

# Software Architecture & System Design Practical Case Studies

By Michael Pogrebinsky



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## Introduction

# Introduction to Software Architecture & System Design Case Studies

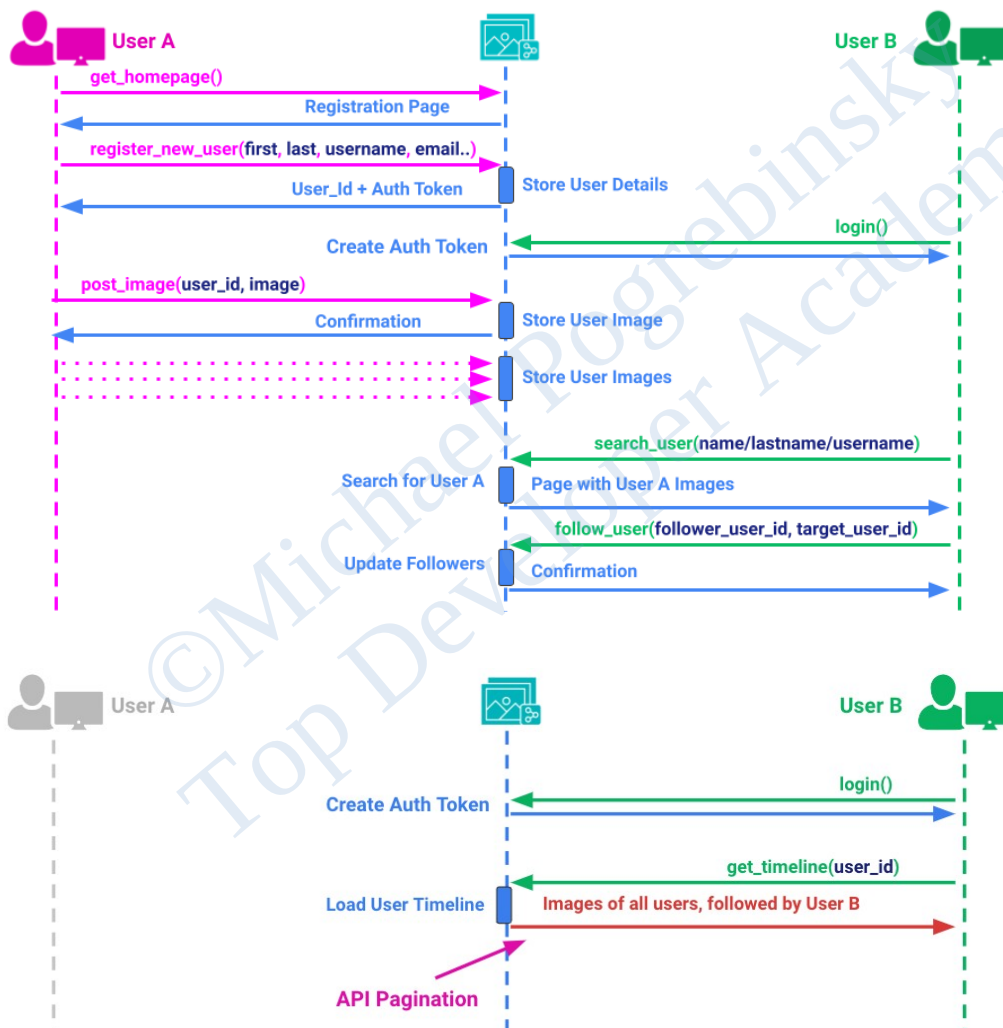
- **Software Architect's Mindset - Important Concepts**
  - Abstraction
  - Every System is Unique
  - System Design doesn't have One Correct Solution
- **System Design - Step-by-step Process**
  - Gathering Functional Requirements
  - Gathering Non-Functional Requirements
  - Defining System's API &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

## Notes:

# Design a Highly Scalable Image Sharing Social Media Platform

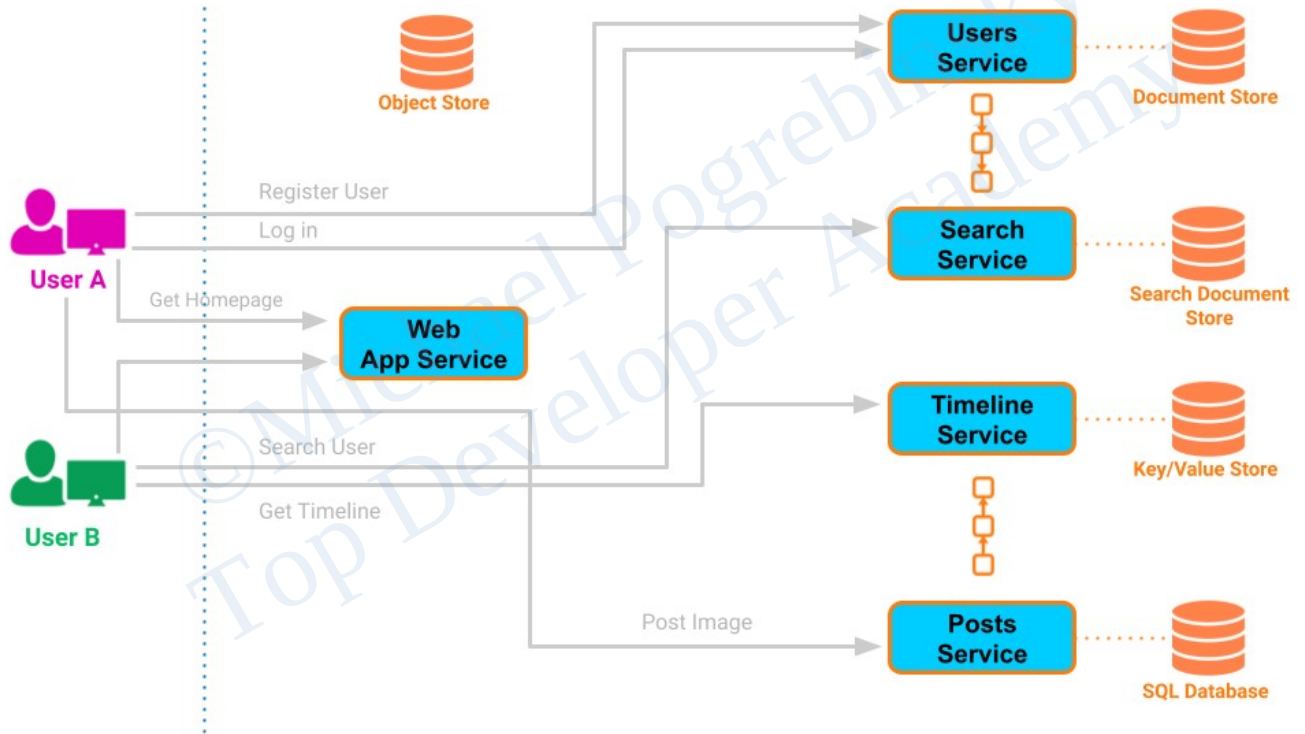
## System Design of a Highly Scalable Image-Sharing Platform - Part 1

- Sequence Diagram and System's API:



