Software Architecture & System Design Practical Case Studies

By Michael Pogrebinsky

Copyright Notice

www.topdeveloperacademy.com

Introduction to Software Architecture & System Design Case Studies

- **Software Architect's Mindset - Important Concepts**
  - Abstraction
  - Every System is Unique
  - System Design doesn't have One Correct Solution
- **System Design - Step-by-step Process**
  - Gathering Functional Requirements
  - Gathering Non-Functional Requirements
  - Defining System's API & Sequence of Events
  - Designing for Functional Requirements
  - Addressing Non-Functional Requirements

Notes:

www.topdeveloperacademy.com

Design a Highly Scalable Image Sharing Social Media Platform

System Design of a Highly Scalable Image-Sharing Platform - Part 1

- **Sequence Diagram and System's API:**

www.topdeveloperacademy.com
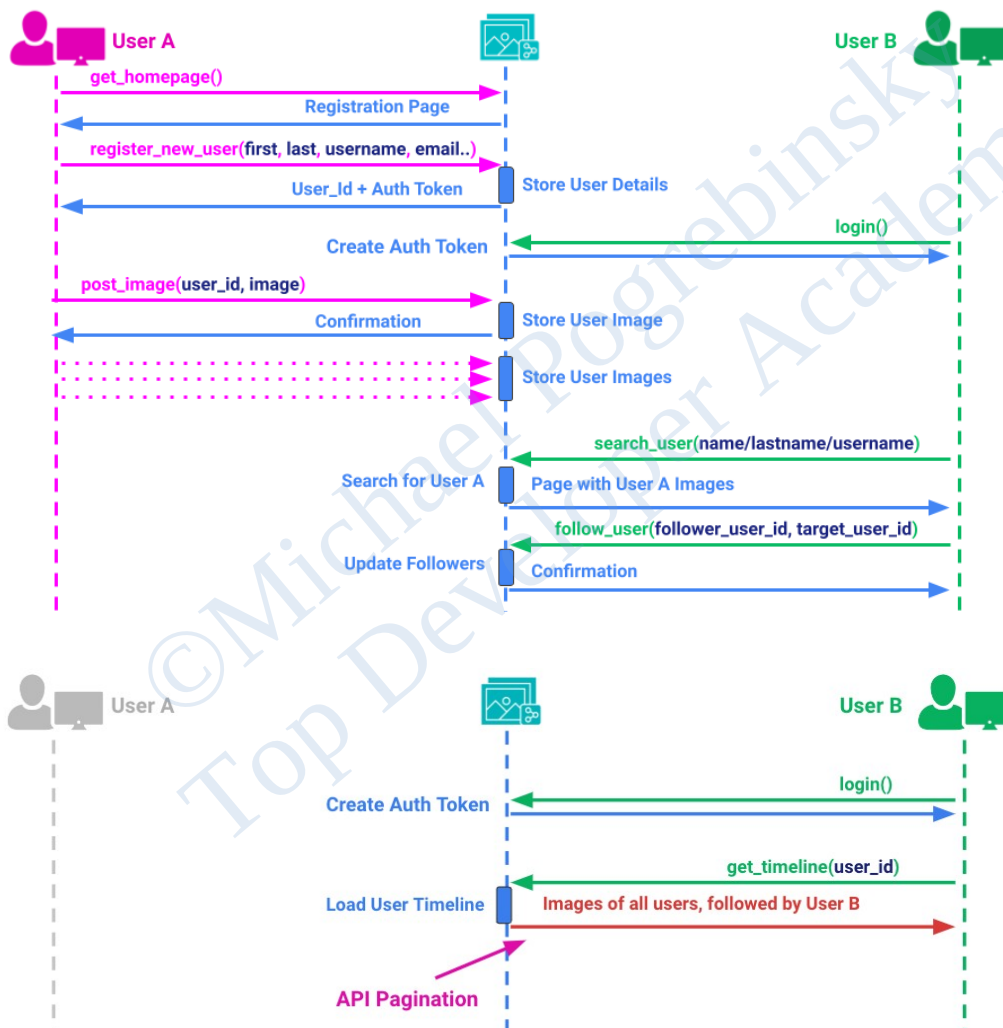
System Design of a Highly Scalable Image-Sharing Platform - Part 2

- **Functional Software Architecture Diagram:**

Notes:

www.topdeveloperacademy.com
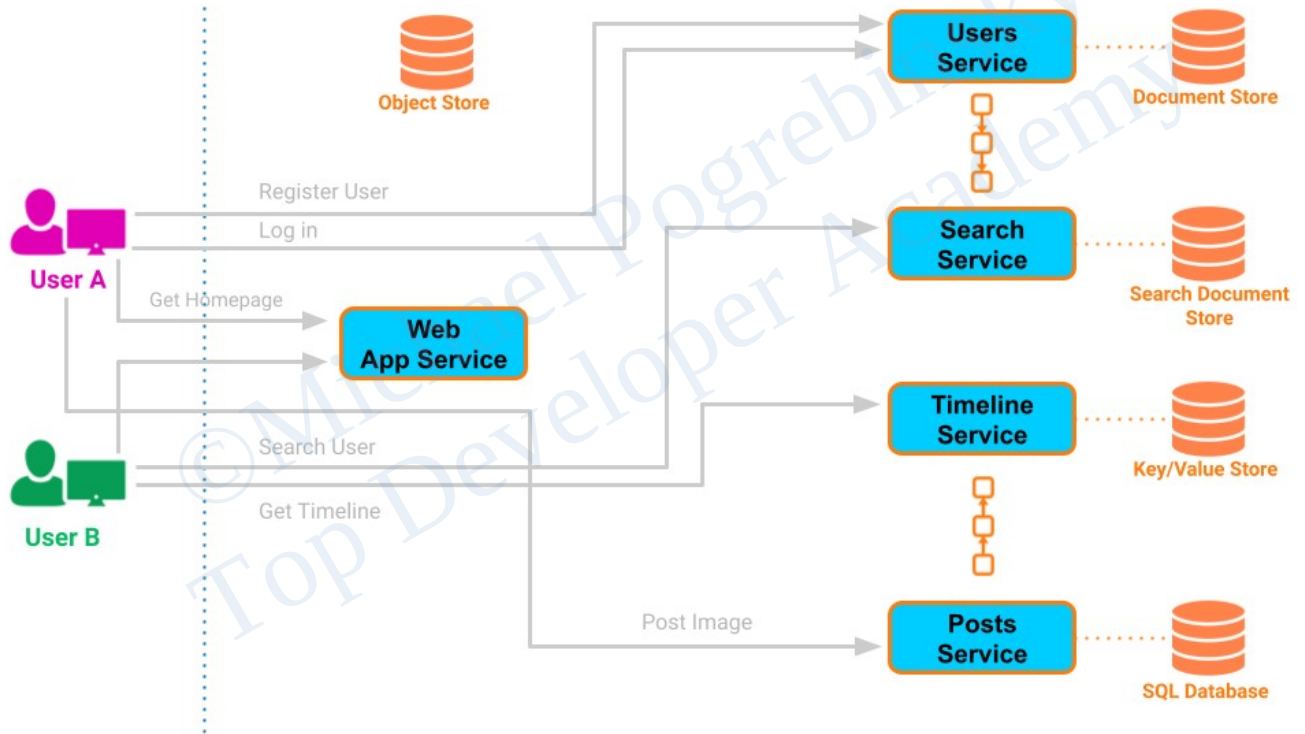
System Design of a Highly Scalable Image-Sharing Platform - Part 3

