CStorage: An Efficient Classification-based Image Storage System in Cloud Datacenters

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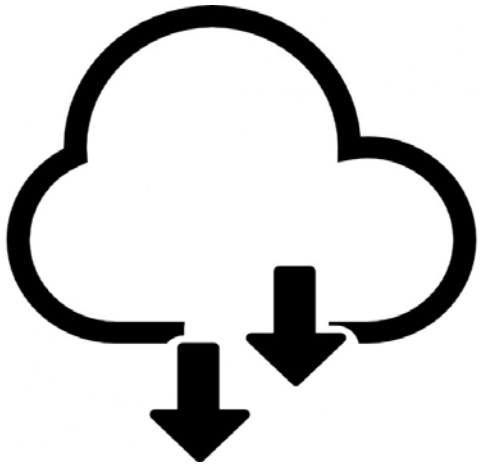
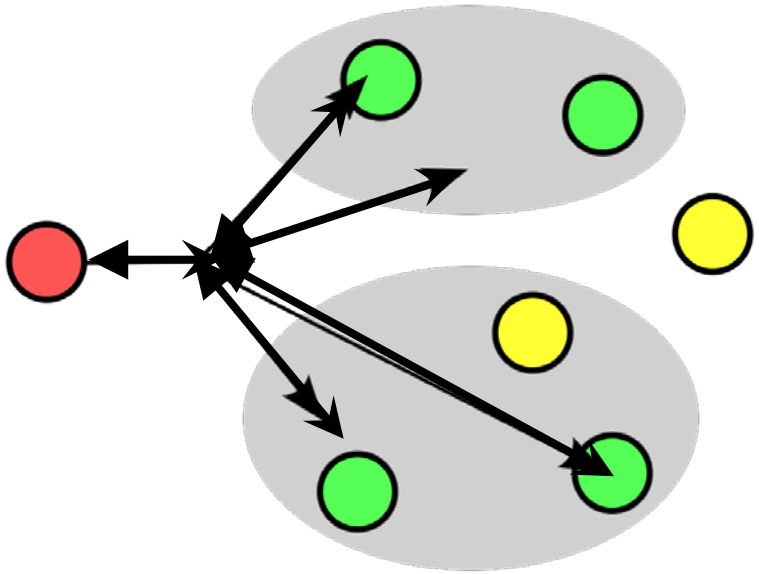
Outline

- Introduction
- Approach description
- Evaluation
- Conclusion



Incast Congestion



Incast is a many-to-one communication pattern commonly found in cloud data centers. It begins when a singular parent server places a request for data objects to a large number of servers simultaneously.