# System Design of a Highly Scalable Image-Sharing Platform - Part 2

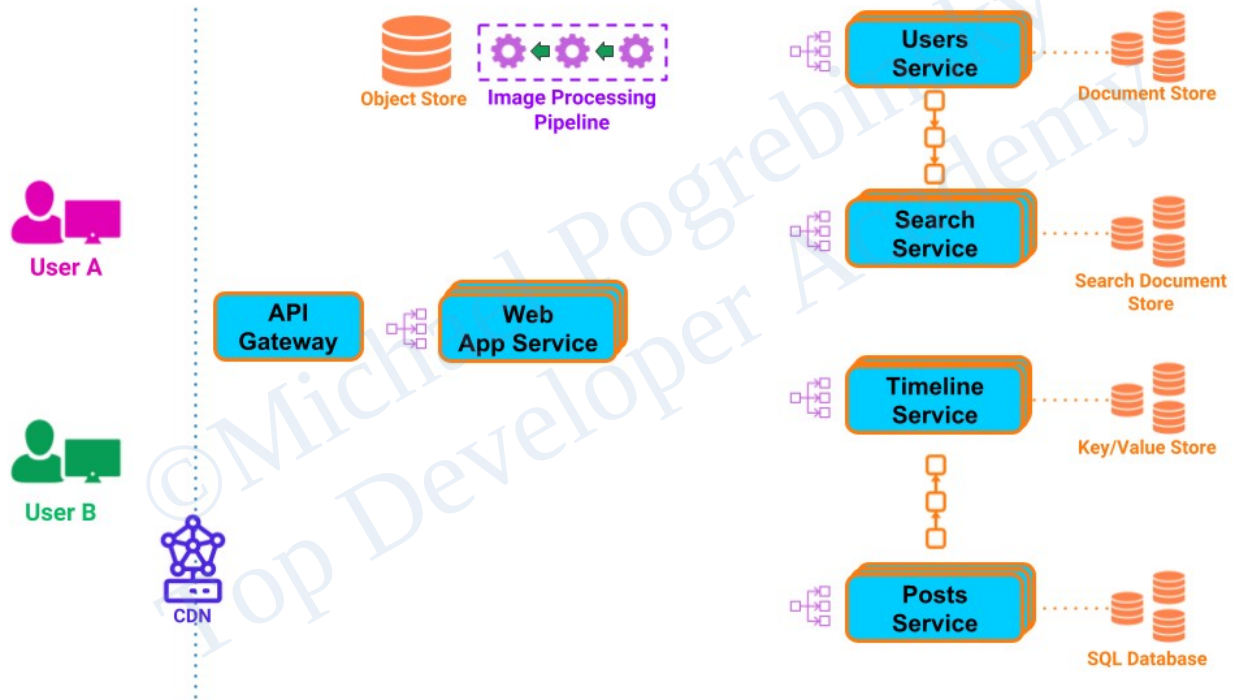
- Functional Software Architecture Diagram:



## Notes:

# System Design of a Highly Scalable Image-Sharing Platform - Part 3

- Final Software Architecture Diagram:

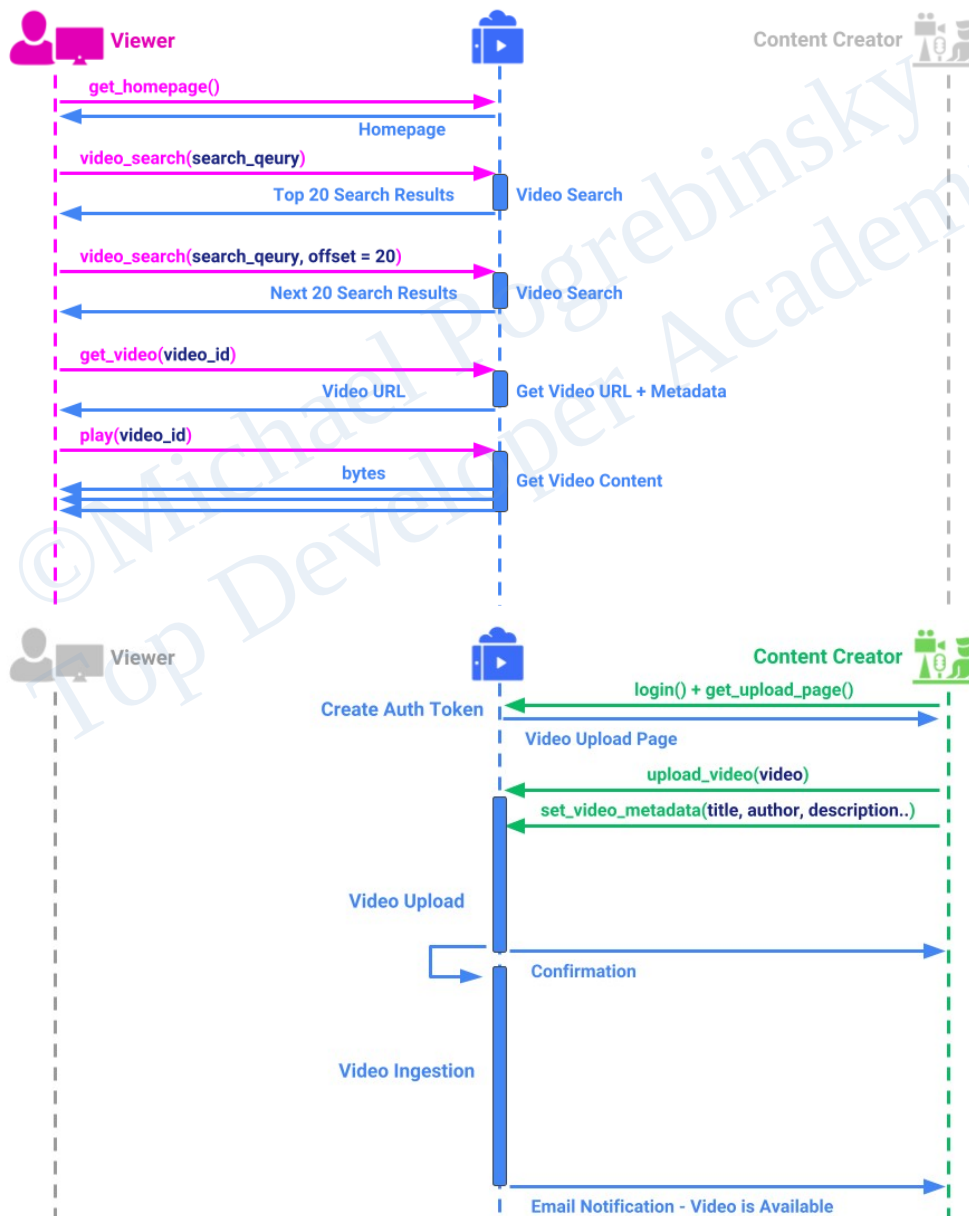


## Notes:

# Design a Video-On-Demand (VOD) Streaming Service

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

- Sequence Diagram and API:

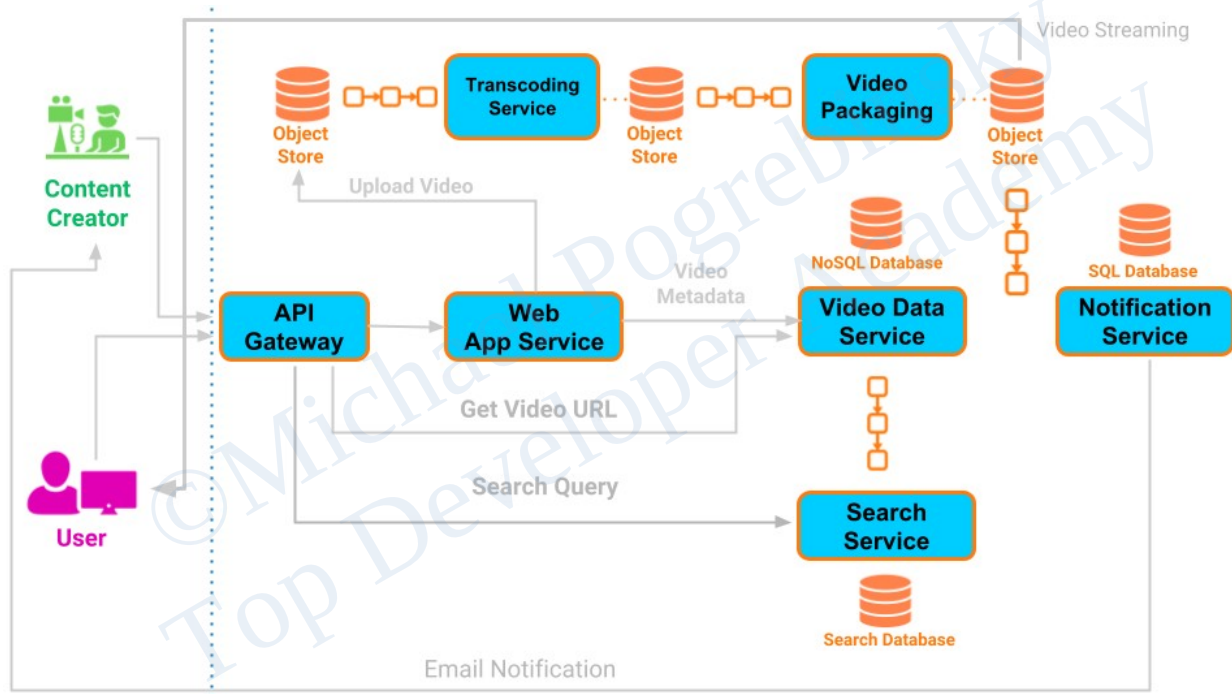


# Notes:



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

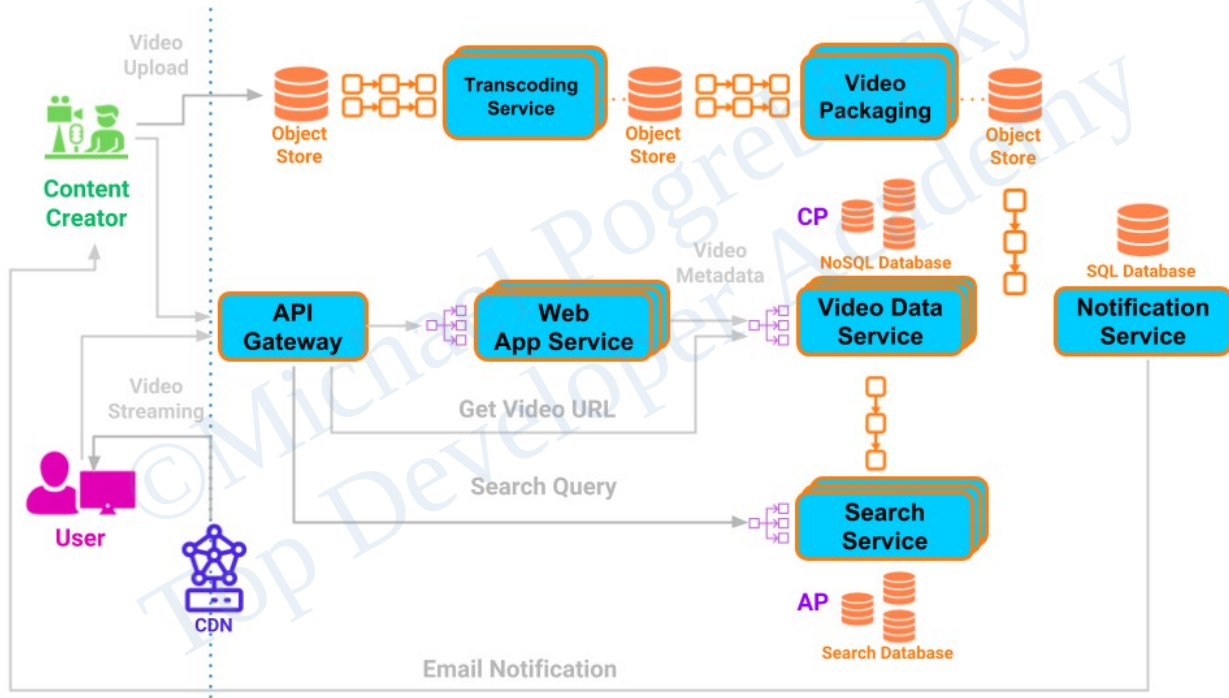
- Functional Software Architecture Diagram:



## Notes:

# Software Architecture & System Design of a VOD Streaming Service - Part 3

- Final Software Architecture Diagram:

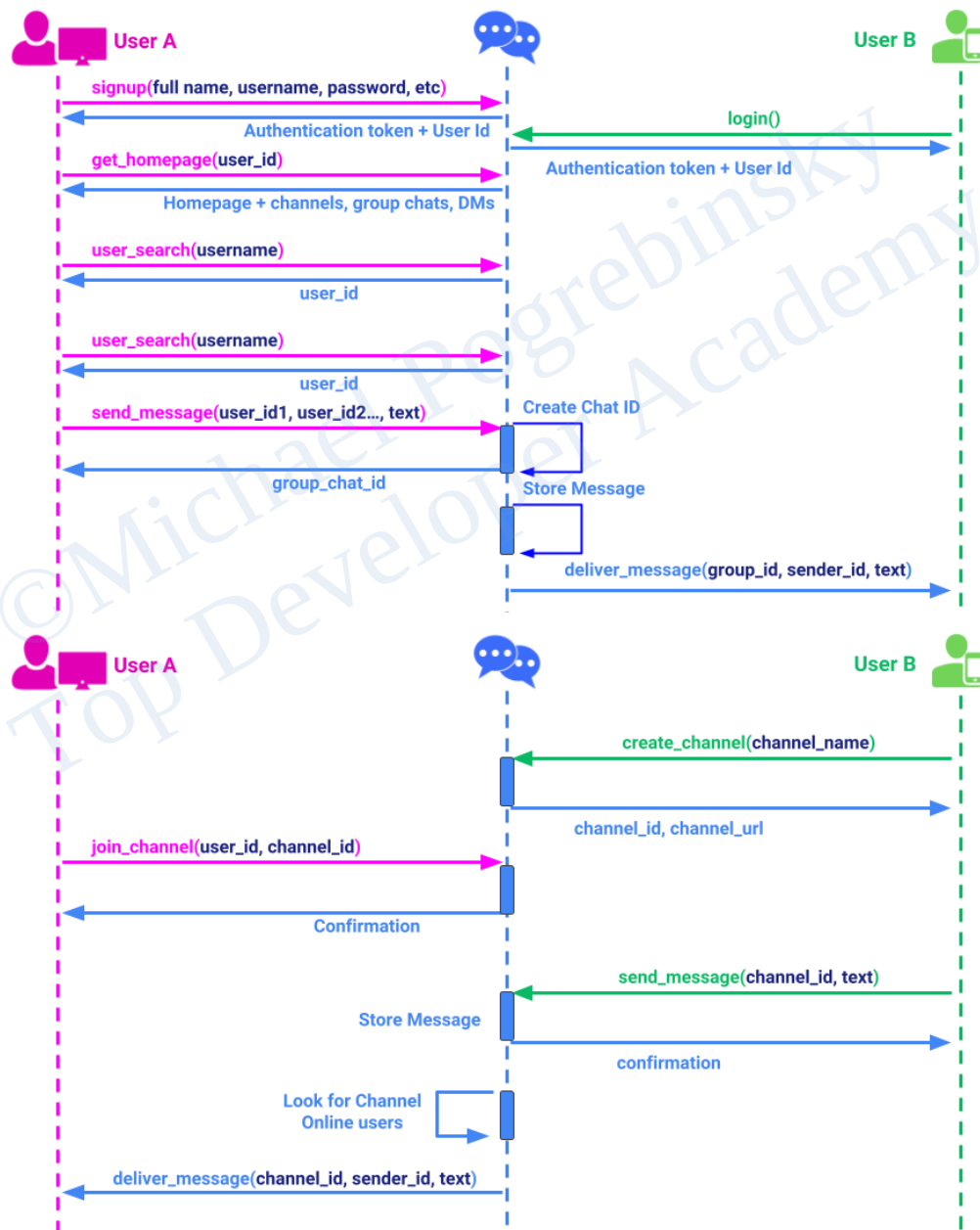


## Notes:

# Design a Highly Scalable, Real-Time Instant Messaging Service

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

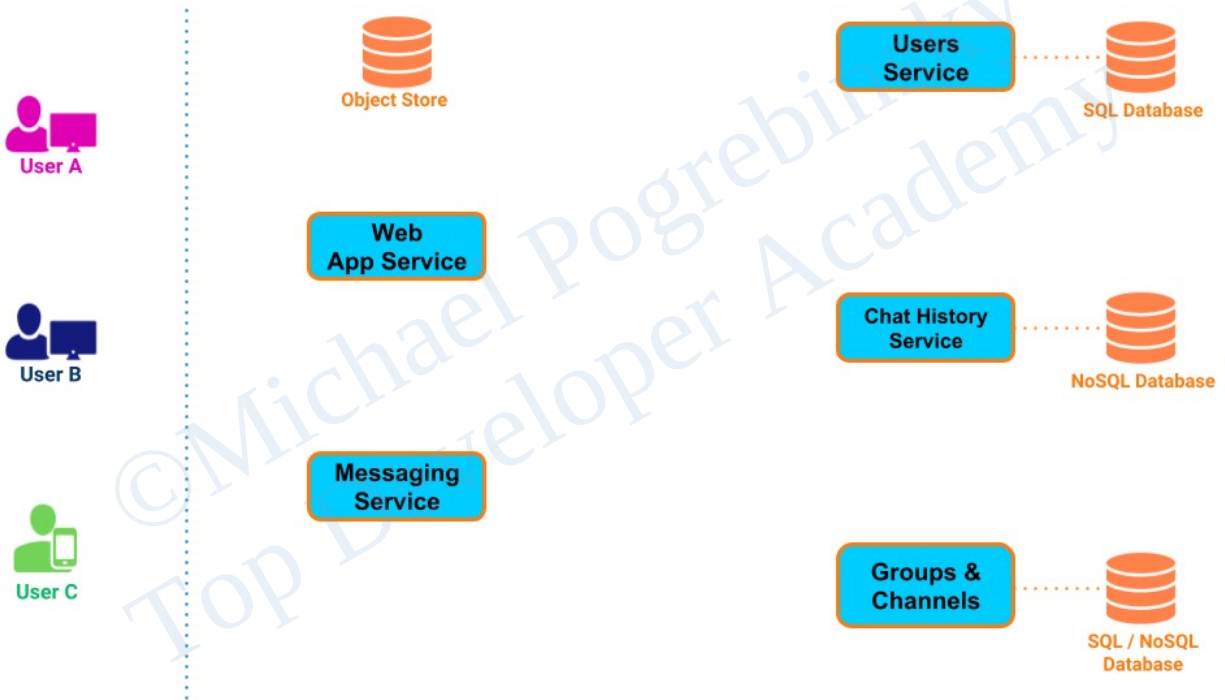
- Sequence Diagram and System's API:



# Notes:

# Software Architecture & System Design of a Real-Time Instant Messaging - Part 2

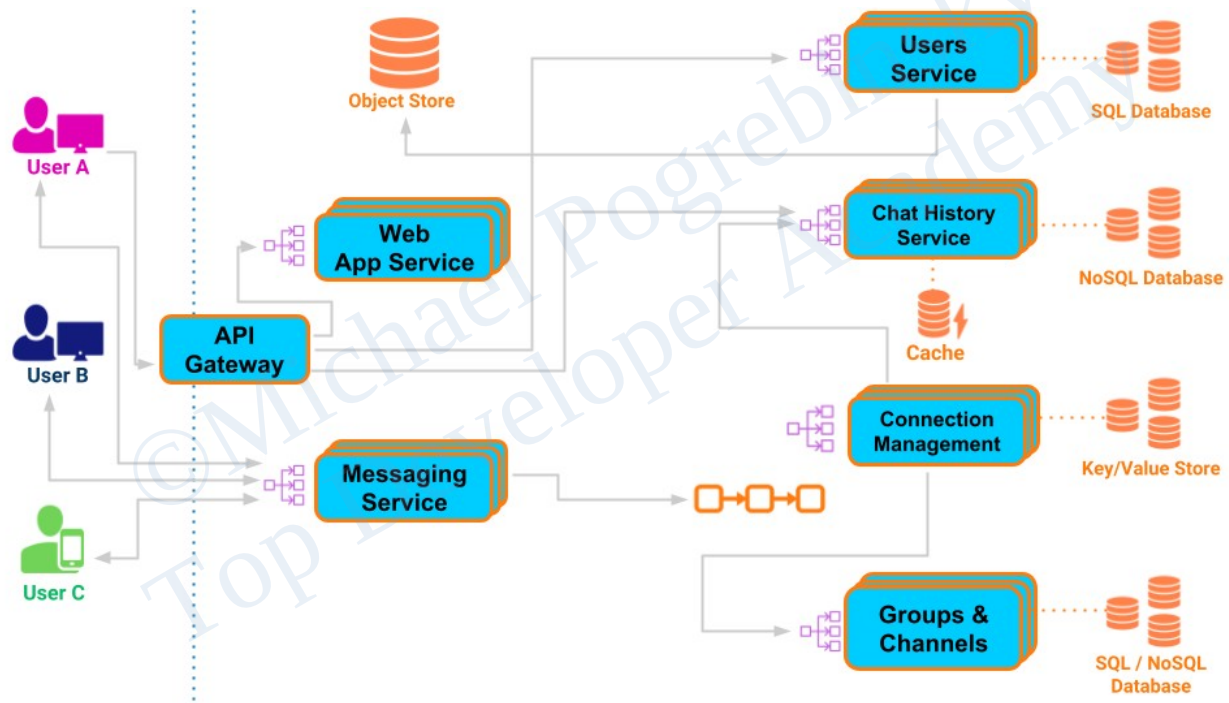
- Functional Software Architecture Diagram:



## Notes:

# Software Architecture & System Design of a Real-Time Instant Messaging - Part 3

- Final Software Architecture Diagram:



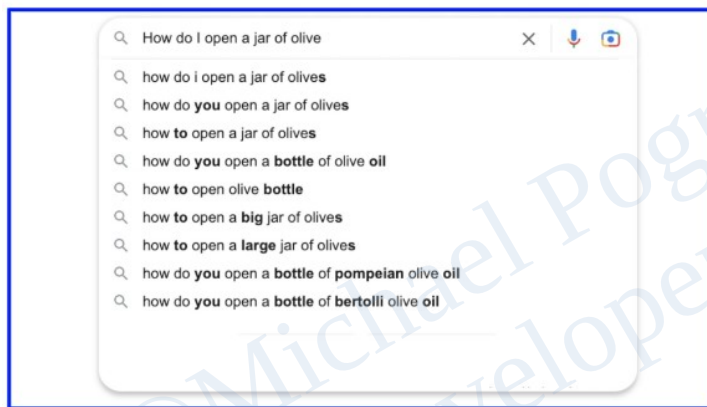
**Notes:**

# Design a Typeahead / Autocomplete for a Search Engine

## 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**

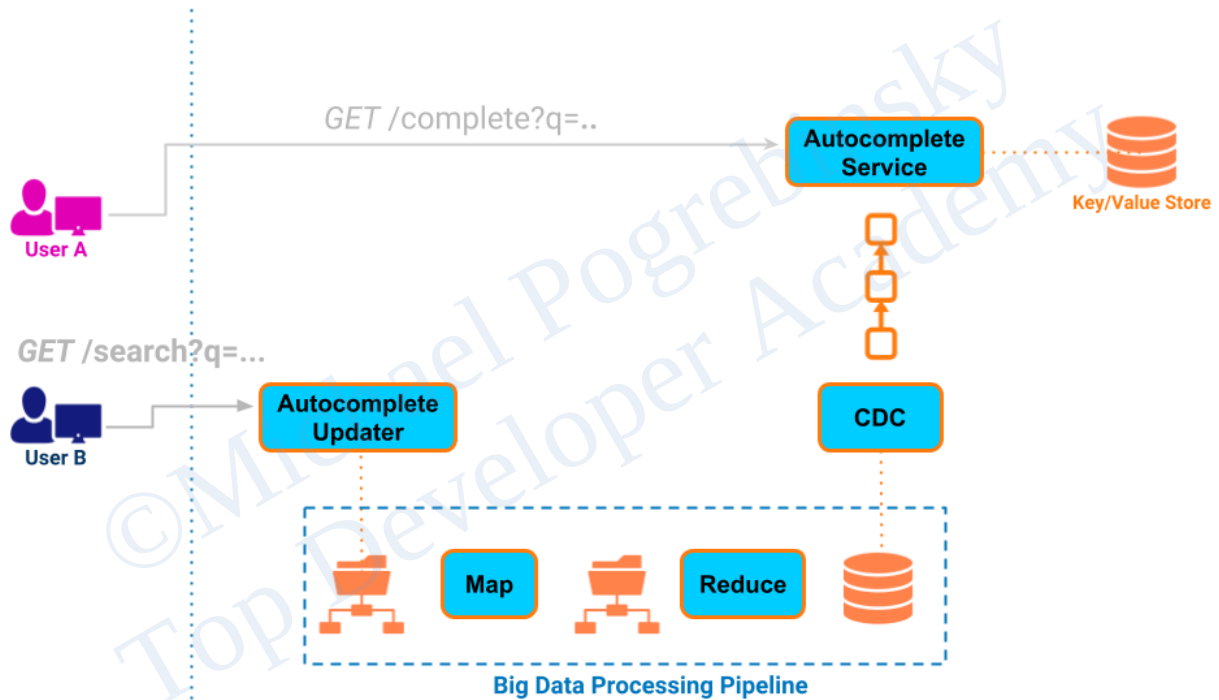
```
Response : {  
  "results": [  
    ".....",  
    ".....",  
    ".....",  
    ".....",  
    ".....",  
    ".....",  
    ".....",  
    ".....",  
    ".....",  
    ".....",  
    "....."  
  ]  
}
```

# Notes:



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

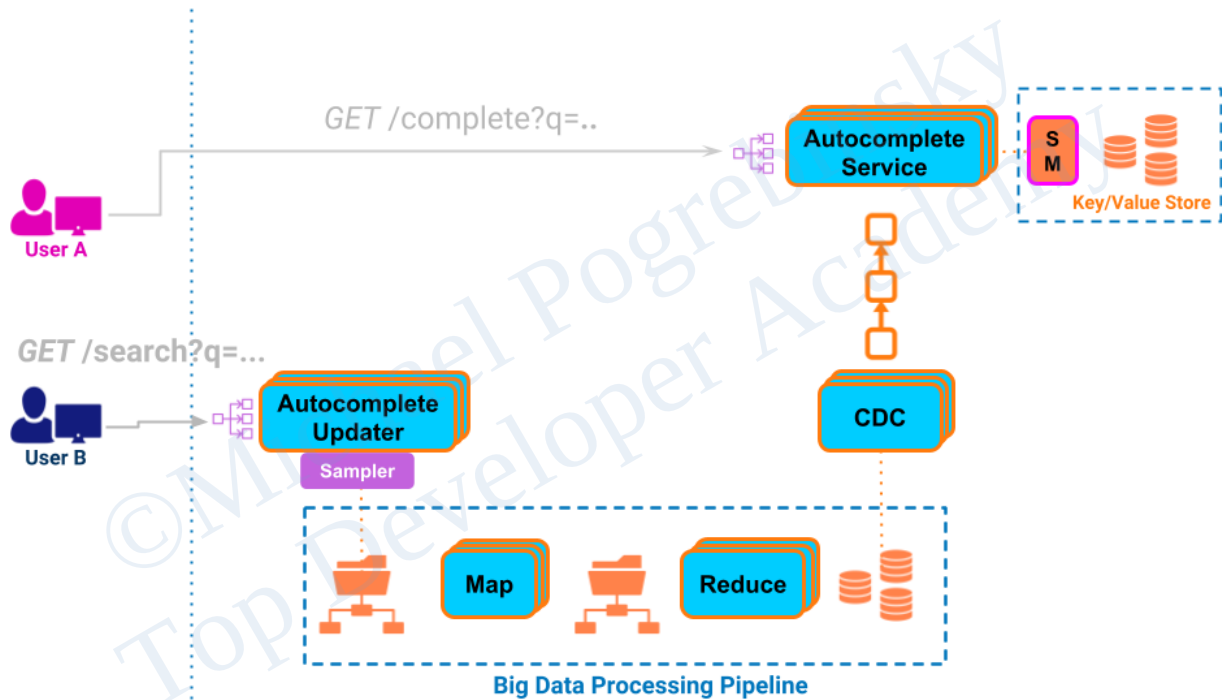
- Functional Software Architecture Diagram:



## Notes:

# System Design a Highly Scalable Typeahead Service for a Search Engine - Part 3

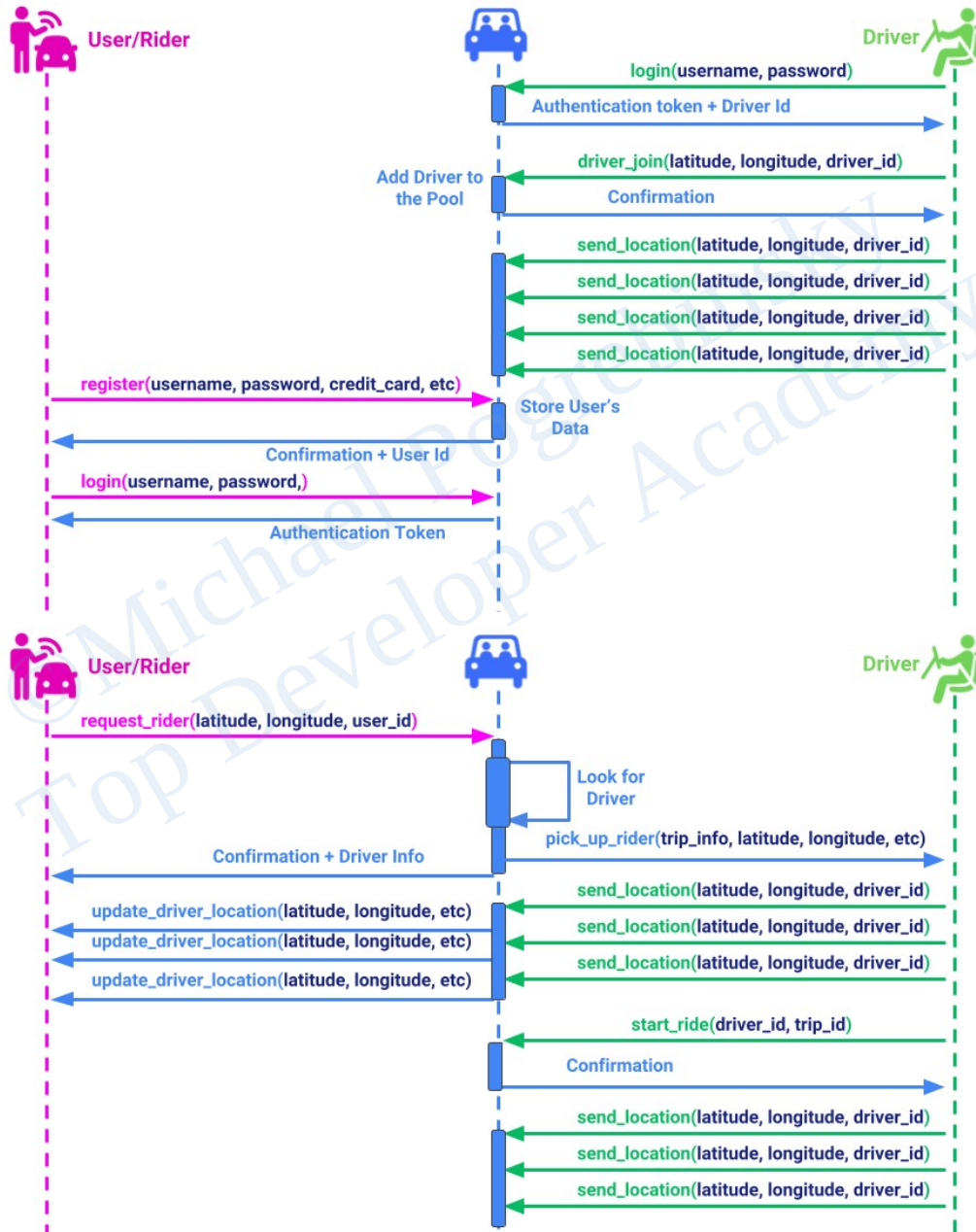
- Final Software Architecture Diagram:

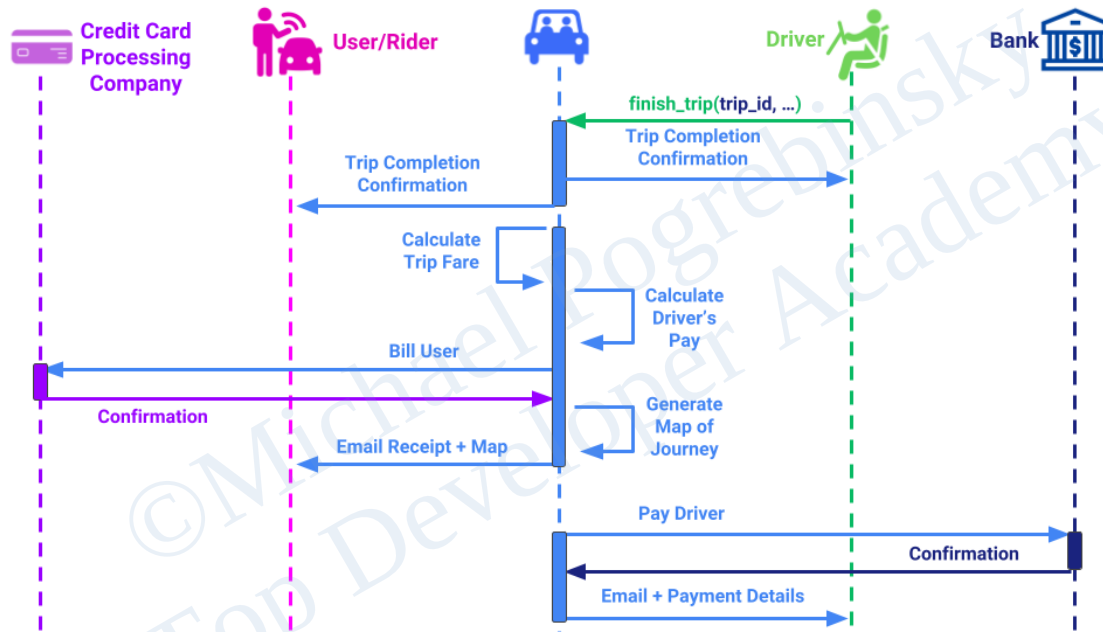


# Design a Scalable Ride Sharing Service

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

- Sequence Diagram and System's API:

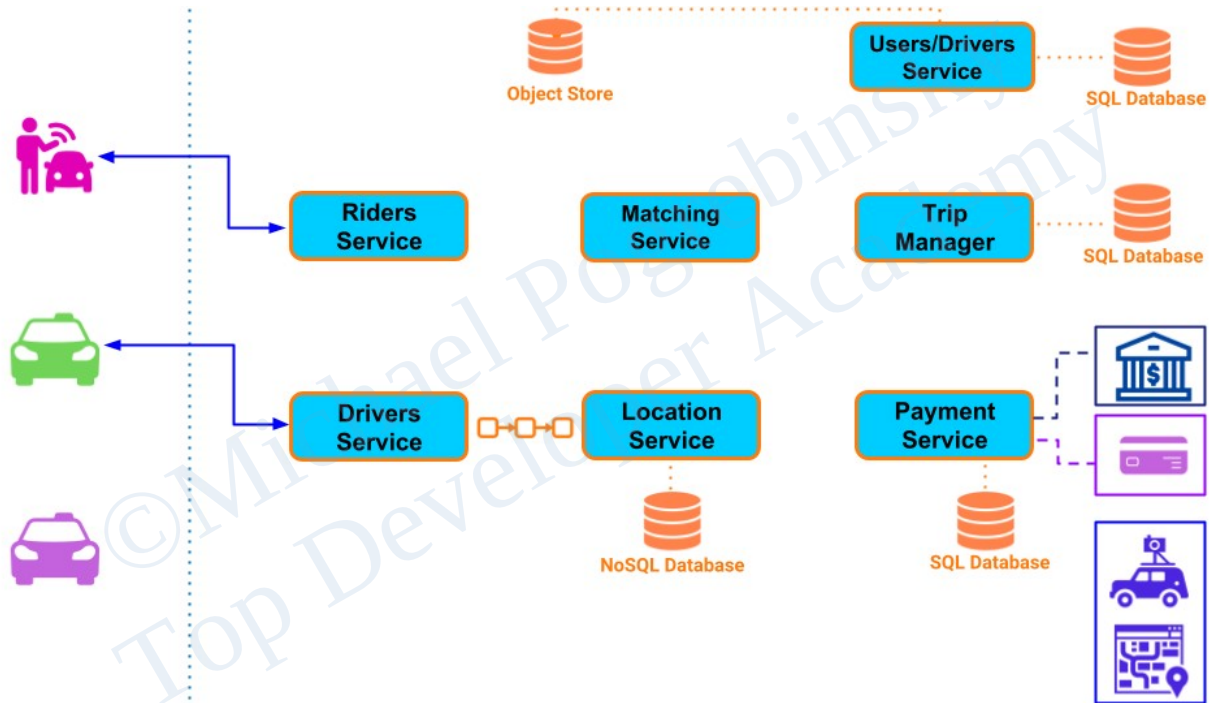




## Notes:

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

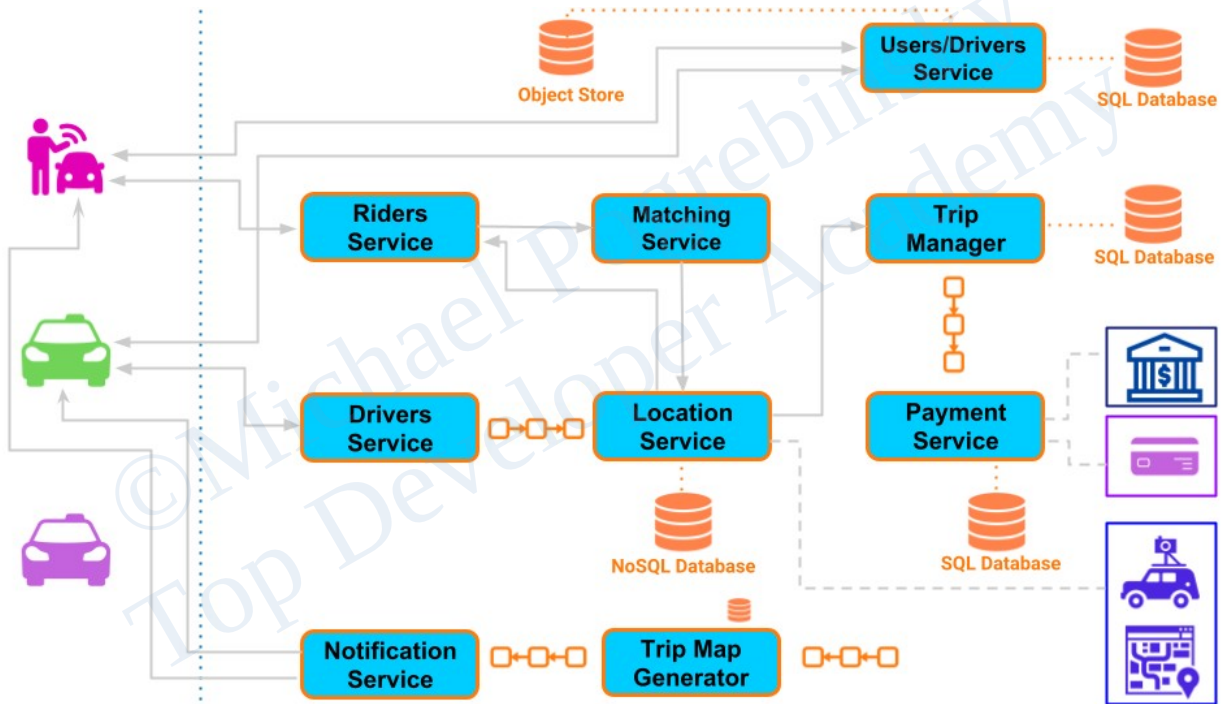
- Functional Software Architecture Diagram:



## Notes:

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

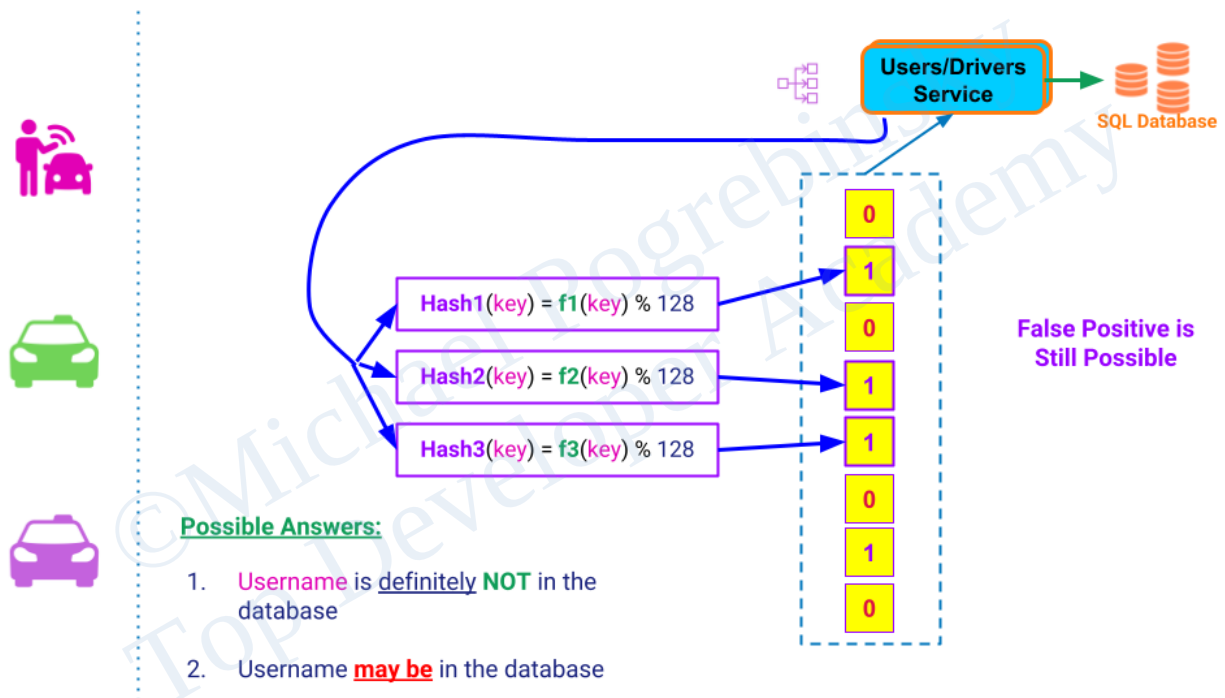
- Functional Software Architecture Diagram:



## Notes:

# Software Architecture & Design of a Scalable Rideshare Service - Part 4

- Adding a Bloom Filter to the Users Service:

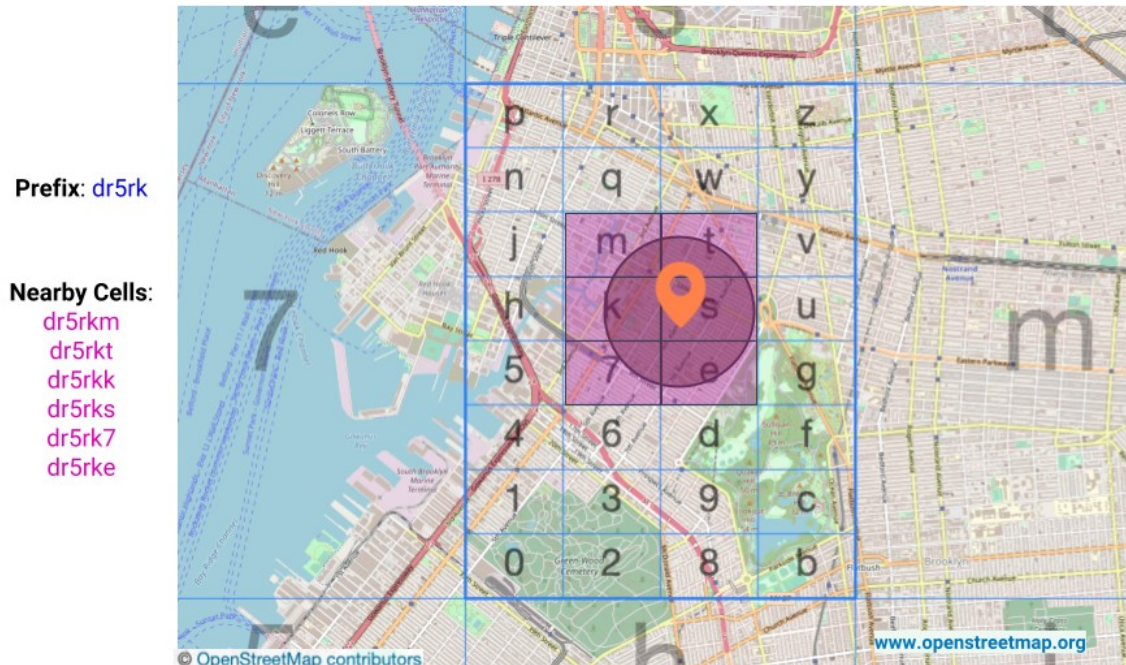


## Notes:

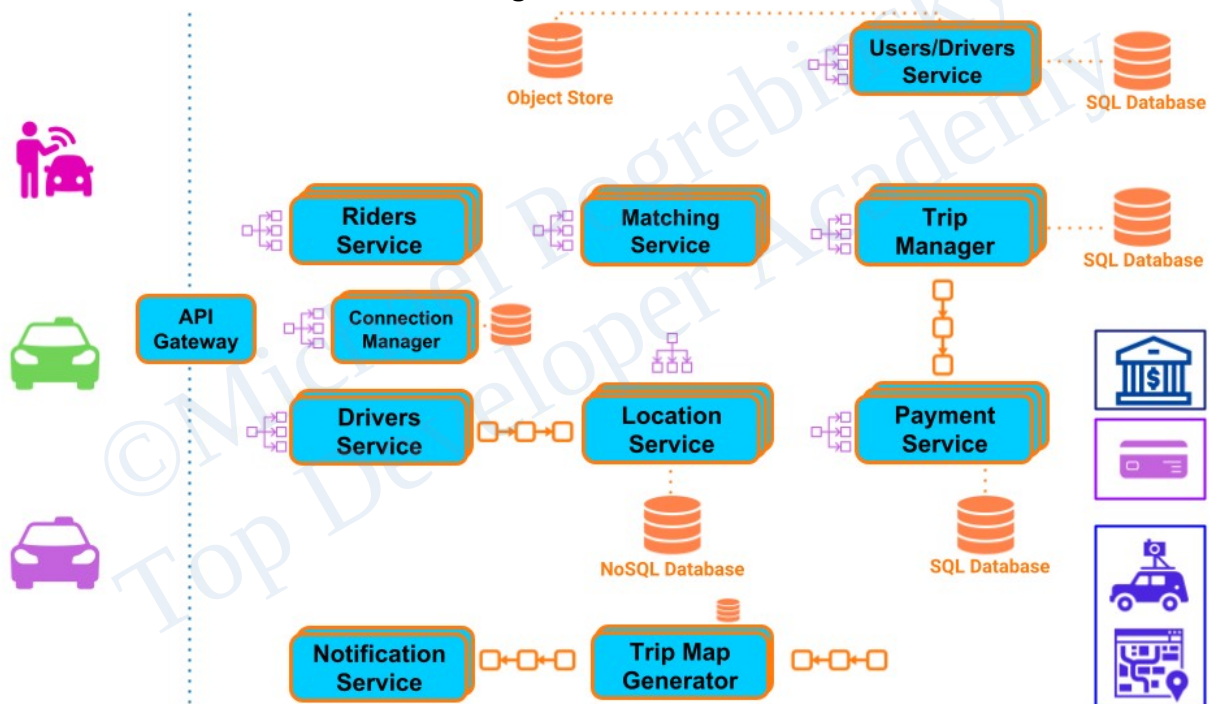


# Software Architecture & Design of a Scalable Rideshare Service - Part 5

- Adding Geohash:



- Final Software Architecture Diagram:





# Notes: