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# Photo Sharing Pub / Sub (PSPS)

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Group 5

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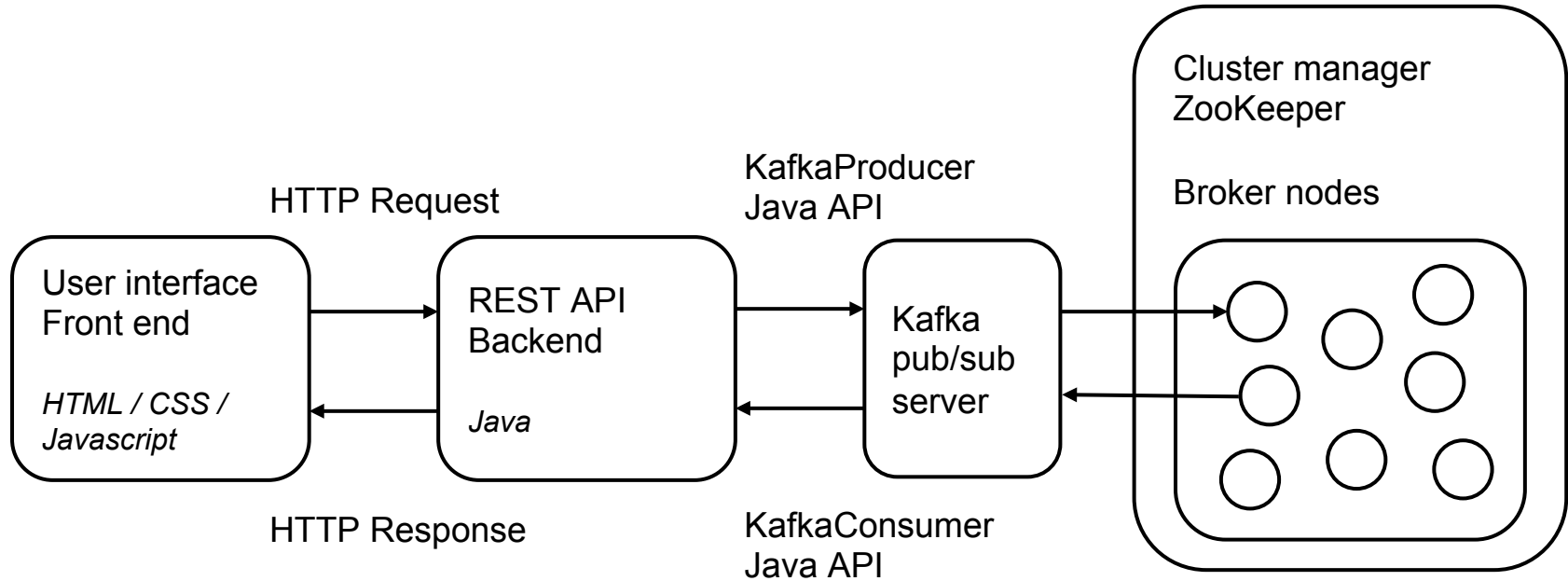
# Motivation and Goals

- Image sharing is a popular and successful a business model
- Distributed applications are necessary for a large, global user-base
- Kafka pub/sub system provides this distributed information sharing with limited overhead
- A front end should allow users to view and share photos

# Related Work / Literature

- Eugster, Patrick - The Many Faces of Publish/Subscribe
  - Considered different model types:
  - Topic-based vs. Content-based
- Considered different model structures:
  - Tree-based vs. DHT-based vs. Cluster-based
- Considered different load-balancing problems
  - Publications, subscriptions, network-traffic
- Dedousis, Dimitris - On the fly load balancing to address hot topics in topic-based pub/sub systems
  - Conclusion: Topic-based Cluster-based model

# System Architecture



# User Interface

- View pictures by topic
- Upload pictures to topic
- Pictures shared across all users
- Video demonstration:

<https://www.youtube.com/watch?v=fVXw8kCJ0iU>

## Welcome to PSPS!

Select topic to subscribe to:

You are subscribed to cars, dogs



**Contribute to the PSPS community, upload your own pictures!**

Add topic tags

Topic 1:   
Topic 2:   
Topic 3:

Current topics: cars, cats, blue, dogs, whales

No file chosen

# Testing and Results

- Load balancing topic partitions
- 10 brokers; 10 topics, each with 5 partitions and 3 replicas; 10 images/topic
- Quick rebalance after simulated crash (4 node failures)
- Manual rebalance after adding new nodes

Results after Crash:

| Topic:fish10  | PartitionCount:5 | ReplicationFactor:3 | Configs:segment.bytes=1073741824 |  |
|---------------|------------------|---------------------|----------------------------------|--|
| Topic: fish10 | Partition: 0     | Leader: 2           | Replicas: 2,0,5 Isr: 2,0         | In-Sync Replicas   |
| Topic: fish10 | Partition: 1     | Leader: none        | Replicas: 9,5,8 Isr:             | Crashed Partition:<br>After the crash multiple replicas are lost and some such as partition 1 don't even have a leader anymore |
| Topic: fish10 | Partition: 2     | Leader: 1           | Replicas: 1,8,2 Isr: 1,2         |  |
| Topic: fish10 | Partition: 3     | Leader: 4           | Replicas: 4,2,9 Isr: 4,2         |  |
| Topic: fish10 | Partition: 4     | Leader: 1           | Replicas: 6,9,1 Isr: 1           |  |

Results after Manual Rebalance:

| Topic:fish10  | PartitionCount:5 | ReplicationFactor:3 | Configs:segment.bytes=1073741824 |  |
|---------------|------------------|---------------------|----------------------------------|--|
| Topic: fish10 | Partition: 0     | Leader: 8           | Replicas: 8,1,2 Isr: 1,2,8       | In-Sync Replicas   |
| Topic: fish10 | Partition: 1     | Leader: 9           | Replicas: 9,2,3 Isr: 9,2,3       |  |
| Topic: fish10 | Partition: 2     | Leader: 0           | Replicas: 0,3,4 Isr: 0,3,4       |  |
| Topic: fish10 | Partition: 3     | Leader: 1           | Replicas: 1,4,5 Isr: 5,1,4       |  |
| Topic: fish10 | Partition: 4     | Leader: 2           | Replicas: 2,5,6 Isr: 5,6,2       | Final Partition:<br>The leaders have been restored and all the partitions have their own in-sync replicas they can rely on |