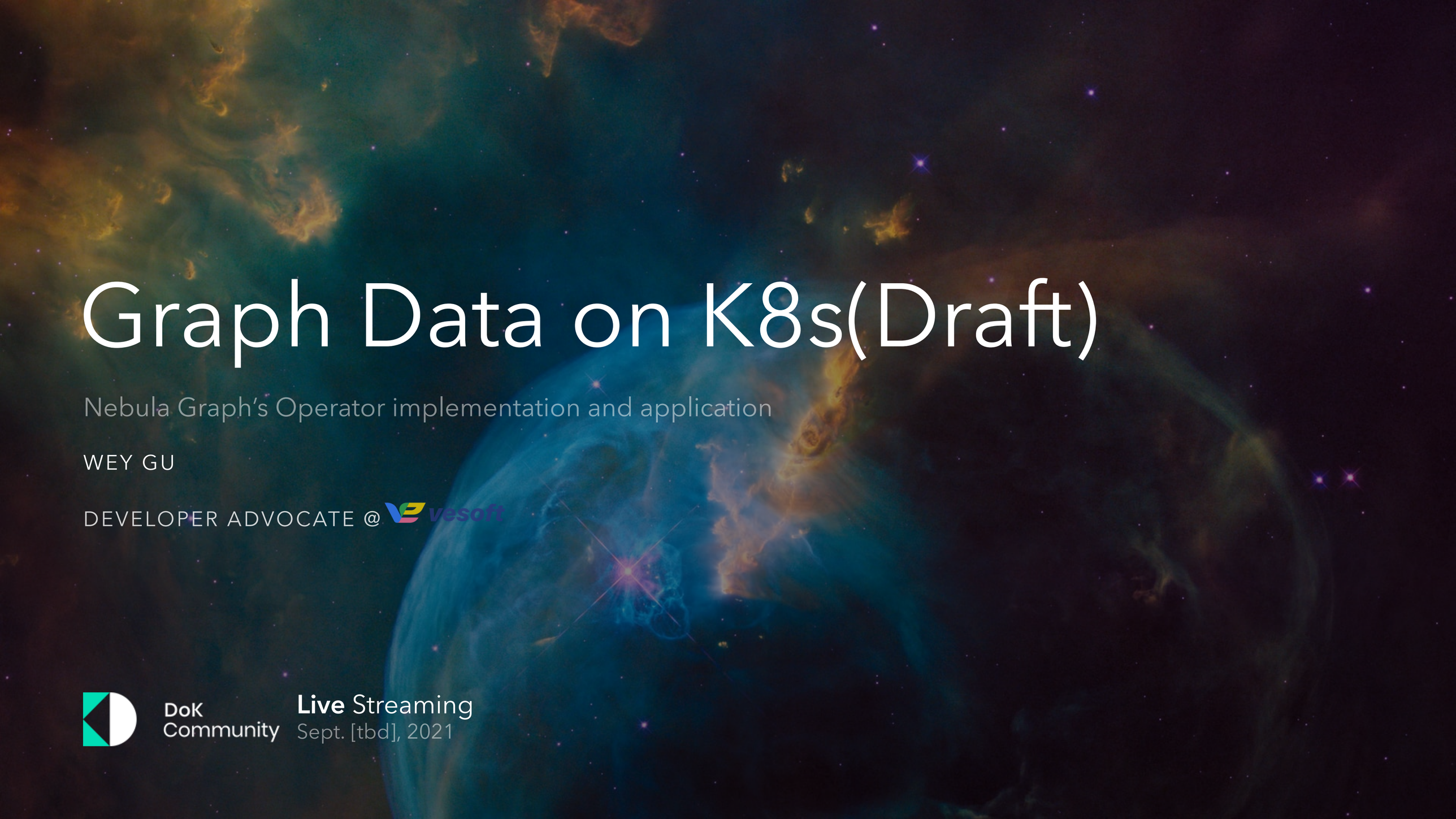

Graph Data on K8s(Draft)

Nebula Graph's Operator implementation and application

WEY GU

DEVELOPER ADVOCATE @ vesoft

DoK Community

Live Streaming

Sept. [tbd], 2021

Wey Gu (Siwei)

- Software Engineer @ Shanghai
- Open Source Believer
- Developer Advocate of Nebula Graph
- Ex-OpenStacker

wey-gu

wey_gu

siwei.io/**about**

Graph Database

What is Graph? What is Graph DB? Why yet another DB?

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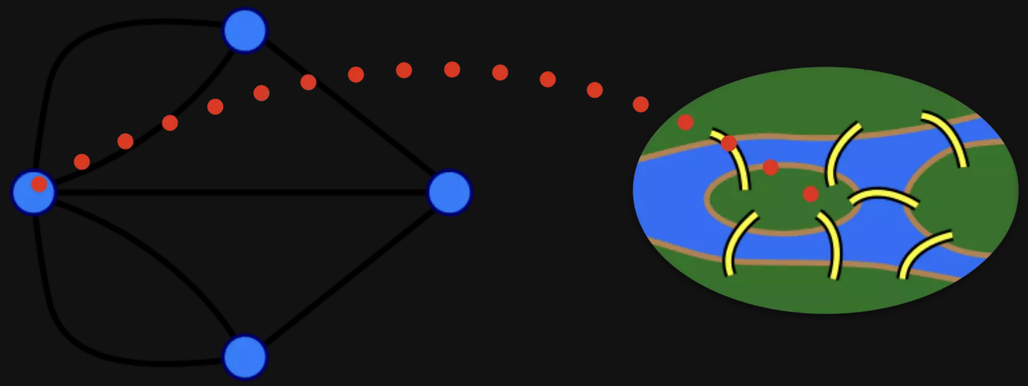
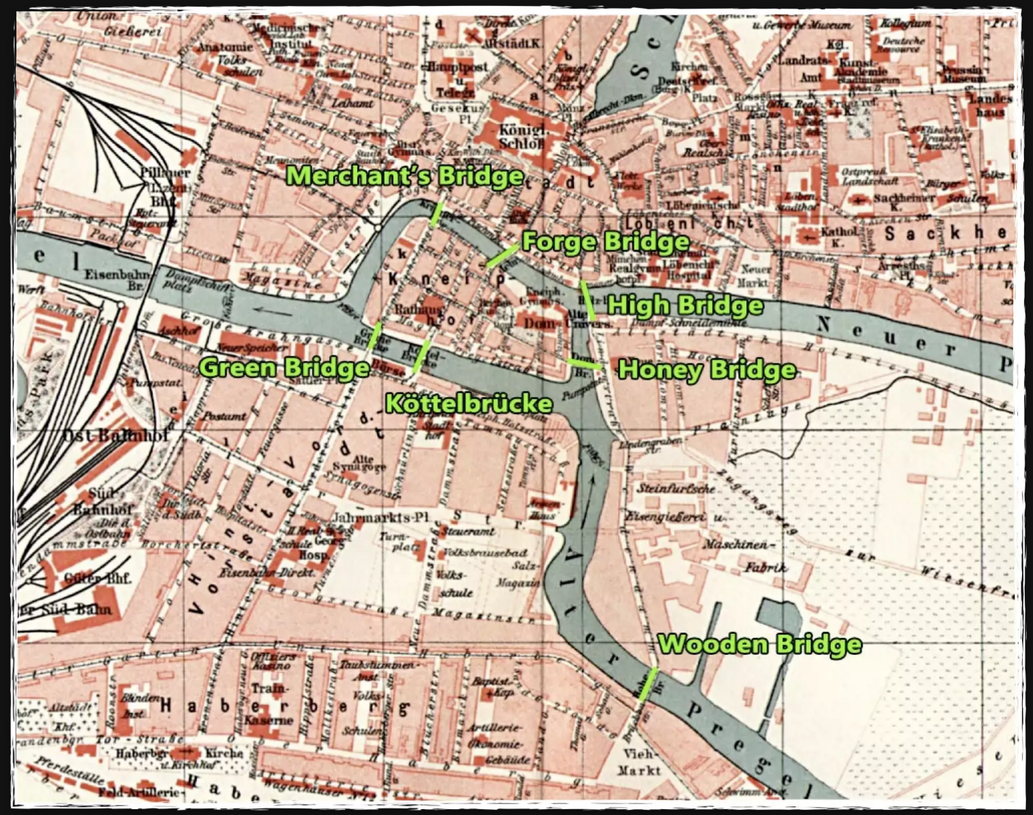
What is Graph?