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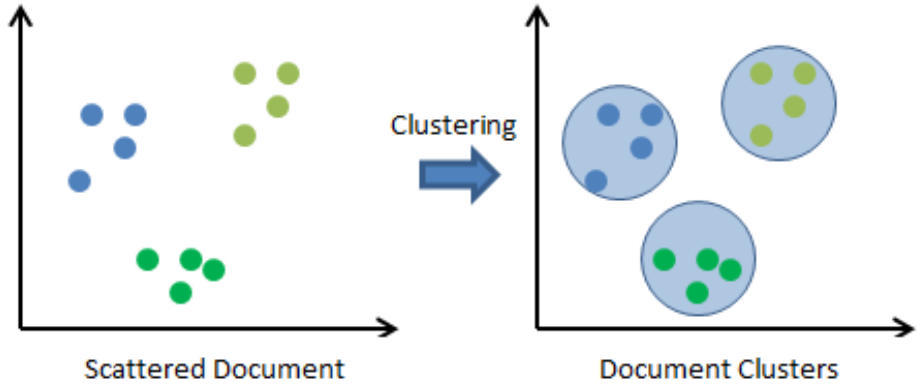
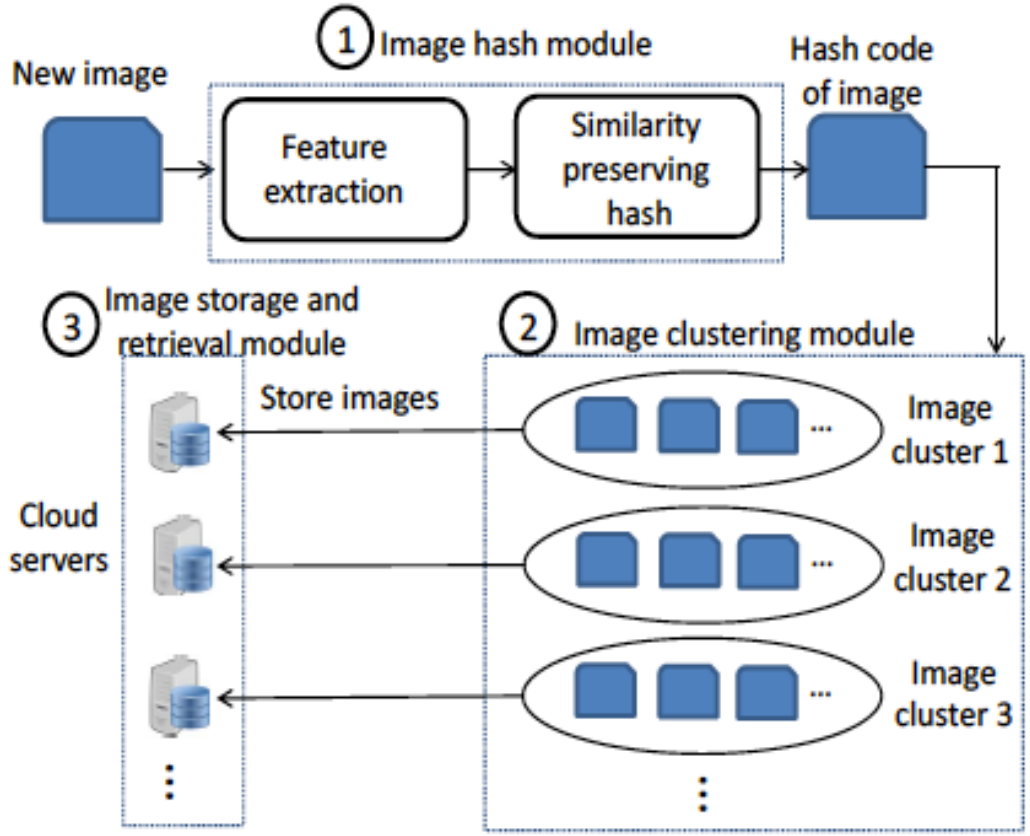
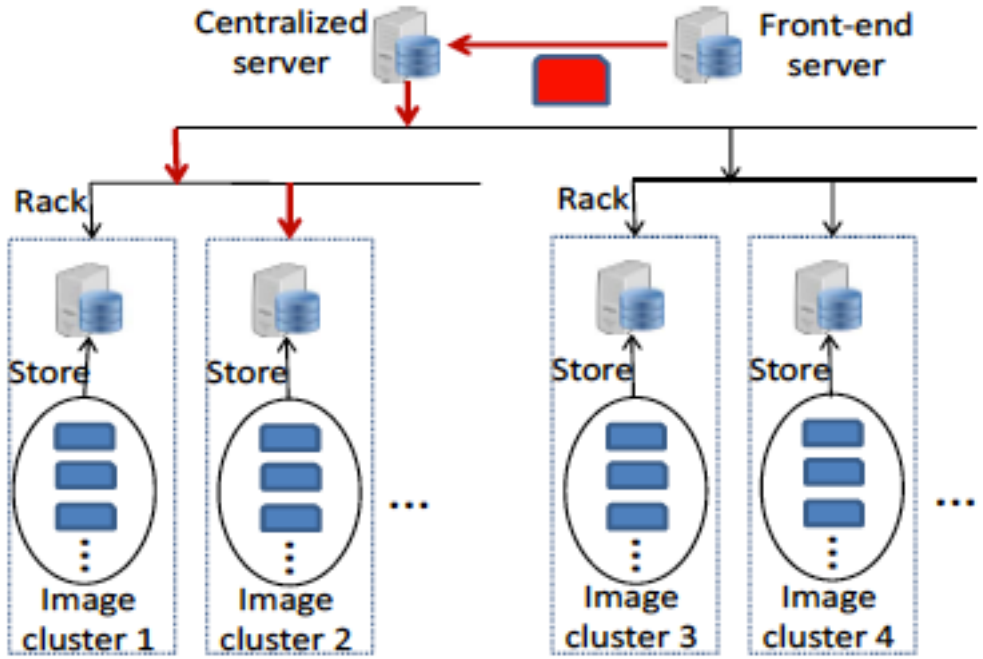
How to?

