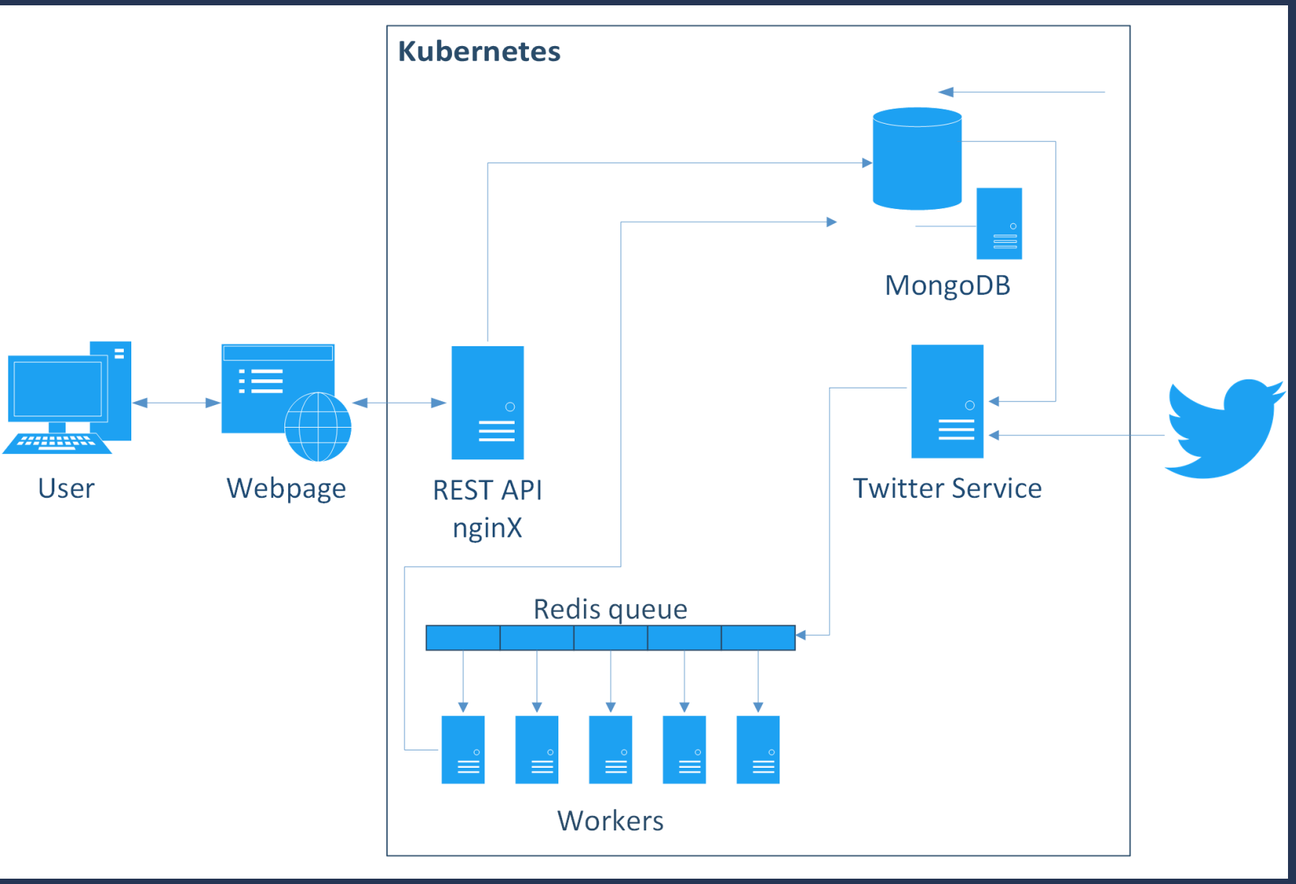
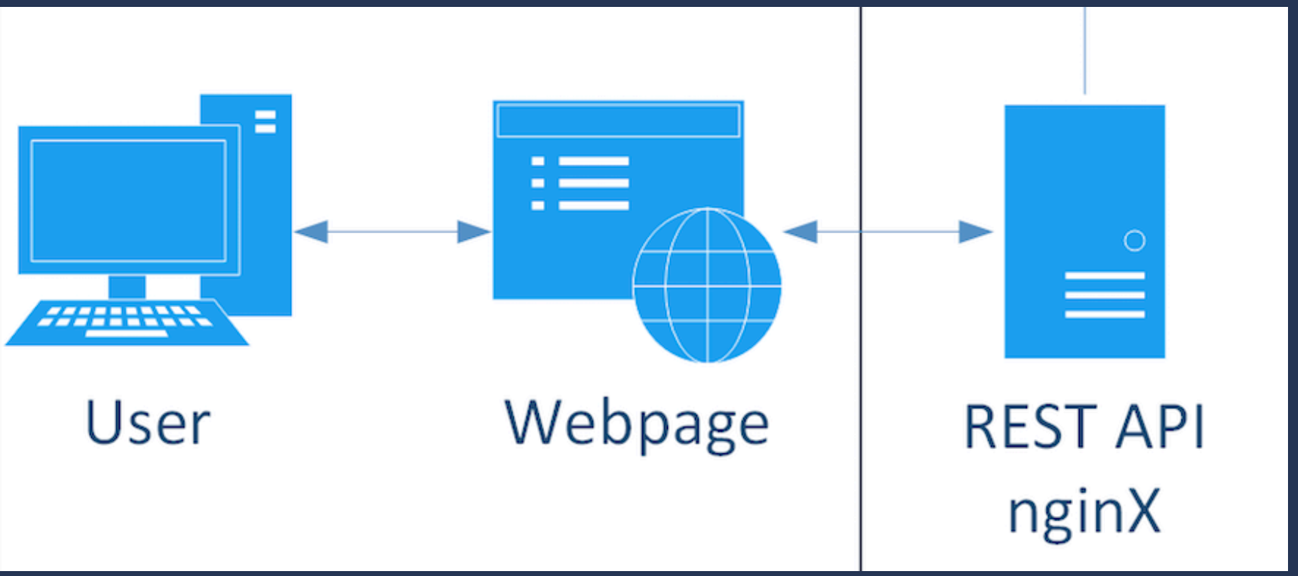