Map of Königsberg with the seven bridges labeled, circa 1905

NebulaGraph

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"A database that uses graph structures for semantic queries with nodes, edges, and properties to represent and store data

wikipedia.org/wiki/graph_database

More on what a GDB is

Why Yet Another DB?

RELATIONAL DB

GRAPH DB

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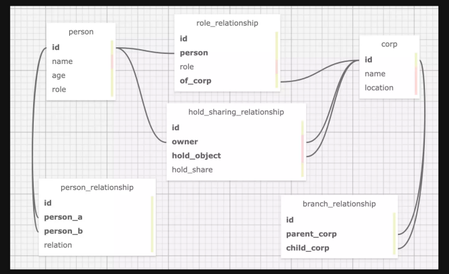
Why Yet Another DB?

Graph Schema

RELATIONAL DB



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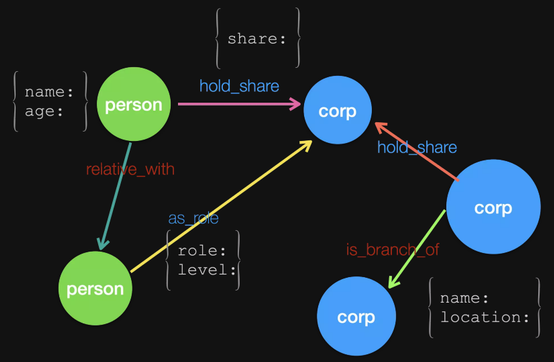

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Why Yet Another DB?

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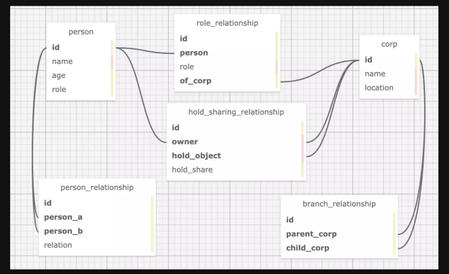

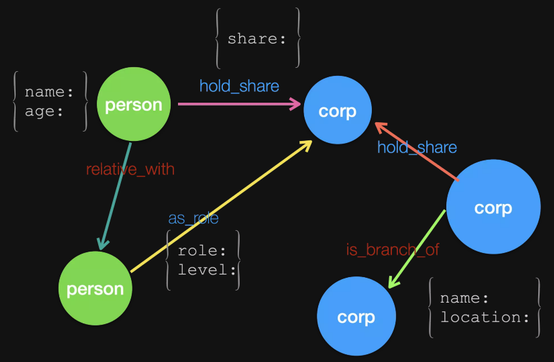

Graph Semantic Queries

```
SELECT a.id, a.name, c.name
FROM player a
JOIN serve b ON a.id=b.player_id
JOIN team c ON c.id=b.team_id
WHERE c.name IN (SELECT c.name
FROM player a
JOIN serve b ON a.id=b.player_id
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WHERE a.name = 'Tim Duncan')
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```
GO FROM 100 OVER serve YIELD serve._dst AS Team | \
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DoK Community

Why Yet Another DB?

RELATIONAL DB

GRAPH DB

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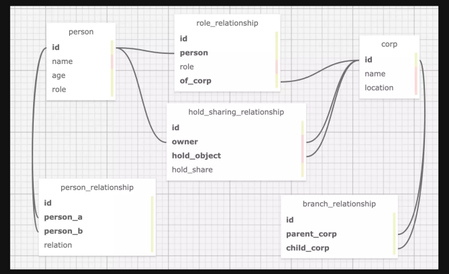

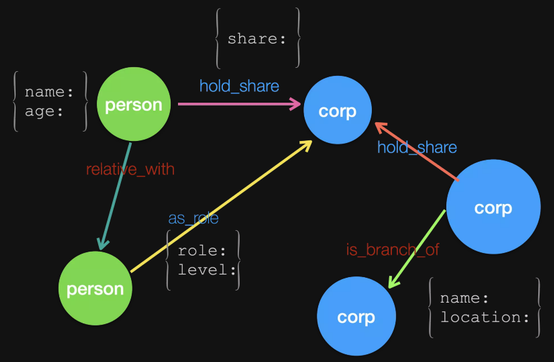

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Performance

	Designed Scenario	2-hop latency (~2.5K)	3-hop latency (~110K)	4-hop latency (~600K)
Graph DB	Relationship Walk	0.01 sec	0.168 sec	1.36 sec
SQL DB	Information retrieval	0.016 sec	30 sec	1544 sec

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Nebula Graph!

Features? Why Yet another Graph DB?

nebula-graph.io/about/**#why-nebula-graph**

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Nebula Graph Introduced

A highly performant linearly scalable graph DB designed in a shared-nothing distributed model. It has been proven to beat the performance of competing graph databases by multiple times over in production.

DoK
Community

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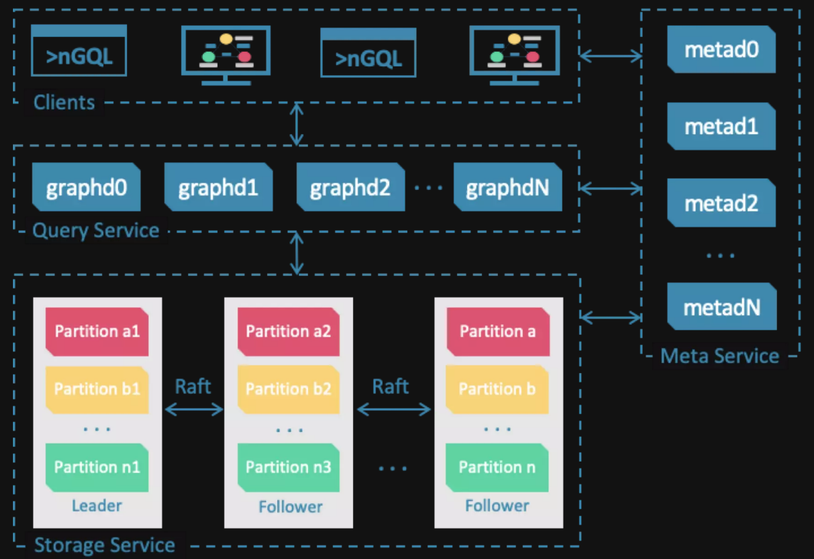

DoK Community

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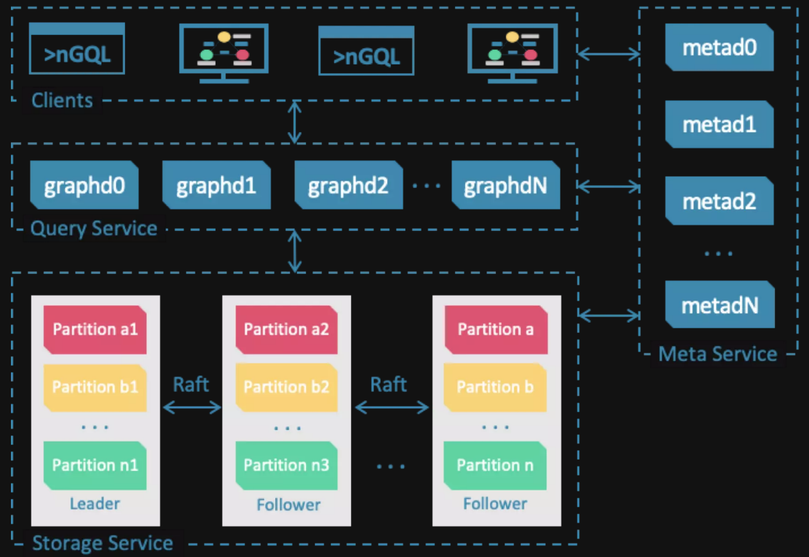


Nebula Arch.

Use Cases

京东数科 · 美团 · 有赞 · 小红书 · WiFi万能钥匙

Tencent 腾讯 · WeBank 微众银行 · vivo · 企查查 · 快手

知乎 · 360数科 · SUNING 苏宁科技 · BOSS直聘 · 网易

Seeyii 视野金服 · 思知 · 半云科技 · 同盾科技 · 携程金融

akulaku · 合合信息 · 中国移动 · oppo

微信 · 众安保险 · 网易游戏 · Soul · ziroom自如

HUAWEI

DoK Community

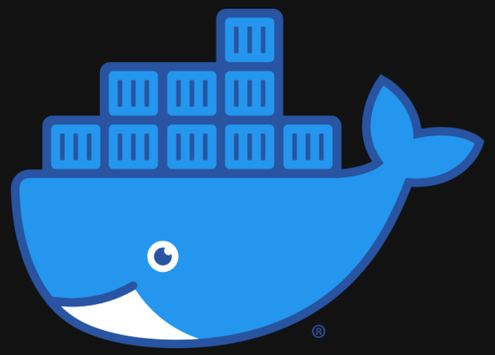
DoK
Community

GDB in the Cloud Native Era

Containerization evolution

Containerization evolution

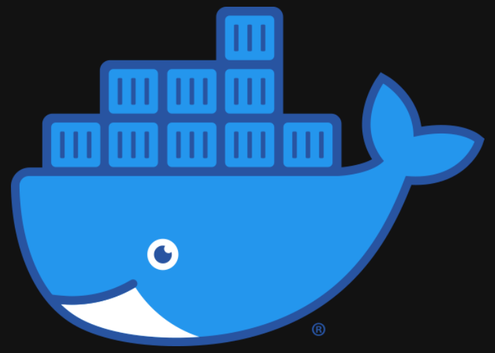
NEBULA DOCKER



DoK
Community

Containerization evolution

NEBULA DOCKER



NEBULA K8S

DoK
Community

Containerization evolution

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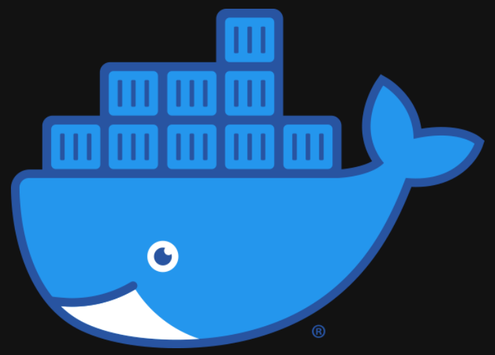
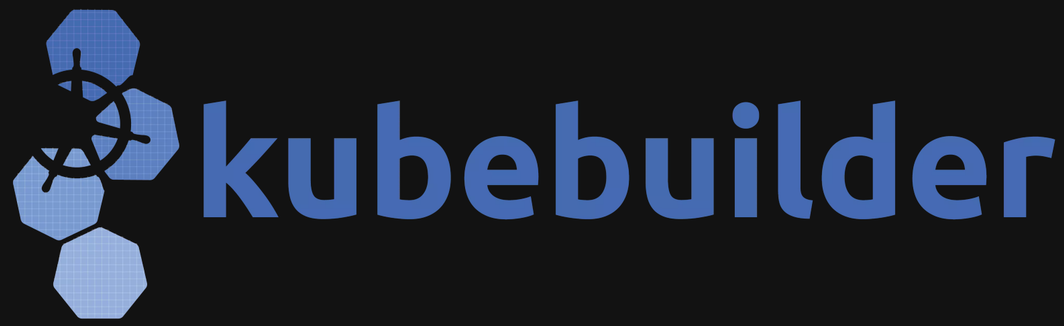


NEBULA K8S

NEBULA OPERATOR



Nebula Operator Implementation

KUBEBUILDER SCAFFOLD

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vesoft-inc/**nebula-operator**

Nebula Operator Implementation

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CRD

```yaml
apiVersion: apps.nebula-graph.io/v1alpha1
kind: NebulaCluster
metadata:
  name: nebula
spec:
  graphd:
    resources:
      requests:
        cpu: "500m"
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    replicas: 3
    image: vesoft/nebula-graphd
    version: v2.5.0
 ...
  reference:
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vesoft-inc/**nebula-operator**

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vesoft-inc/**nebula-operator**

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vesoft-inc/**nebula-operator**

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vesoft-inc/**nebula-operator**

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Nebula Operator Roadmap

roadmap of **nebula-operator**

Nebula Operator Roadmap

- Rolling Upgrade
- Auto Scaling
- Integration with other Services

roadmap of **nebula-operator**

Nebula Operator Roadmap

- Rolling Upgrade
- Auto Scaling
- Integration with other Services

Check out our Github Repo and contribute!

vesoft-inc/**nebula-operator**

roadmap of **nebula-operator**

Nebula Operator Roadmap

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- Integration with other Services

Check out our Github Repo and contribute!

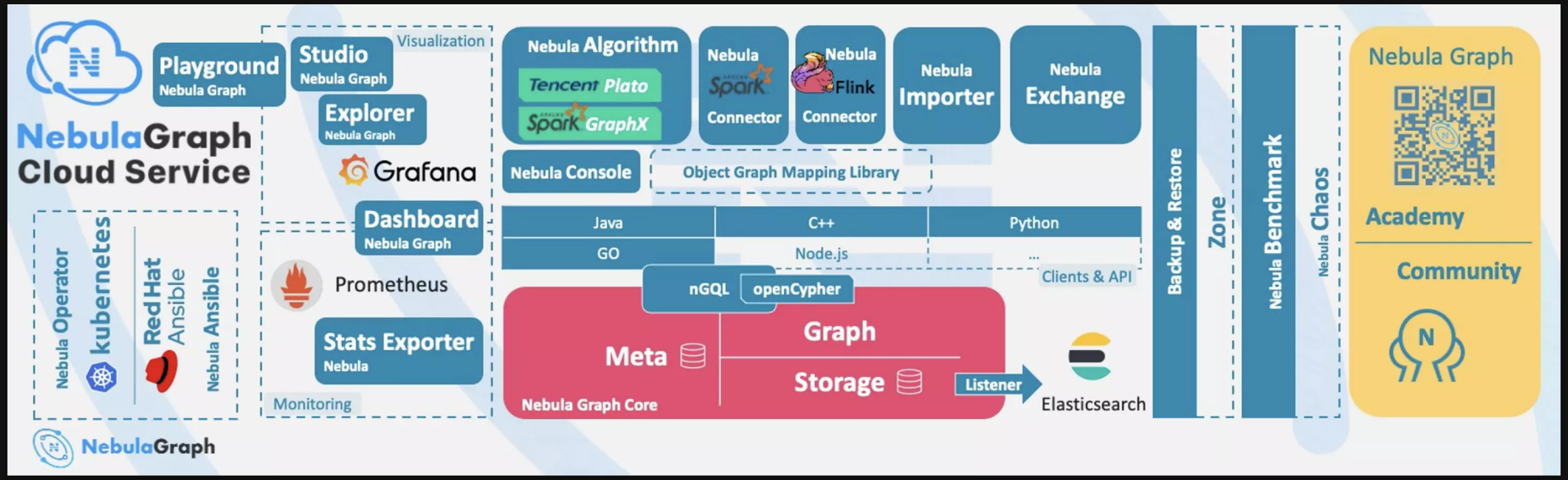
vesoft-inc/**nebula-operator**

roadmap of **nebula-operator**

Nebula Landscape

Nebula Community is rich in ecology and still expanding and exploring, welcome to join and contribute!