Image clustering





Overview of the CStorage image storage system



Overview of the image storage and retrieval module

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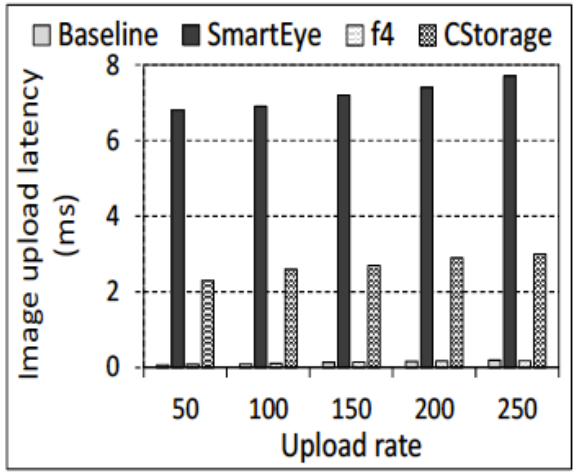
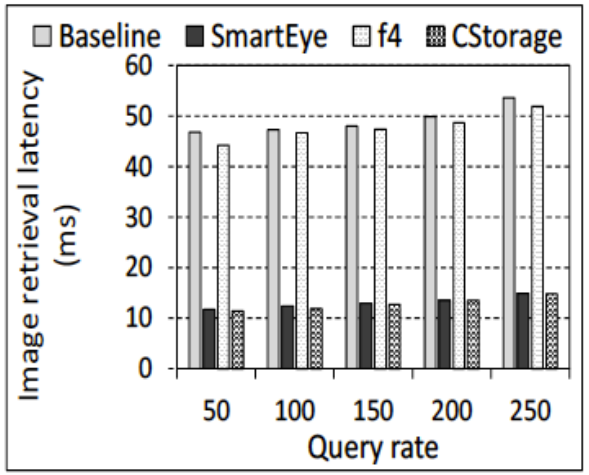
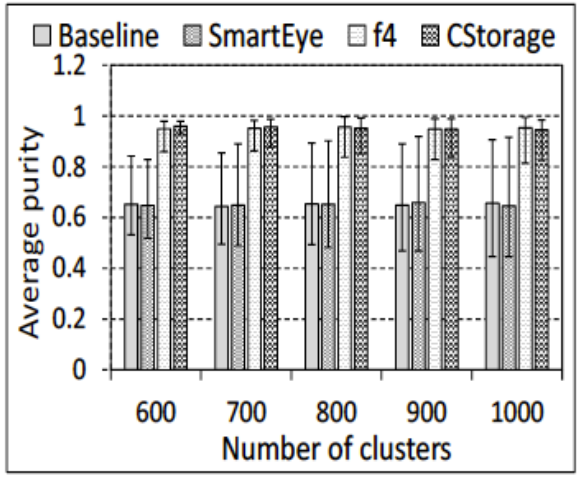
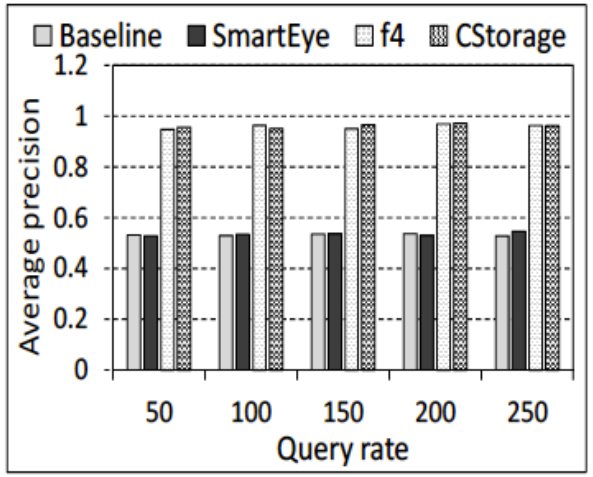

Baseline
SmartEye
f4
CStorage
Image upload latency (ms)
0
2
4
6
8
50
100
150
200
250
Upload rate


Baseline
SmartEye
f4
CStorage
Image retrieval latency (ms)
0
10
20
30
40
50
60
50
100
150
200
250
Query rate


Baseline
SmartEye
f4
CStorage
Average purity
0
0.2
0.4
0.6
0.8
1
1.2
600
700
800
900
1000
Number of clusters


Baseline
SmartEye
f4
CStorage
Average precision
0
0.2
0.4
0.6
0.8
1
1.2
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Query rate

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1) CStorage leverages the deep learning technique to extract image features, which are more accurate than handcrafted image features such as PCA-SIFT.

2) CStorage significantly reduces the image retrieval latency primarily caused by incast network congestion.

3) We conduct extensive experiment with millions of images. Experimental results show the effectiveness of CStorage in reducing image retrieval latency and improving retrieval accuracy.

Thank you!

Questions?