- **Final Software Architecture Diagram:**

Notes:

www.topdeveloperacademy.com
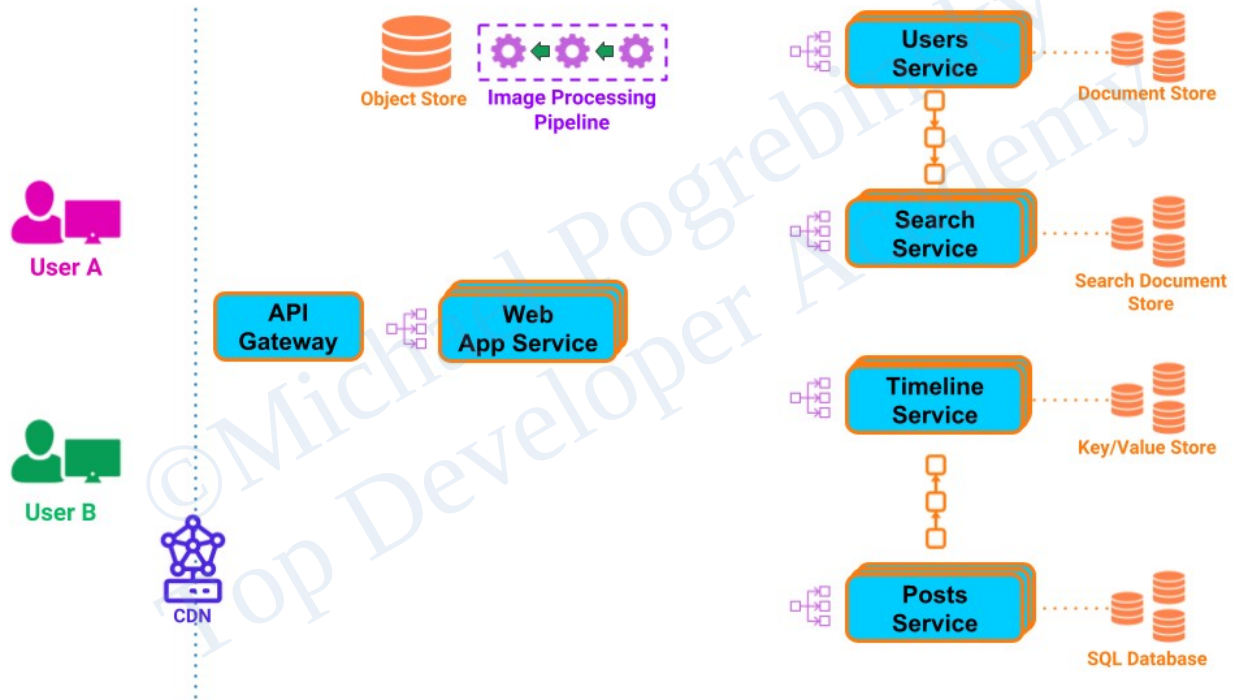
Design a Video-On-Demand (VOD) Streaming Service

Software Architecture & System Design of a VOD Streaming Service - Part 1

- **Sequence Diagram and API:**
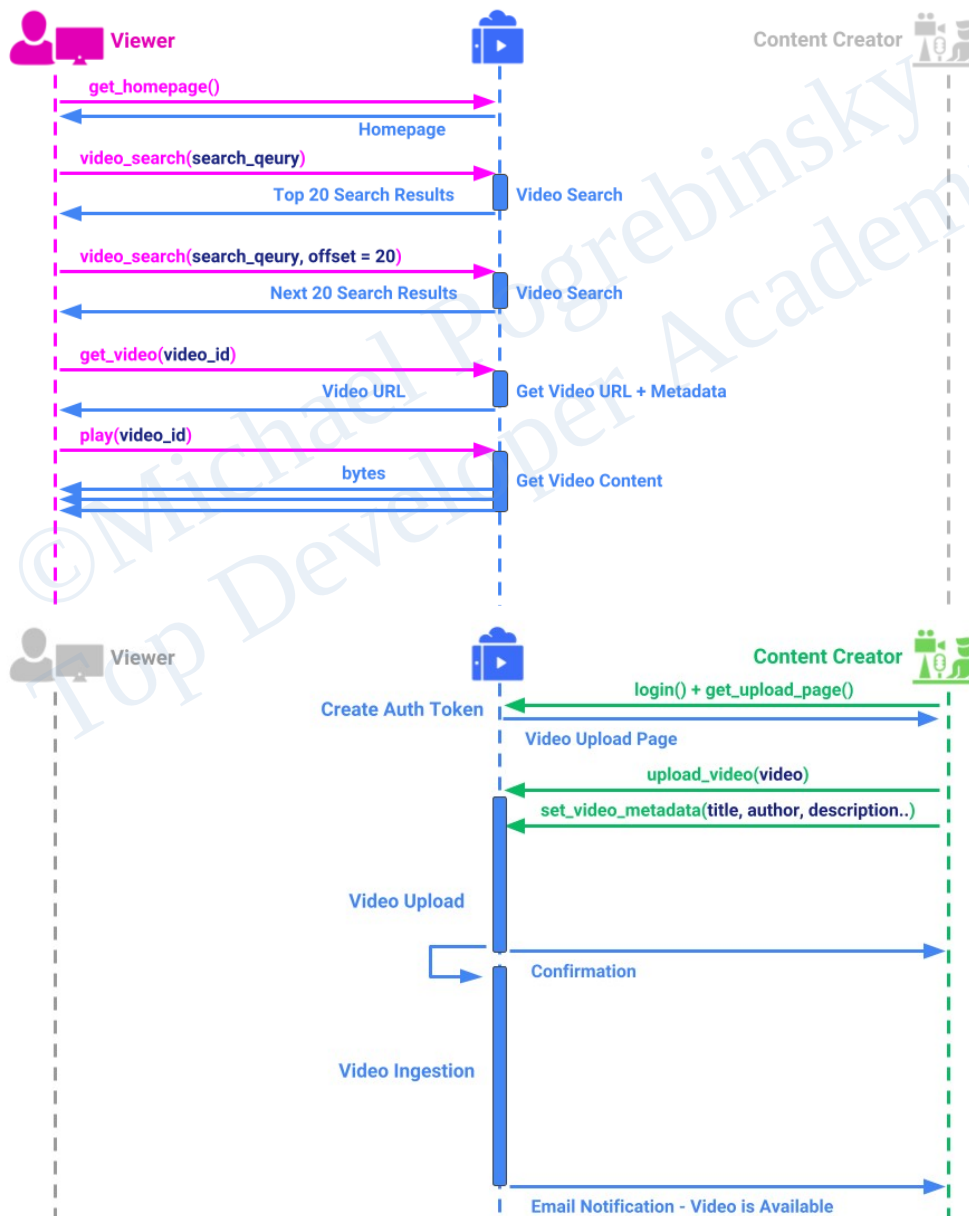
www.topdeveloperacademy.com