Kubernetes
MongoDB
User
Webpage
REST API
nginX
Twitter Service
Redis queue
Workers



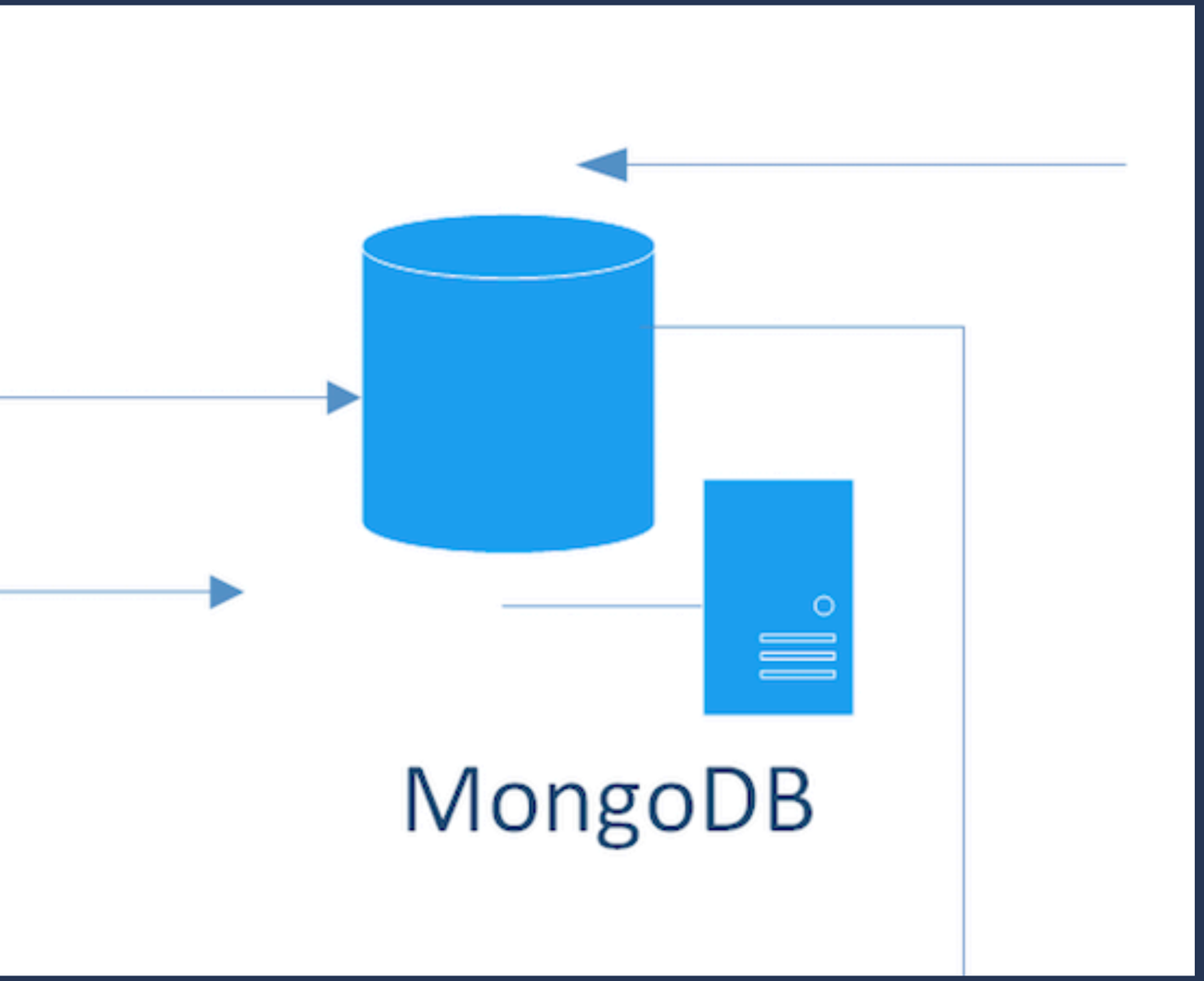
Containerized Microservices deployed through Kubernetes