- Deployment, Monitoring
- Data Visualization
- Algorithm, Analytic
- Clients, Connectors, ETL



vesoft-inc/**nebula**

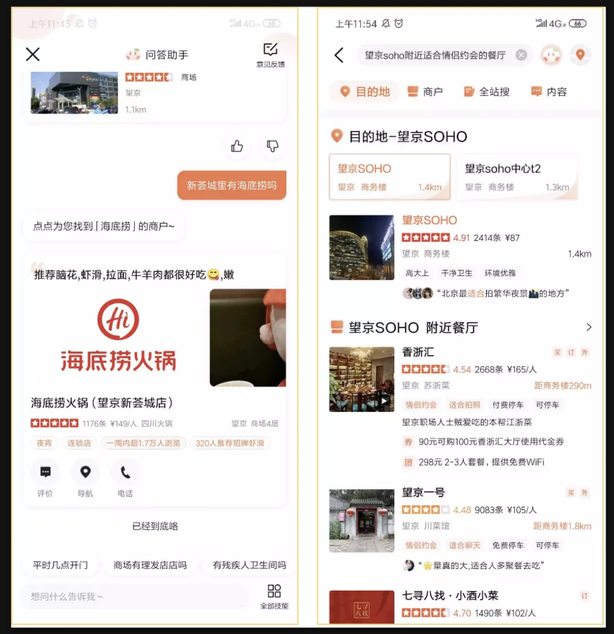
DoK Community

Hands on GraphDB

Nebula on K8s - Demo

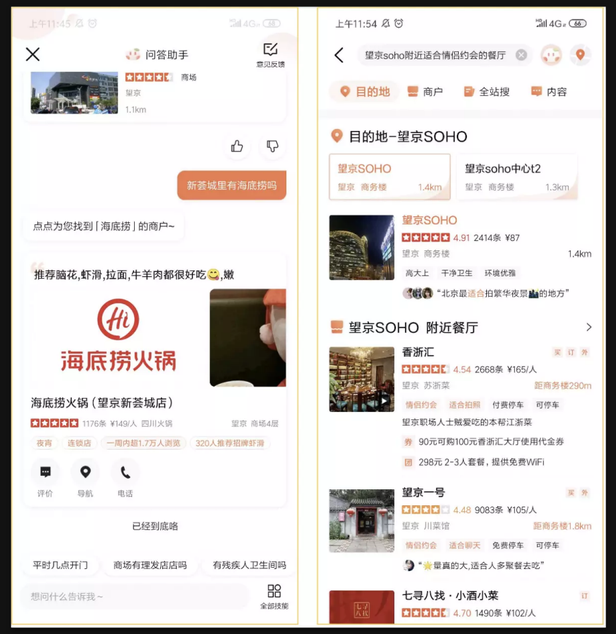
Use Case Explained

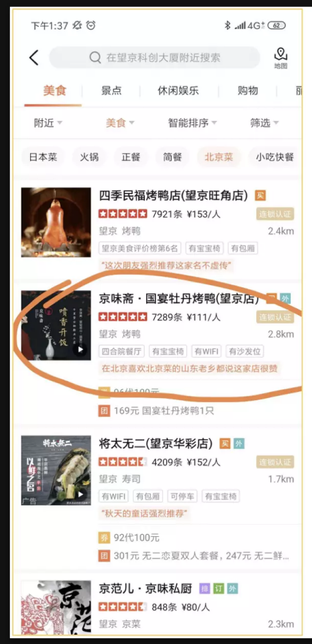
Use Case Explained

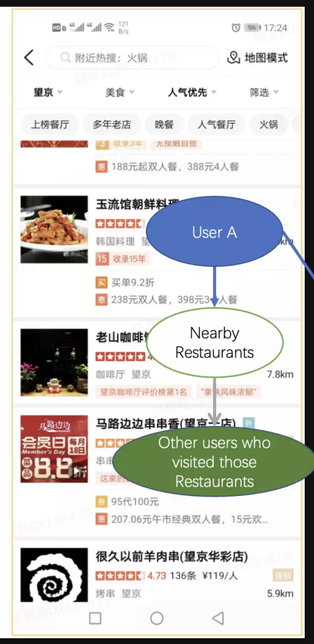


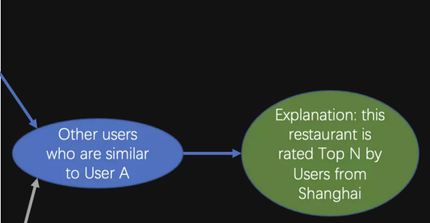
DoK Community

Use Case Explained



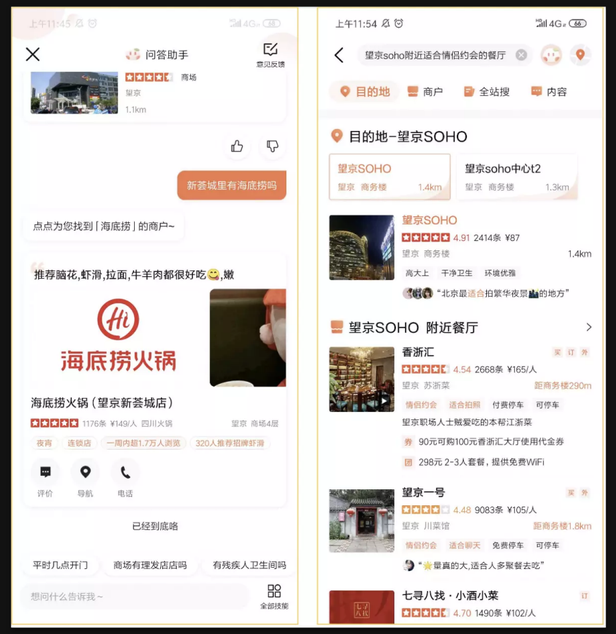


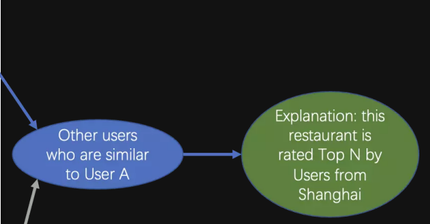




DoK Community

Use Case Explained

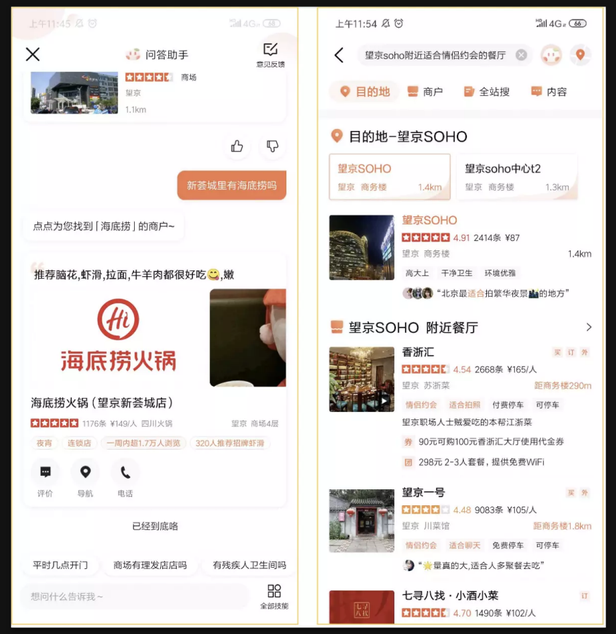


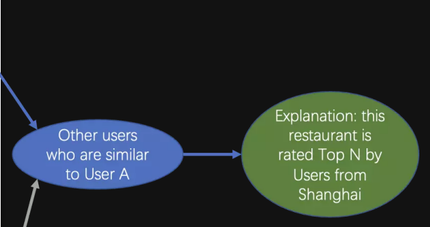


tech.meituan.com/2021/04/01/nebula-graph-practice-in-meituan.html

DoK Community

Use Case Explained





SNS	Risk Control	Public Security	Knowledge Graph	ML
Biopharmacy	IoT	Blockchain	Data Lineage	AIOps

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DoK Community

KinD + Nebula Graph

```
curl -sL nebula-kind.siwei.io/install.sh | bash
```

```
$ kubectl get svc nebula-graphd-svc-nodeport
NAME                          TYPE       CLUSTER-IP      EXTERNAL-IP   PORT(S)                          AGE
nebula-graphd-svc-nodeport    NodePort   10.233.62.198   <none>        9669:32669/TCP,19669:32001/TCP   3m57s
$ kubectl edit svc nebula-graphd-svc-nodeport
service/nebula-graphd-svc-nodeport edited
$ ~/.nebula-kind/bin/console -u root -p password --address=192.168.8.137 --port=32669
2021/09/01 20:38:39 [INFO] connection pool is initialized successfully
Welcome to Nebula Graph!

(root@nebula) [(none)]> show hosts
+-------------------------------------------------------------------------+------+----------+--------------+-------------
| Host                                                                    | Port | Status   | Leader count | Leader distr
+-------------------------------------------------------------------------+------+----------+--------------+-------------
| "nebula-storaged-0.nebula-storaged-headless.default.svc.cluster.local" | 9779 | "ONLINE" | 0            | "No valid pa
+-------------------------------------------------------------------------+------+----------+--------------+-------------
| "nebula-storaged-1.nebula-storaged-headless.default.svc.cluster.local" | 9779 | "ONLINE" | 0            | "No valid pa
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| "Total"                                                           |      |          | 0            |
+-------------------------------------------------------------------+------+----------+--------------+-------------

Got 4 rows (time spent 2510/2955 us)
```

Nebula Graph Data Import

```
$ wget https://docs.nebula-graph.io/2.0/basketballplayer-2.X.ngql
$ ~/.nebula-kind/bin/console -u root -p password --address=192.168.8.137 --port=32669 -f basketballplayer-2.X.ngql
...
(root@nebula) [basketballplayer]> insert edge serve(start_year,end_year) values "player150"->"team213":(2018, 2019);
Execution succeeded (time spent 946/1091 us)
Wed, 01 Sep 2021 20:47:58 UTC

[root@wey wey.gu]# ~/.nebula-kind/bin/console -u root -p password --address=192.168.8.137 --port=32669
(root@nebula) [(none)]> show spaces
+--------------------+
| Name               |
+--------------------+
| "basketballplayer" |
+--------------------+
(root@nebula) [(none)]> use basketballplayer
(root@nebula) [basketballplayer]> show tags
+----------+
| Name     |
+----------+
| "player" |
+----------+
| "team"   |
+----------+
```

Doc: **Sample Dataset**

Nebula Graph Data Import

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+----------+
```

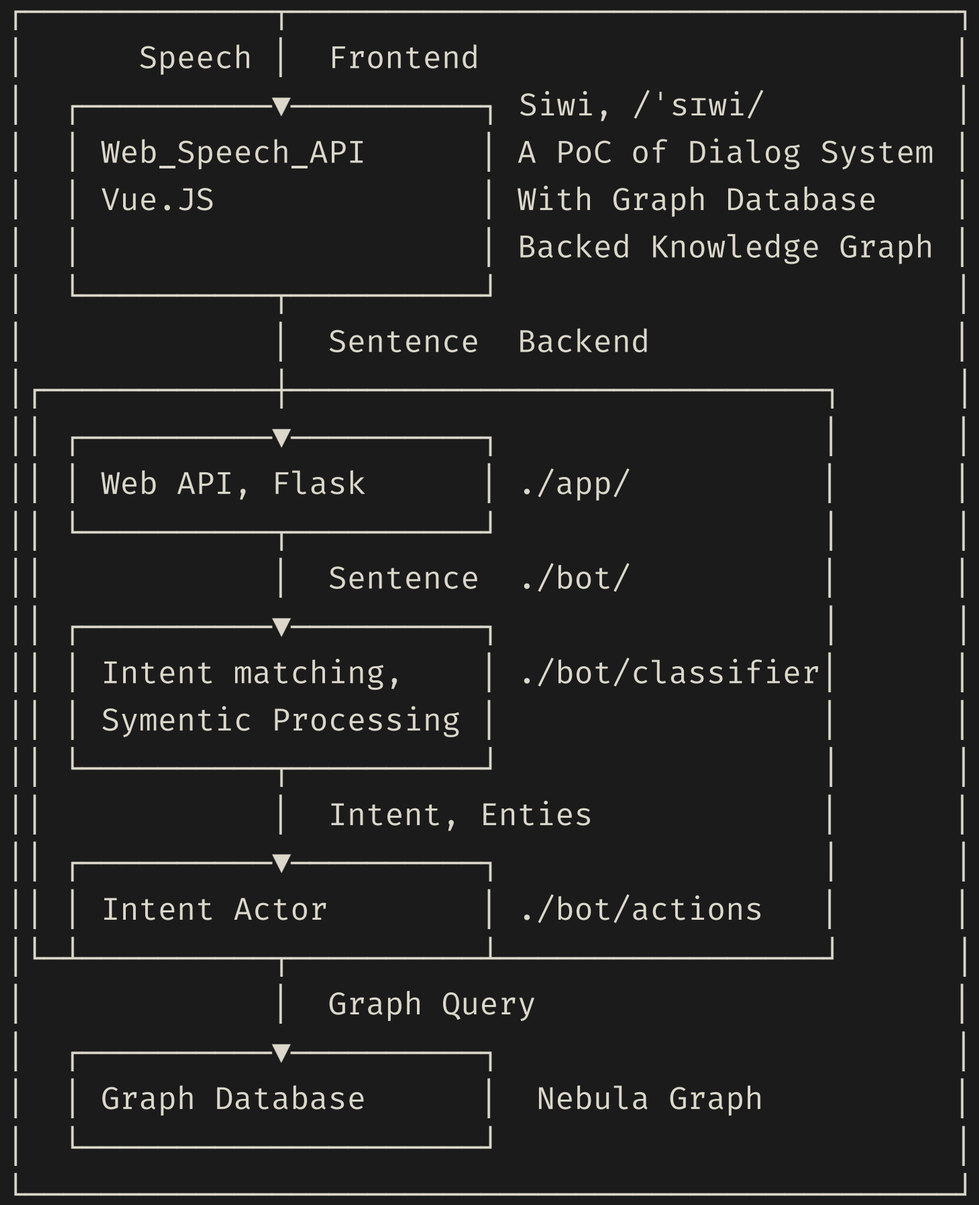
Doc: **Sample Dataset**

Siwi, the voice agent

Siwi (/'sɪwi/) is a PoC of Dialog System With Graph Database Backed Knowledge Graph.

DoK
Community

ARCH



CODE