Notes:

www.topdeveloperacademy.com

Software Architecture & System Design of a VOD Streaming Service - Part 2

- **Functional Software Architecture Diagram:**

Notes:

www.topdeveloperacademy.com
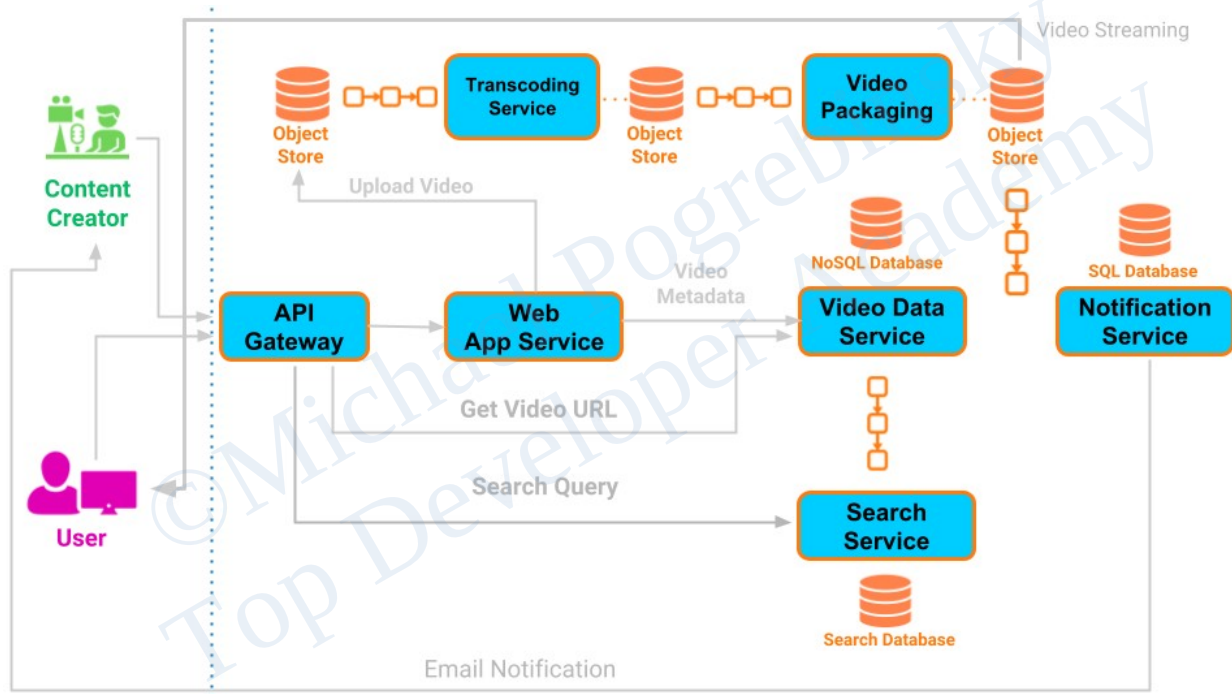
Software Architecture & System Design of a VOD Streaming Service - Part 3

● **Final Software Architecture Diagram:**

Notes:

www.topdeveloperacademy.com
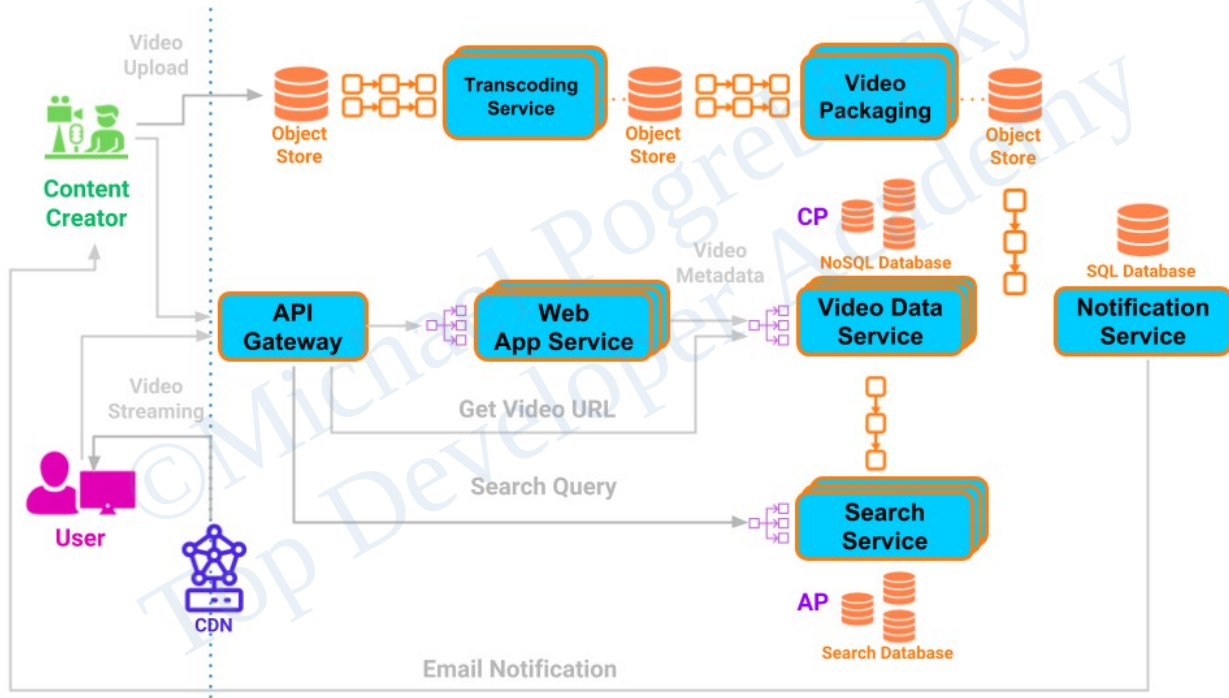
Design a Highly Scalable, Real-Time Instant Messaging Service

Software Architecture & System Design of a Real-Time Instant Messaging - Part 1

- **Sequence Diagram and System's API:**

www.topdeveloperacademy.com

Notes:

www.topdeveloperacademy.com
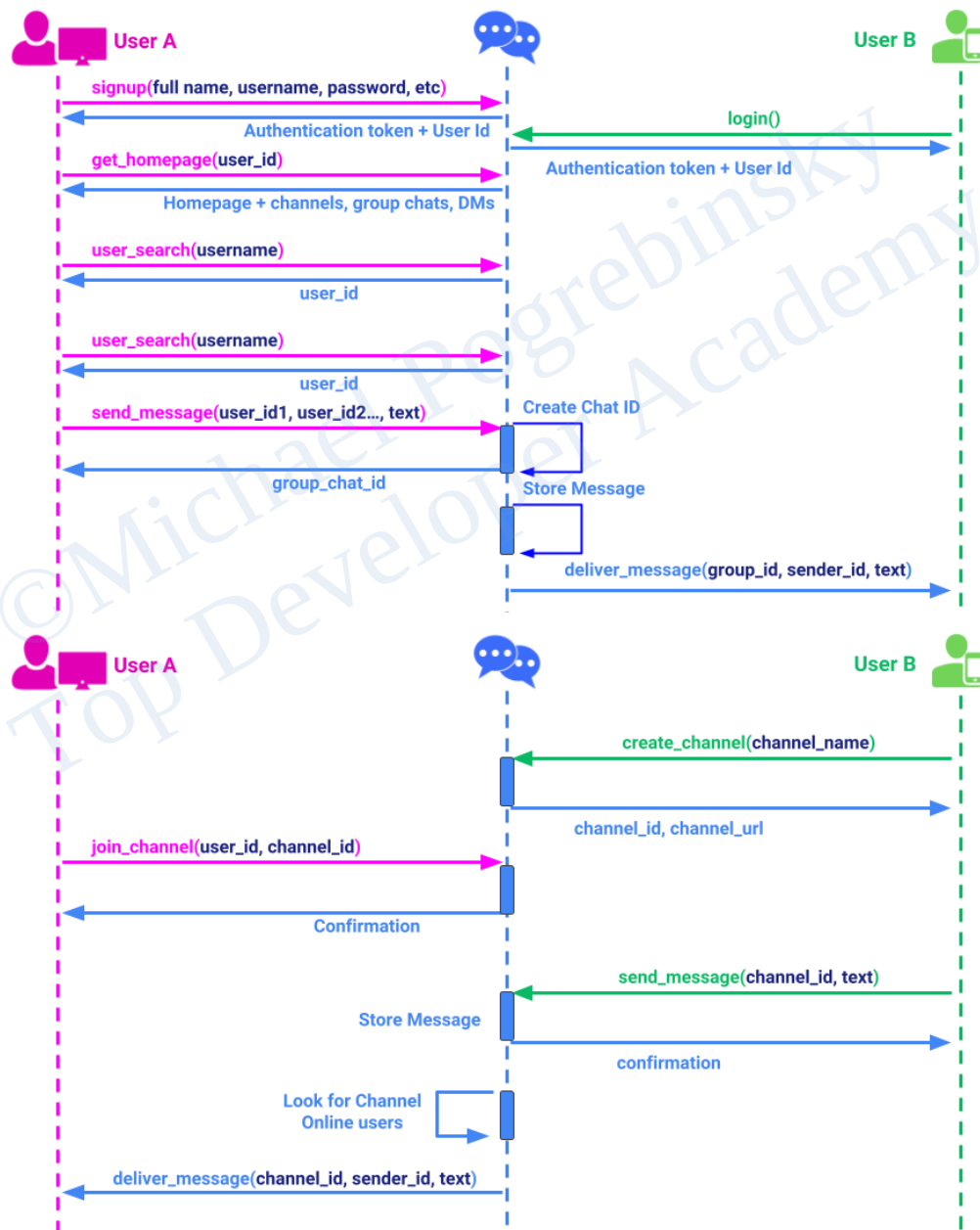
Software Architecture & System Design of a Real-Time Instant Messaging - Part 2

● **Functional Software Architecture Diagram:**

Notes:

www.topdeveloperacademy.com
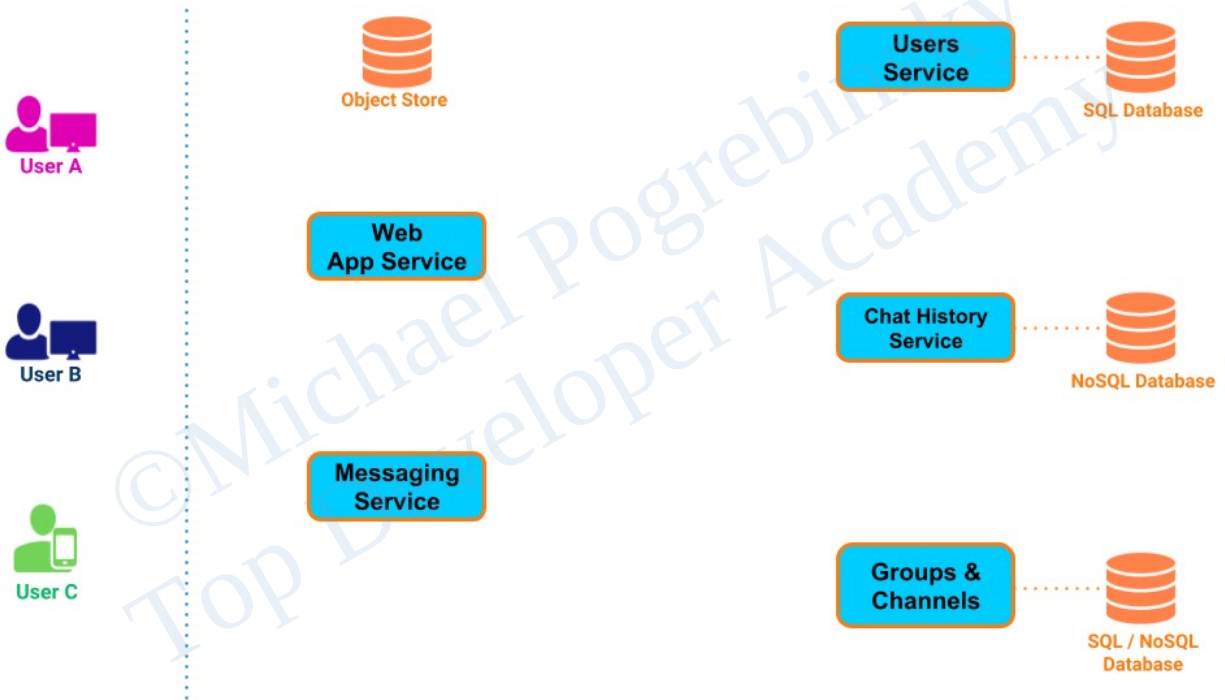
Software Architecture & System Design of a Real-Time Instant Messaging - Part 3
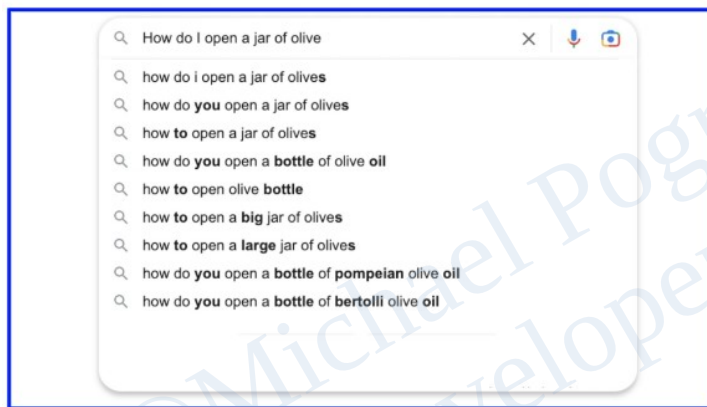
- **Final Software Architecture Diagram:**
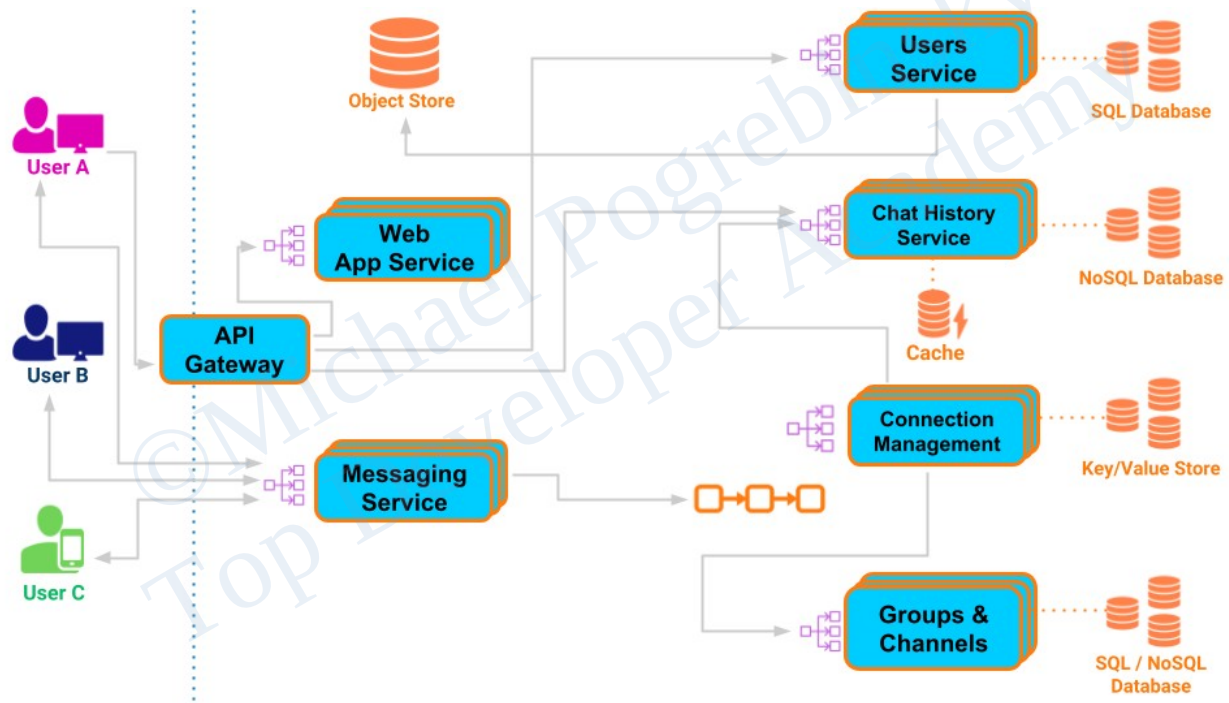
Notes:

www.topdeveloperacademy.com

System Design a Highly Scalable Typeahead Service for a Search Engine - Part 1

- **System's API:**

HTTP GET /complete?q=How%20do%20I%20open%20a%20jar%20of%20olive


```
Response : {
  "suggestions":[
    "How do i open a jar of olives",
    "How do you open a jar of oli..",
    "How to open a jar of olives"
    "How do you open a bottle ….",
    "How to open olive bottle",
    "How to open a big jar of olives",
    "How to open a large jar of ….",
    "How do you open a bottle ….",
    "How do you open a bottle …"
  ]
}
```

HTTP GET /search?q=How%20do%20I%20open%20a%20jar%20of%20olives

```
Response : {
  "results":[
    "……………………………",
    "……………………………",
    "……………………………",
    "……………………………",
    "……………………………",
    "……………………………",
    "……………………………",
    "……………………………",
    "……………………………"
  ]
}
```

www.topdeveloperacademy.com

Notes:

www.topdeveloperacademy.com

System Design a Highly Scalable Typeahead Service for a Search Engine - Part 2

- **Functional Software Architecture Diagram:**

Notes:

www.topdeveloperacademy.com
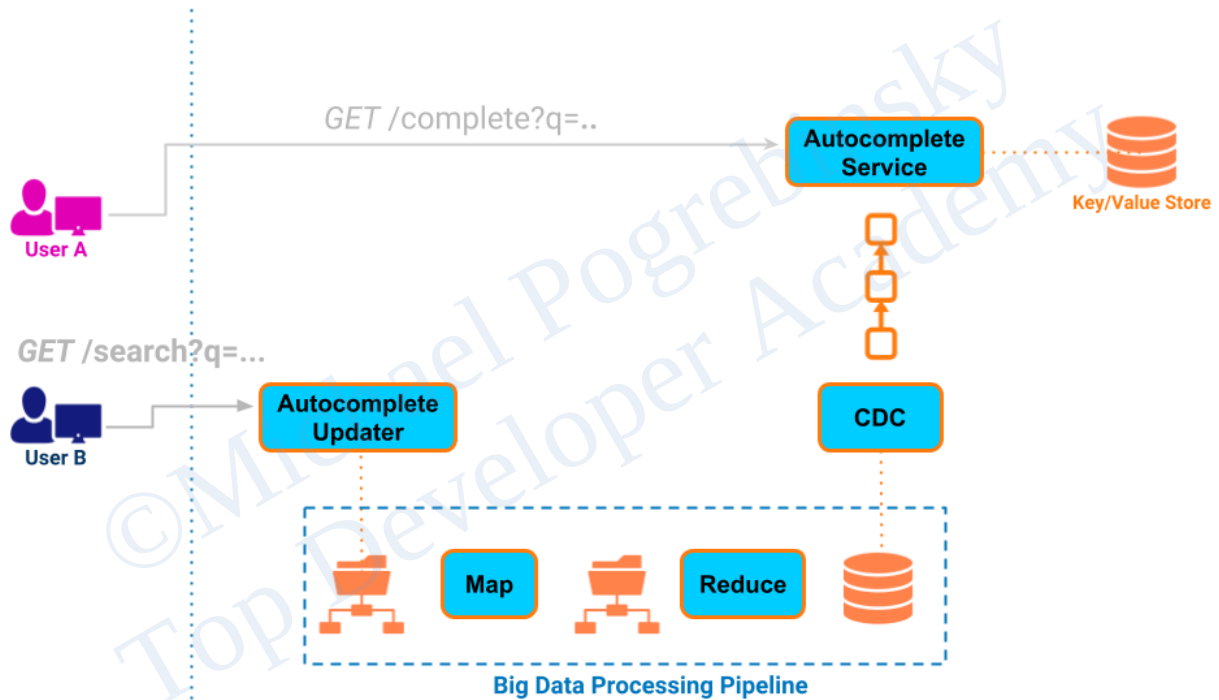
System Design a Highly Scalable Typeahead Service for a Search Engine - Part 3
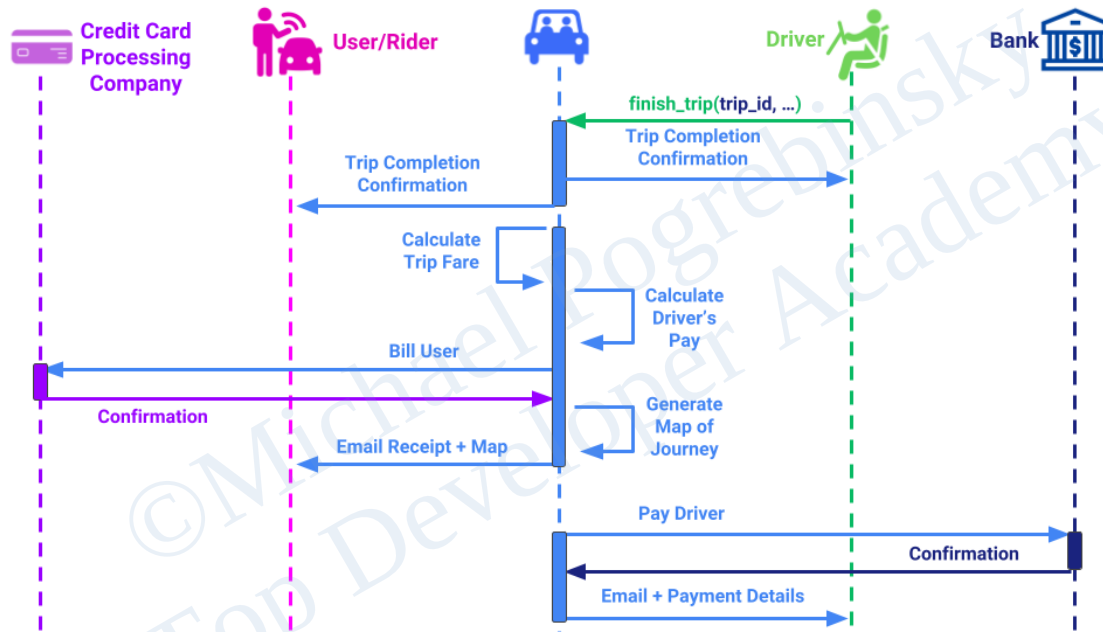
- **Final Software Architecture Diagram:**
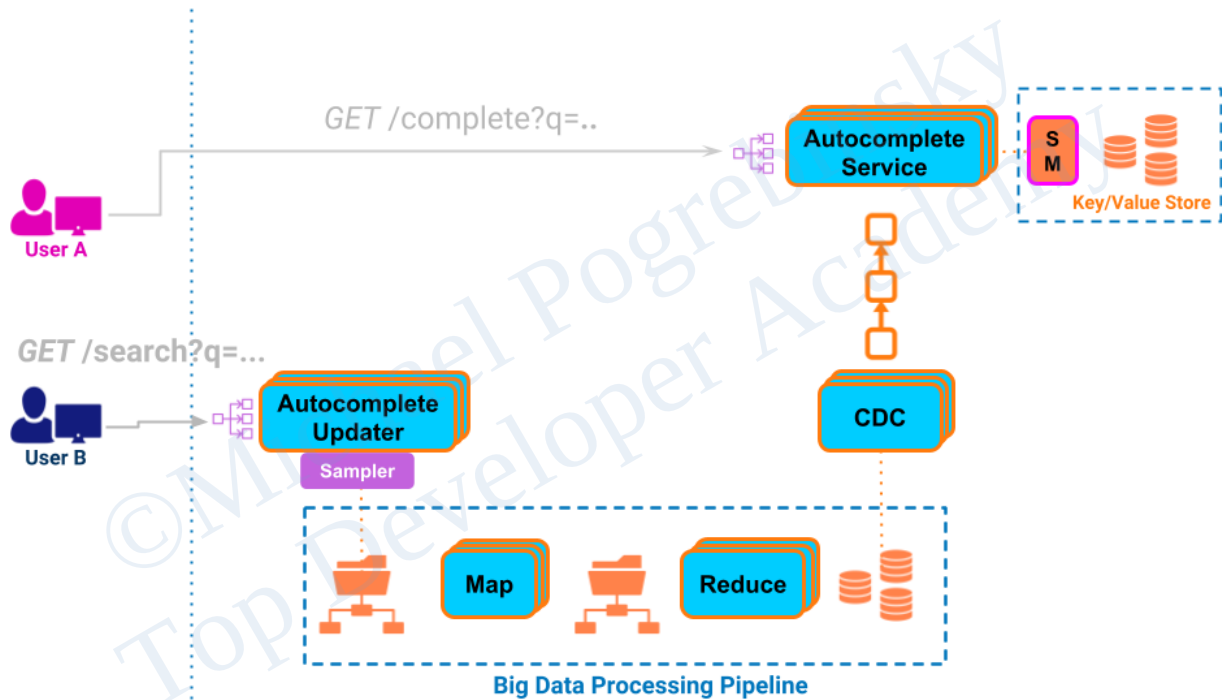
www.topdeveloperacademy.com

Software Architecture & Design of a Scalable Rideshare Service - Part 1

- **Sequence Diagram and System's API:**
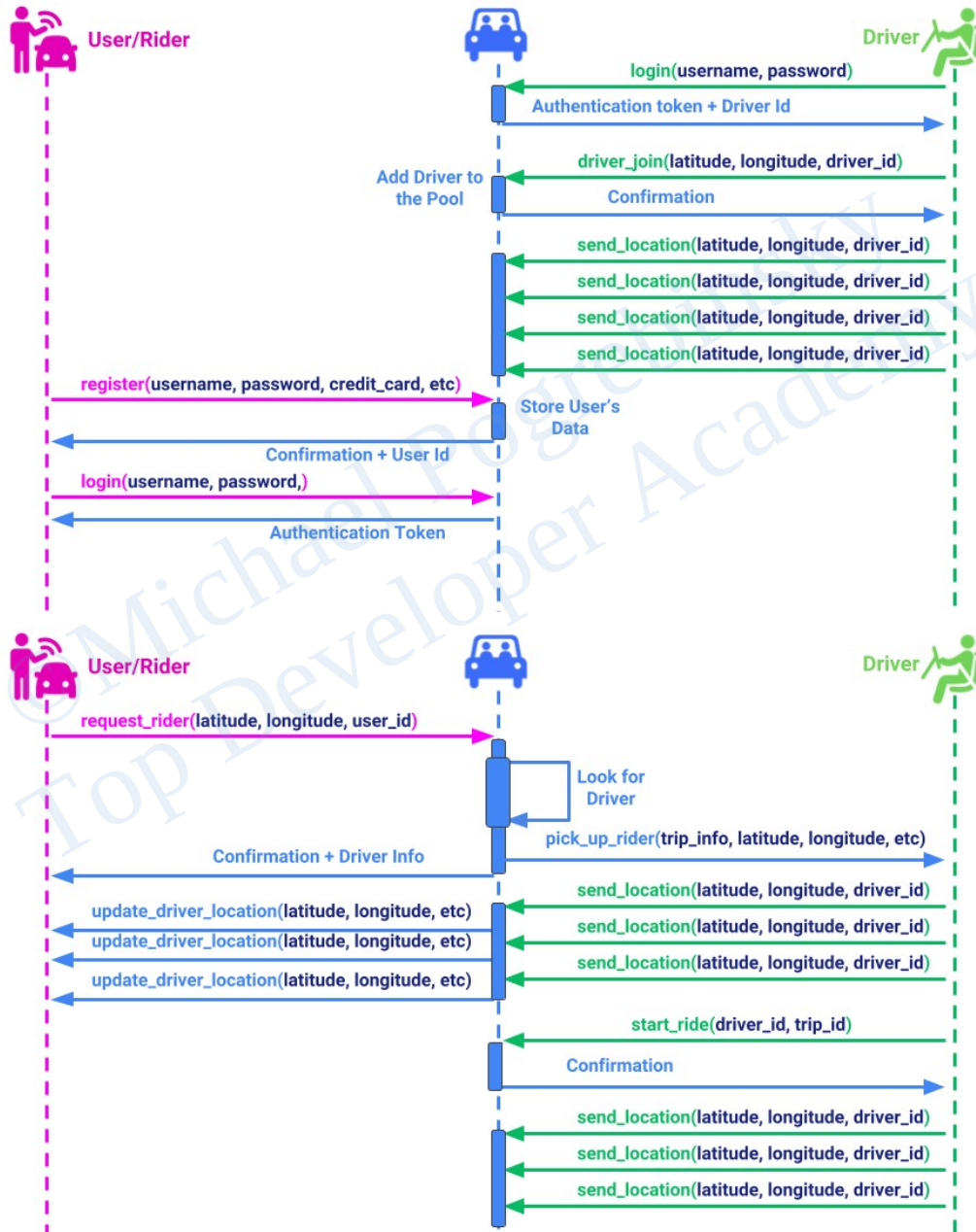
Notes:

www.topdeveloperacademy.com

Software Architecture & Design of a Scalable Rideshare Service - Part 2

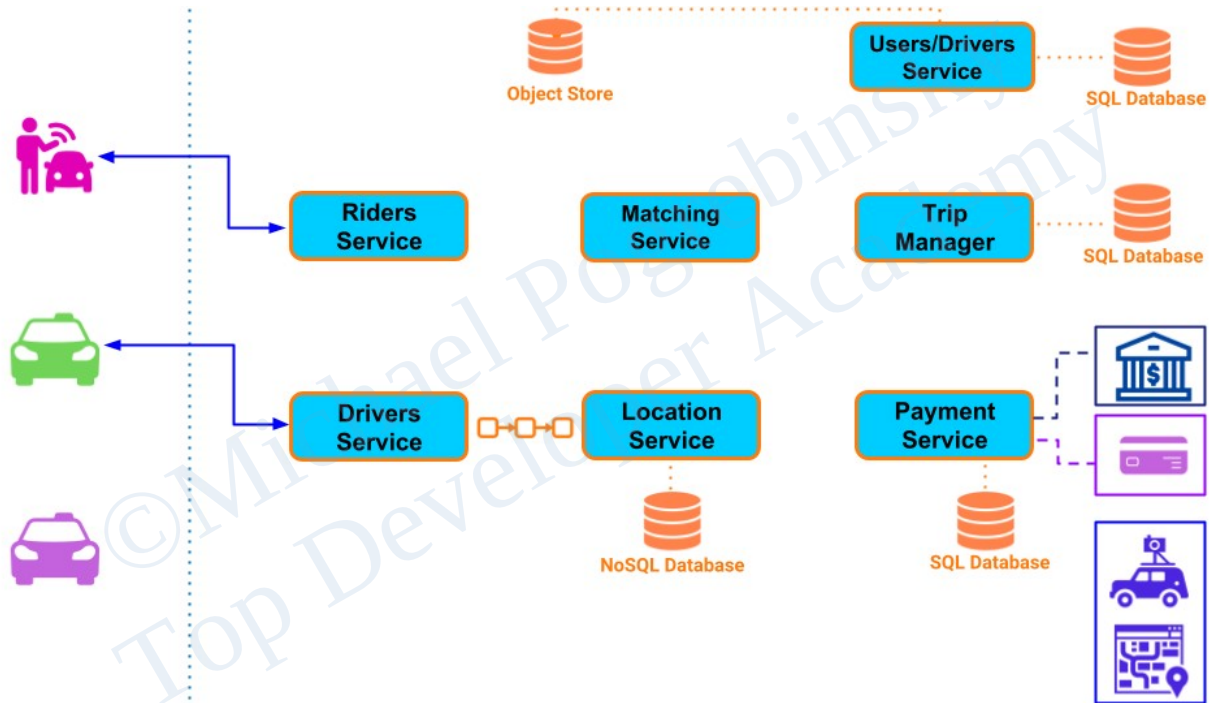- **Functional Software Architecture Diagram:**

Notes:

www.topdeveloperacademy.com

Software Architecture & Design of a Scalable Rideshare Service - Part 3

- **Functional Software Architecture Diagram:**
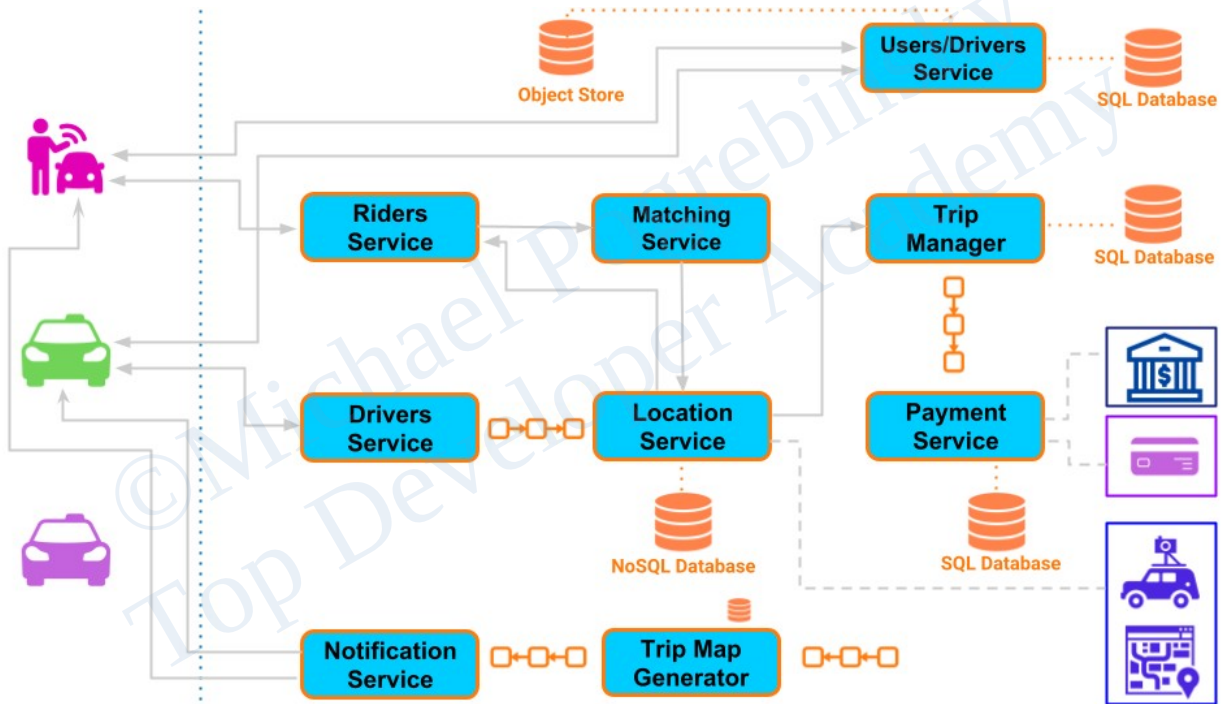
Notes:

- **Adding a Bloom Filter to the Users Service:**

Hash1(key) = f1(key) % 128

Hash2(key) = f2(key) % 128

Hash3(key) = f3(key) % 128

Users/Drivers Service

SQL Database

False Positive is Still Possible

0
1
0
1
1
0
1
0

Possible Answers:

1. Username is definitely NOT in the database
2. Username may be in the database

Notes:

www.topdeveloperacademy.com
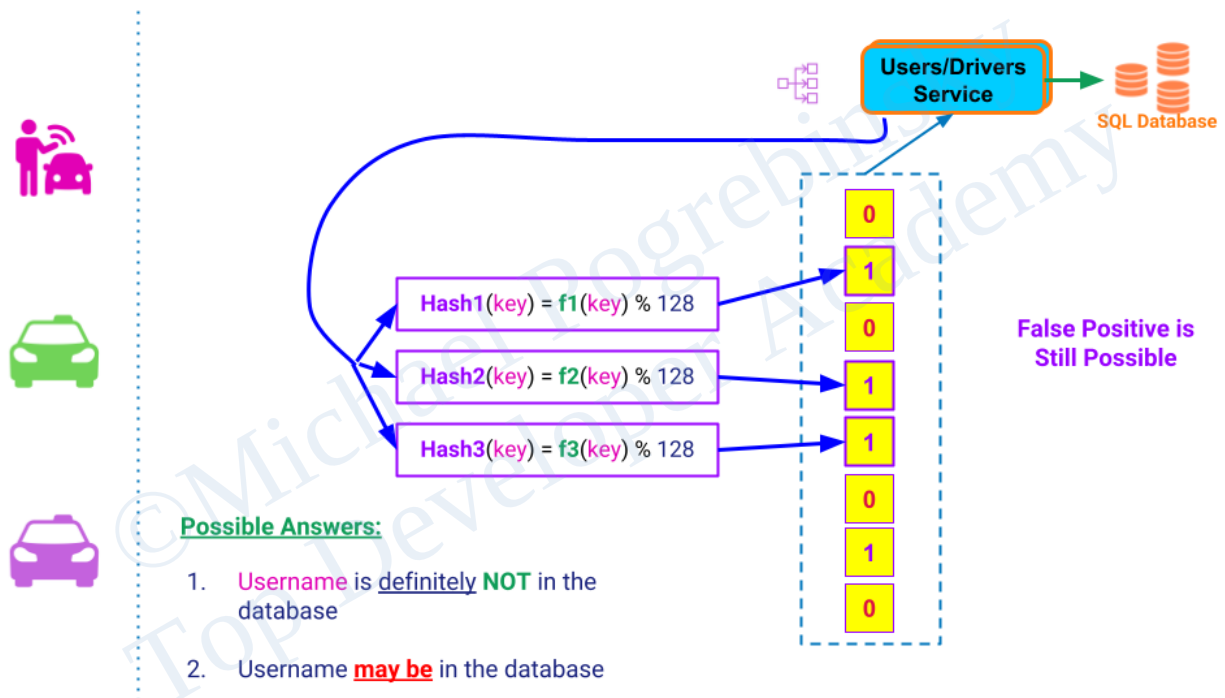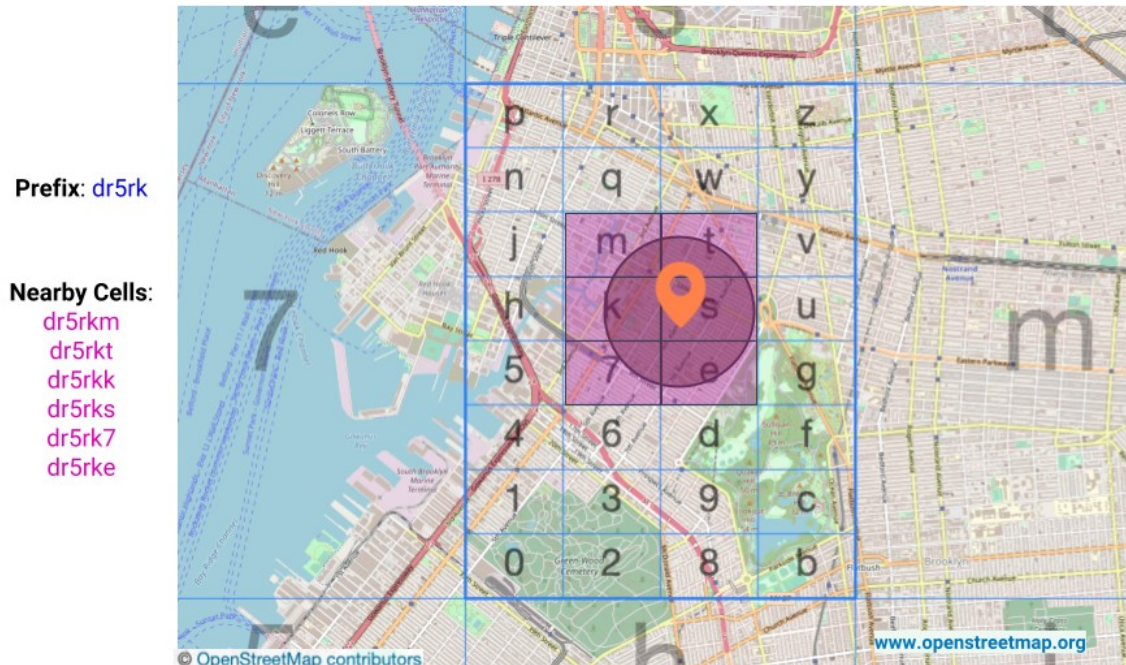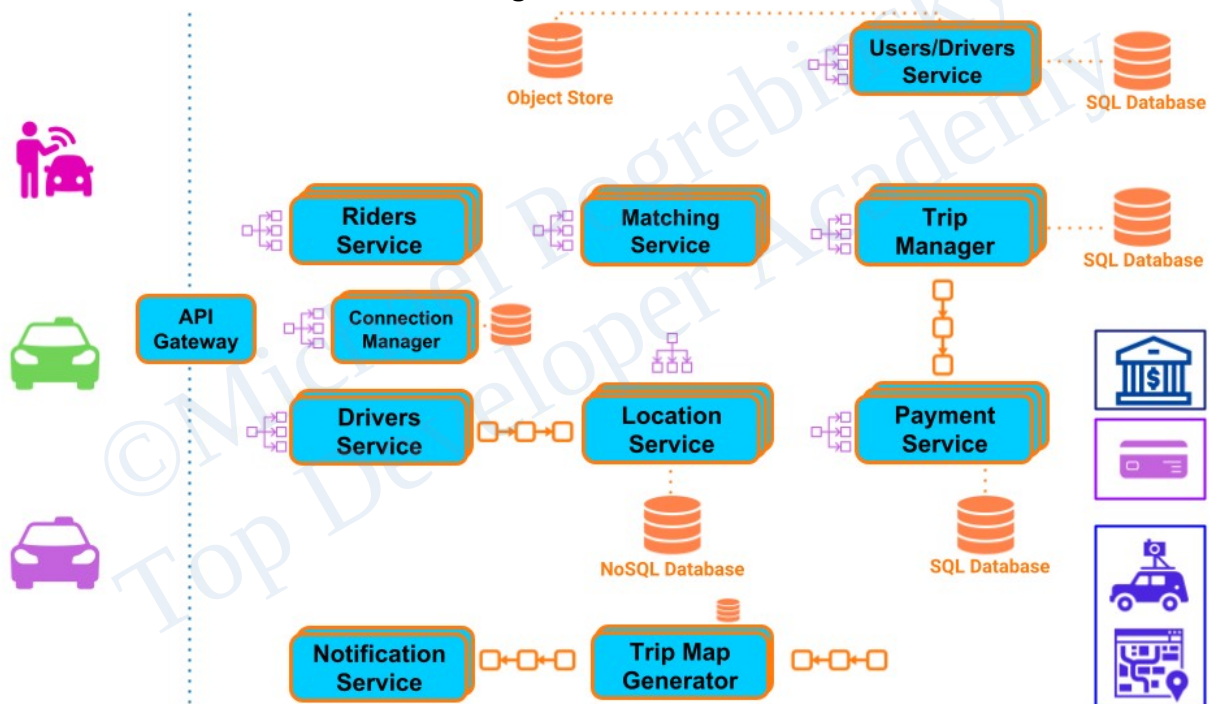
Software Architecture & Design of a Scalable Rideshare Service - Part 5

- **Adding Geohash:**

- **Final Software Architecture Diagram:**

www.topdeveloperacademy.com

Notes:

www.topdeveloperacademy.com