- Components embedded in (Docker) Containers
- Containers have (ideally) one single responsibility

Frontend and API



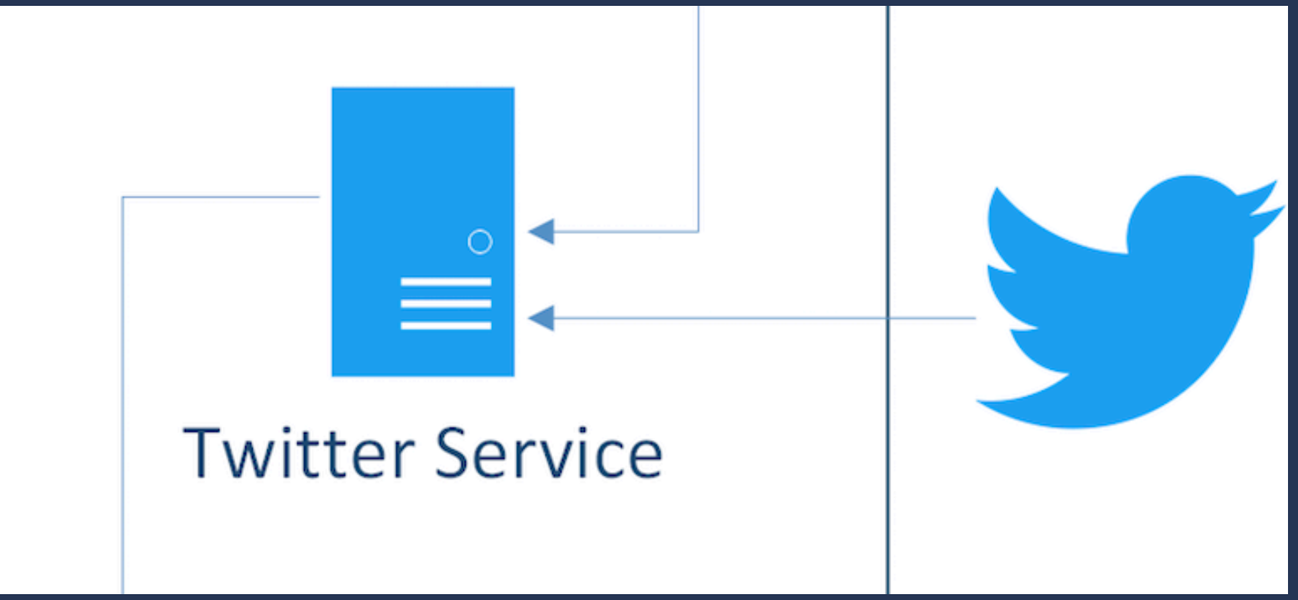
- User inputs term
- Click on register
- Send request to API