```
.
├── README.md
├── src
│   ├── siwi                # Siwi-API Backend
│   │   ├── app             # Web Server, take HTTP req > ca
│   │   └── bot             # Bot API
│   │       ├── actions     # Take Intent, Slots, Query KG h
│   │       ├── bot         # Entrypoint of the Bot API
│   │       ├── classifier # Symentic Parse, Intent Match,
│   │       └── test        # Example Data as equivalent/moc
│   └── siwi_frontend       # Browser End
│       ├── README.md
│       ├── package.json
│       └── src
│           ├── App.vue     # Listen to user and pass Qs to
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└── wsgi.py
```
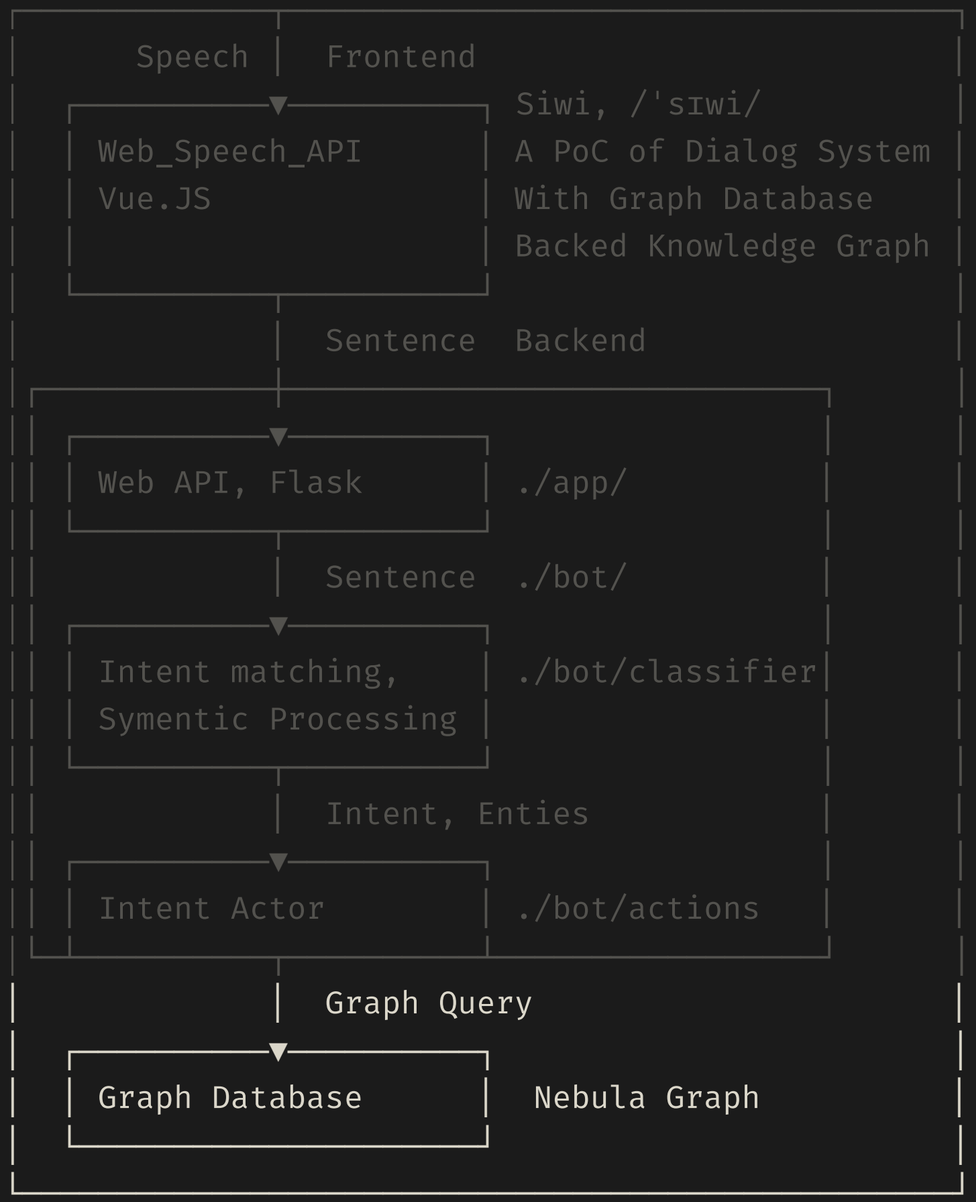

wey-gu/**nebula-siwi**

ARCH



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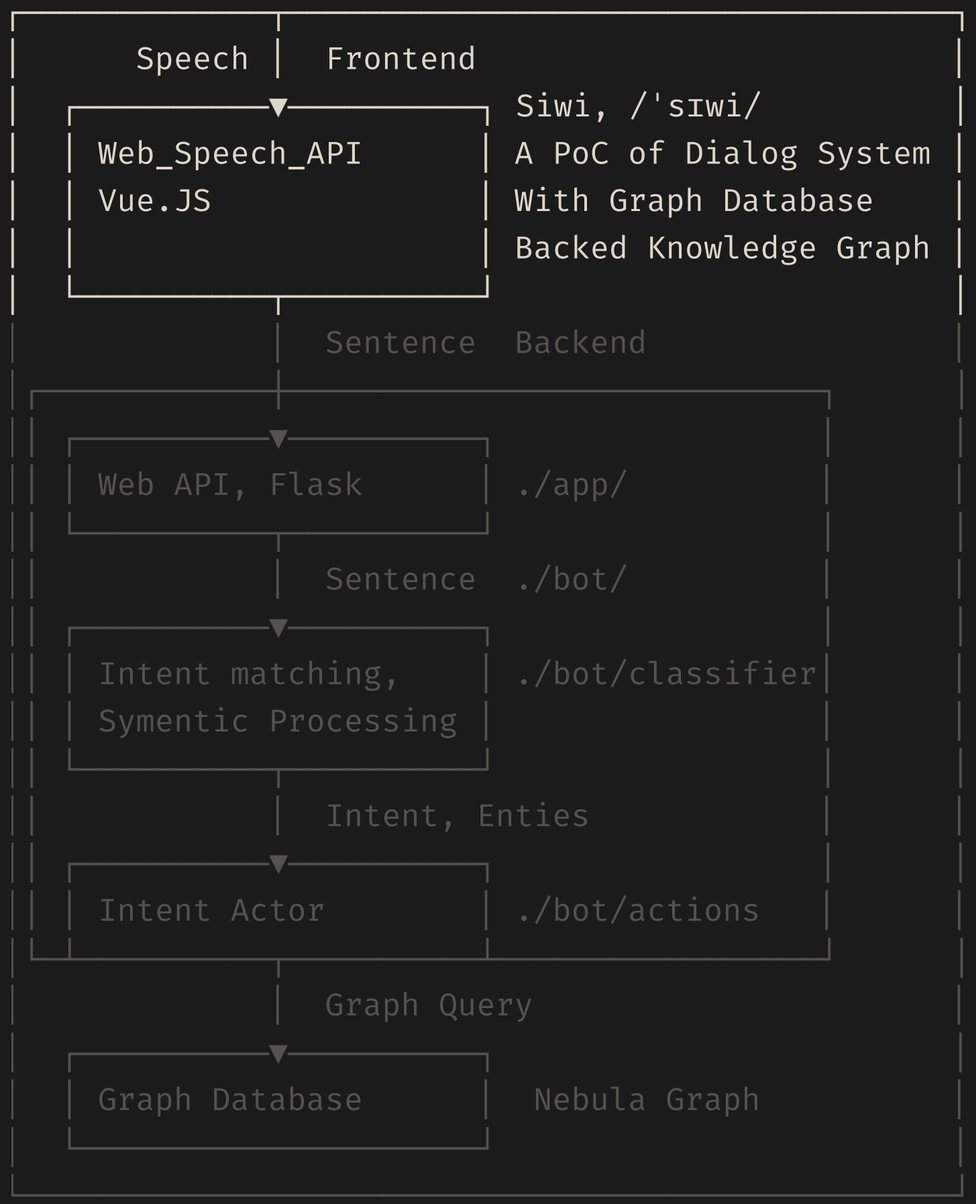

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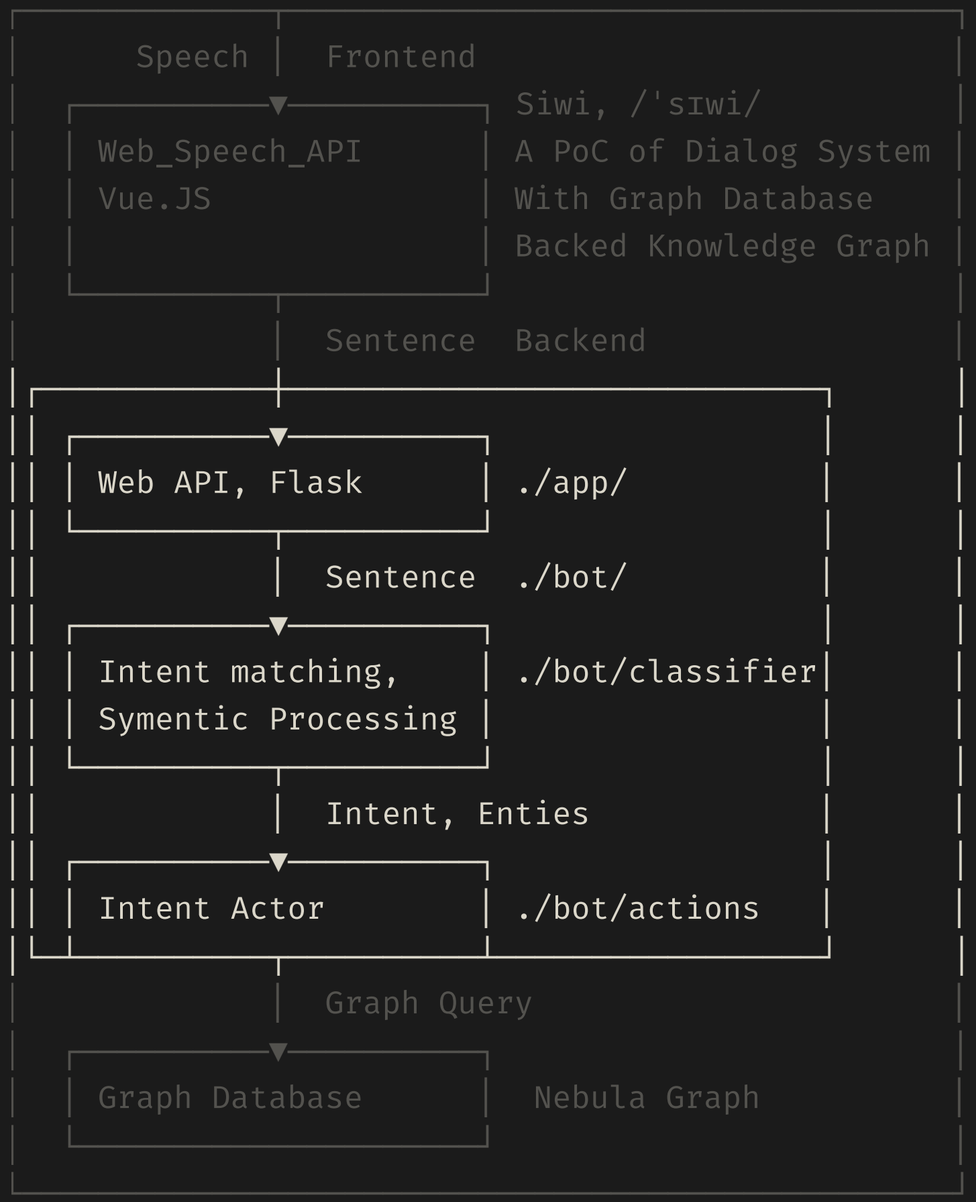

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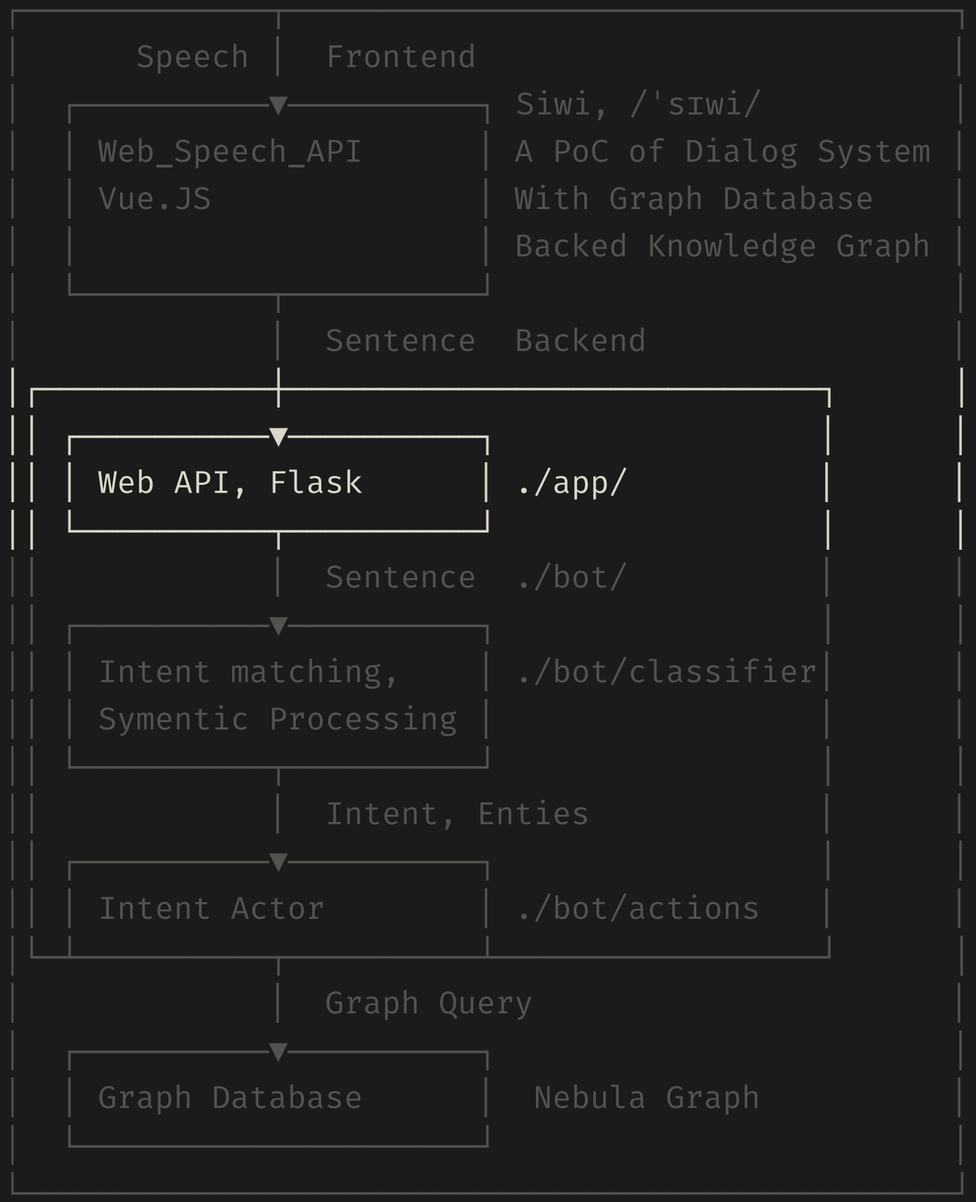

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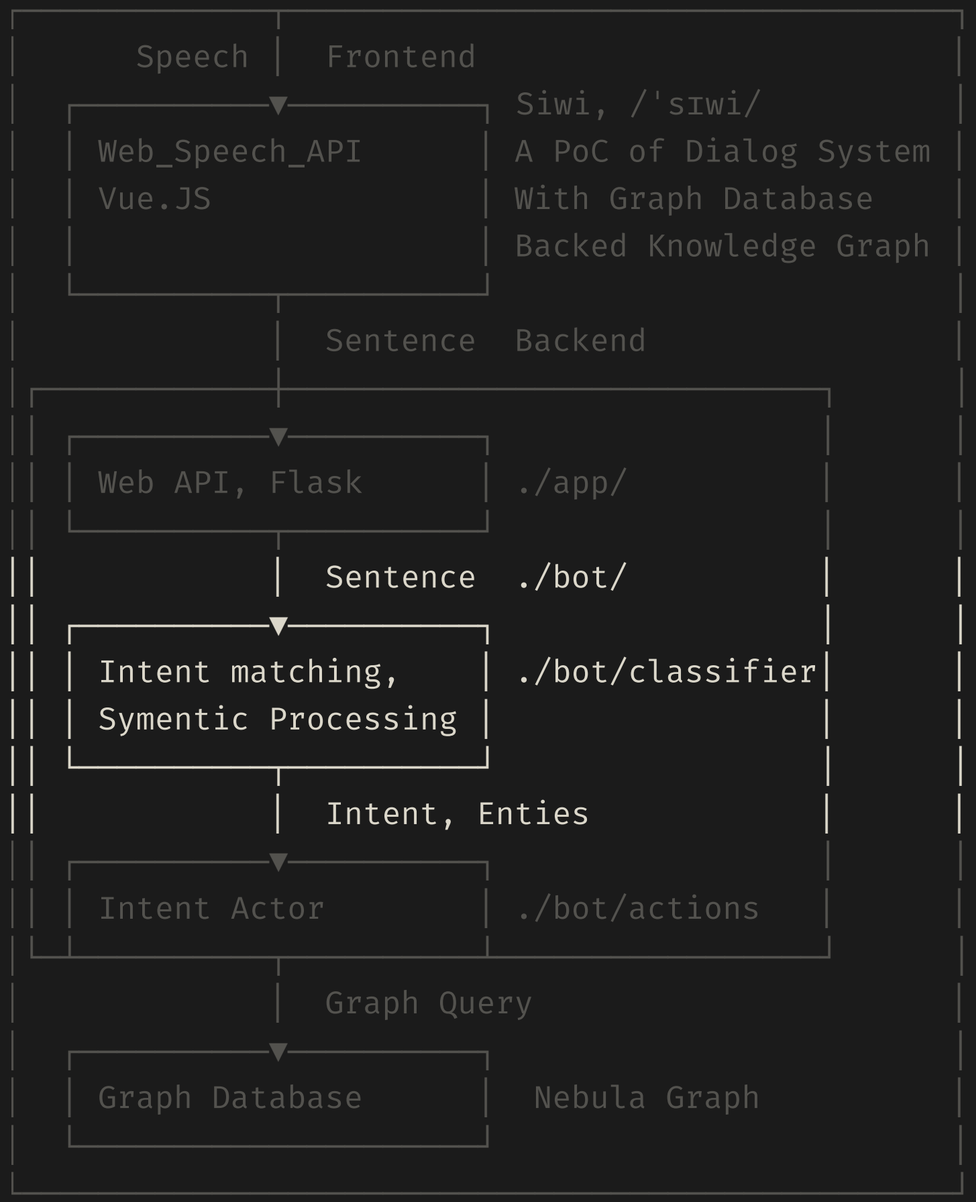

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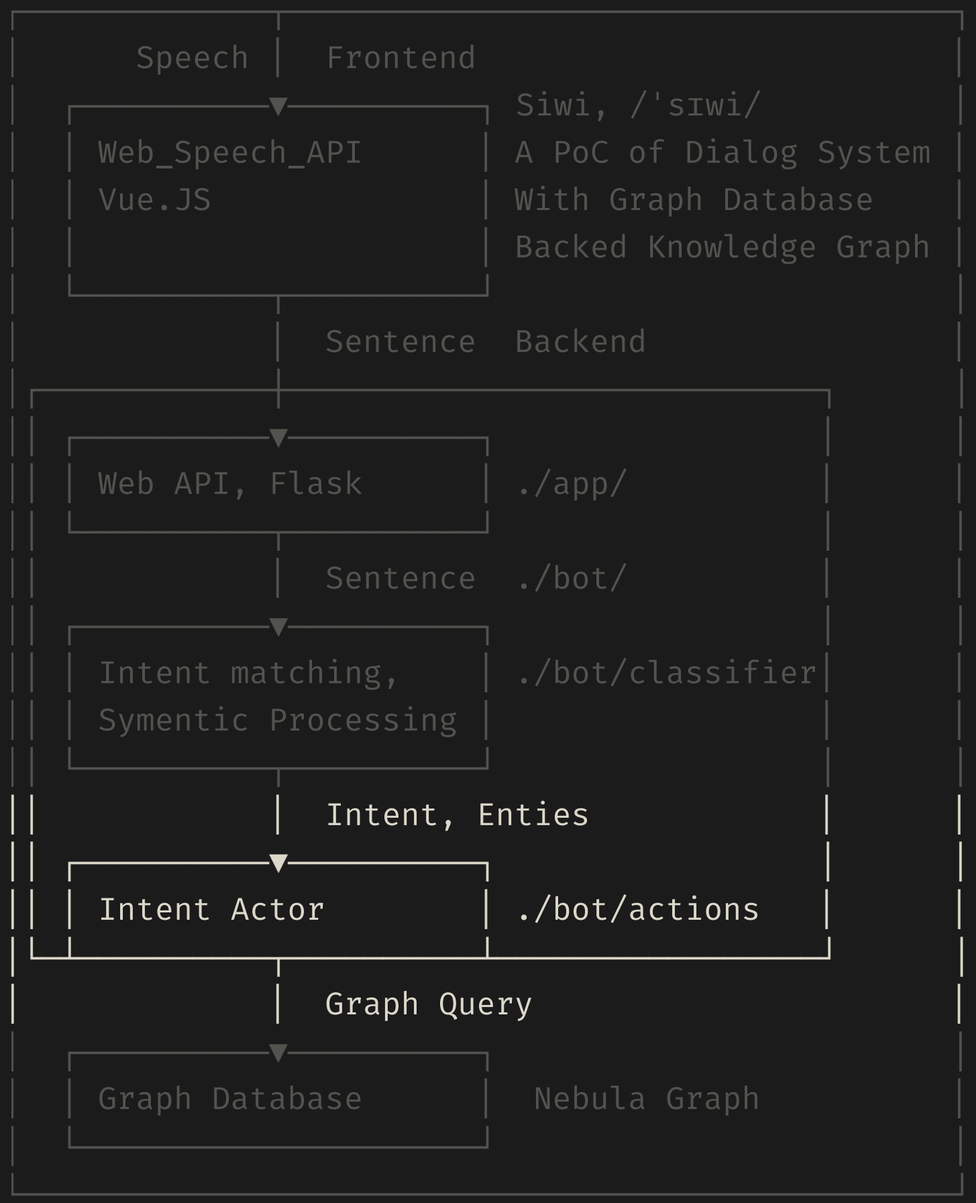