Timeseries: MongoDB (I)

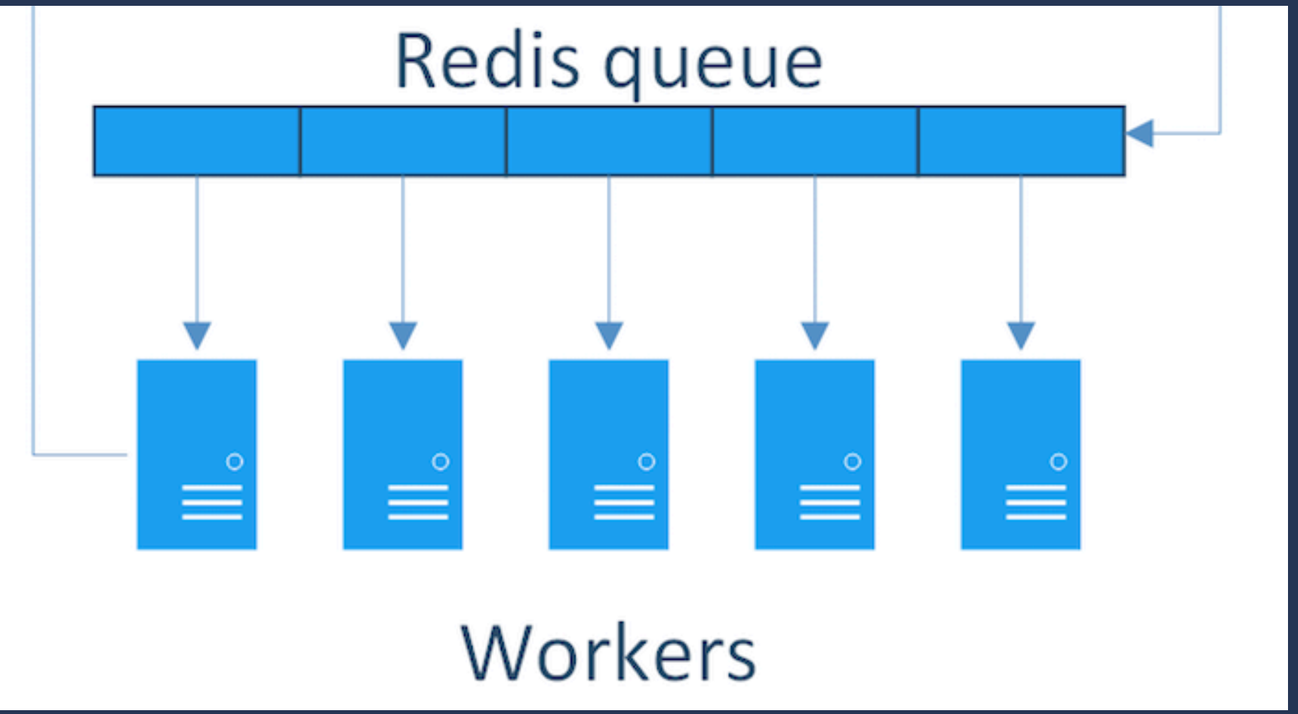
- Request Handler stores Term in MongoDB
- Persistency guaranteed by GCE Persistence Disk

Twitter Service



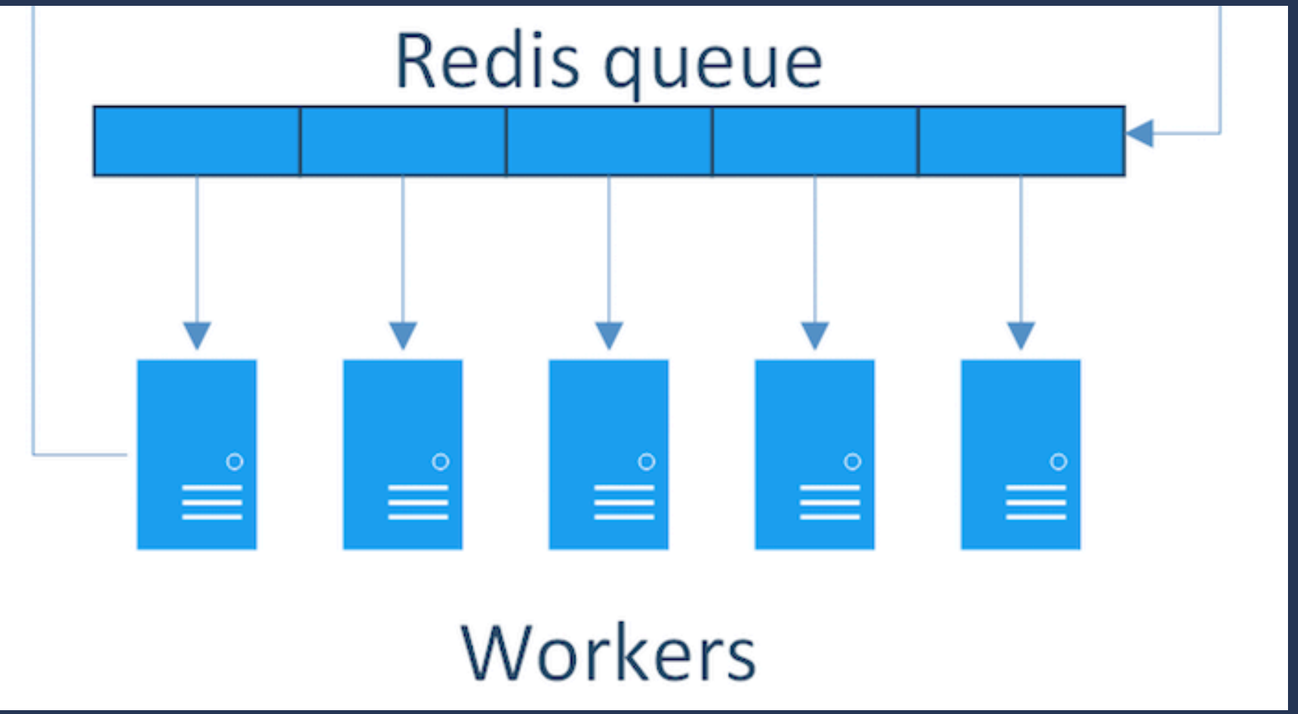
- Gets notified of newly created Terms
- Streaming stops and restarts with the new Term added for tracking
- Arriving Tweets are immediately stored into the Queue