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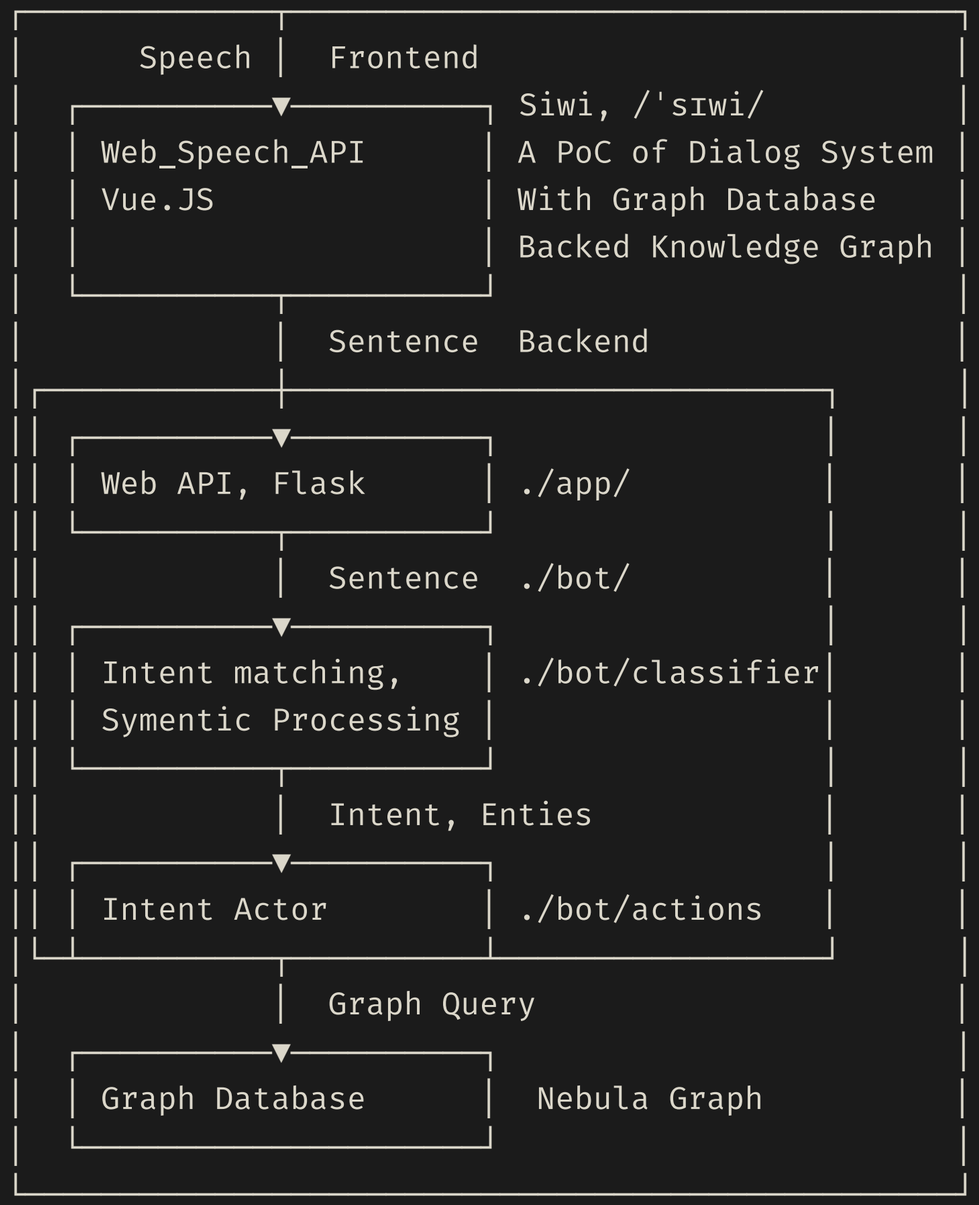

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wey-gu/**nebula-siwi**

Live Demo

Siwi on K8s

katacoda.com/wey/scenarios/**siwi-kgqa**

Recap

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- Nebula Graph!
- Nebula Operator
- GDB on K8s
- Siwi, a KBQA system based on GDB
- Nebula-Siwi on FaaS on KubeSphere

DoK Community

Live Streaming
Sept. [tbd], 2021

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wey-gu

wey_gu

siwei.io

DoK Community

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