Worker Queue

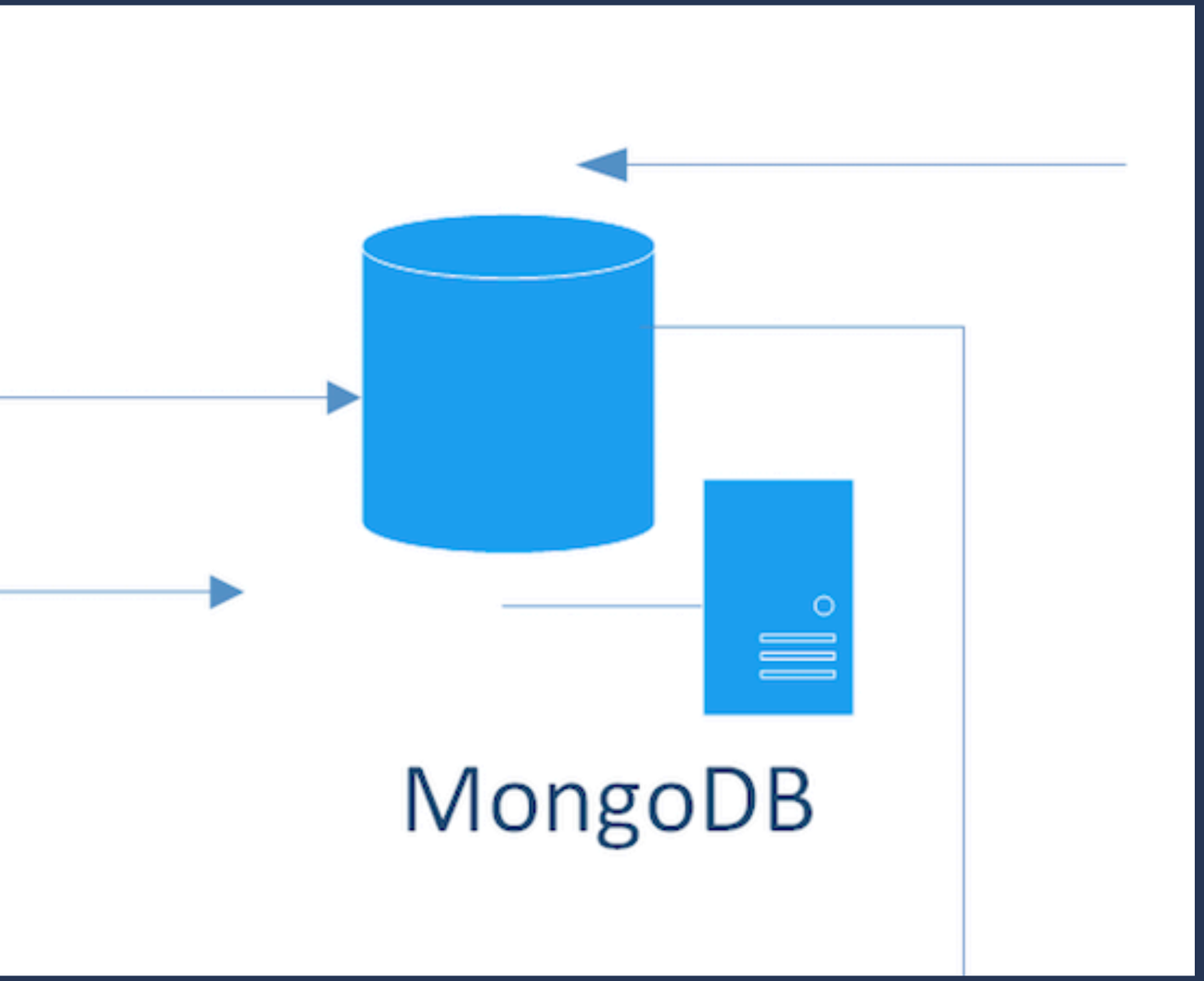


- Redis: in-memory data structure store
- A FIFO queue of Strings (Tweets)
- Load generator
  - API endpoint to add Strings to Queue directly

Compute Workers



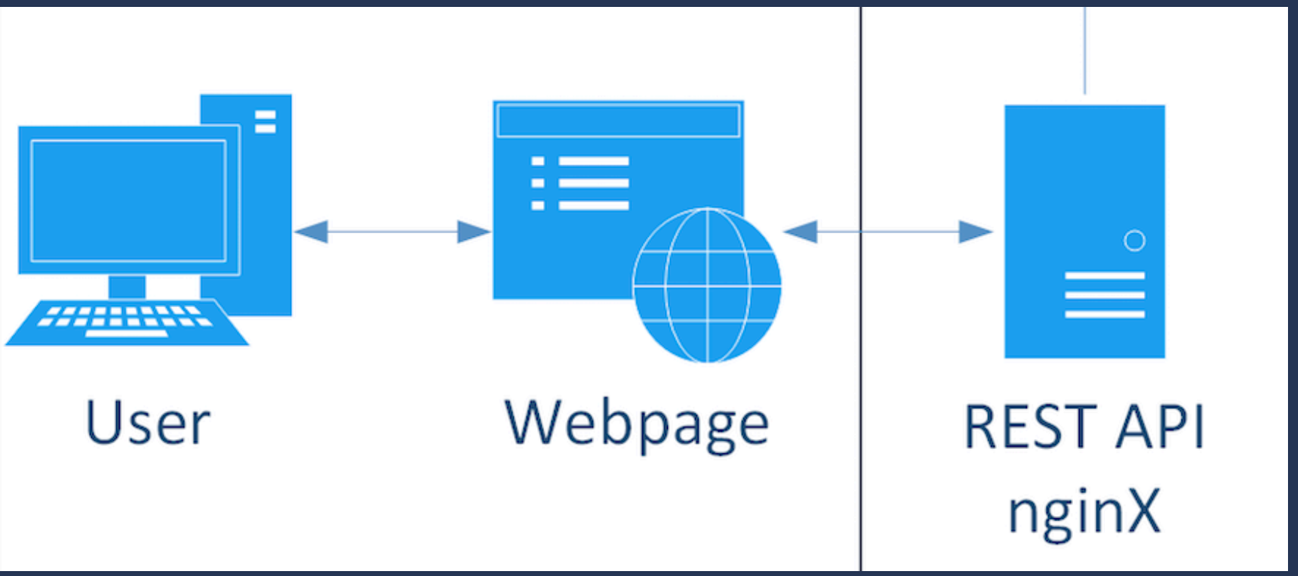
- Running Workers process the Queue:
  - Assign Tweet to Term (filtering)
  - Calculate Sentiment
- Length of the Queue defined the number of Workers
  - Scaled through Kubernetes.



Timeseries: MongoDB (II)

- Workers store the calculated Sentiment into MongoDB.

Displaying Results



- Rest API gets request
- Collect relevant data from MongoDB
- Browser renders data
- Socket gets opened for continues pushes

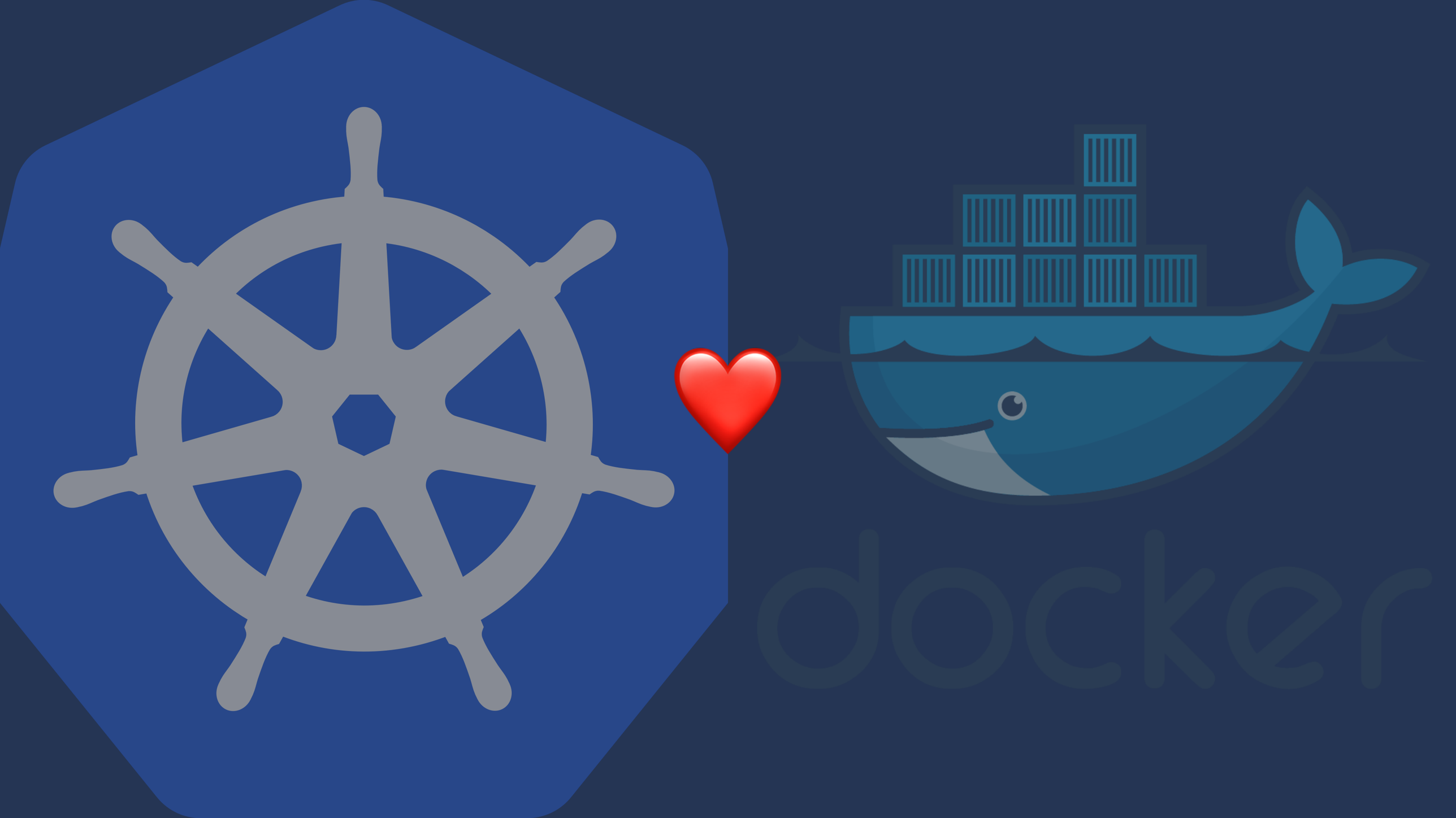
Architectural Styles

- Client / Server through Rest API
- Event-Driven notification of Term updates
- Blackboard: Redis Queue
  - Factory: Twitter Service
  - Worker: Compute Workers
- Highly decoupled Microservices

Do you even scale?

Initial Idea

- Digital Ocean
- Docker Swarm


docker

What does Kubernetes do for us

- Every component is potentially scalable through Kubernetes
  - Even MongoDB!
- Fault Tolerance:
  - Container recovery through Kubernetes
  - Decoupled design and Microservice
- Elasticity
  - Container scaling through Kubernetes

Concerns

- High lock-in to Kubernetes
- Twitter: 400 keyword tracking per stream
  - "default access level allows up to 400 track keywords"
- Matching: may not match to terms perfectly
- Redis: may become a bottleneck
  - but we highly doubt it

Technology Zoo - Platform

- Cloud Platform: Google Container Engine (GCE)
  - Easy support of Kubernetes
- Containerization: Docker
  - Popular Container engine
- Container orchestration: Kubernetes
  - Popular Container orchestration

Technology Zoo - Backend

- Programming Language: Google Go
  - New Programming language 🎉
  - Uniquely suited for Web development
  - Have I mentioned it's fast?
- Terms Storage: MongoDB
  - Easy data schema
- Queue Storage: Redis

Technology Zoo - Frontend

- Frontend: Vuejs
  - Similar to Angular and React
- Webserver: nginx
  - Battle-proven Webserver

Dev Environment

Docker containers using Docker Compose

Demo

Questions?