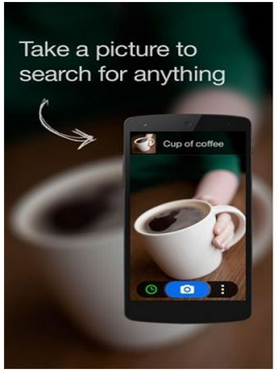
Imagine

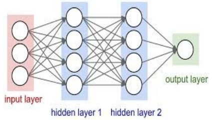
Yi Chen
Data Engineering

Are they same? I might also be interested in...



Match Framework

Inputs:

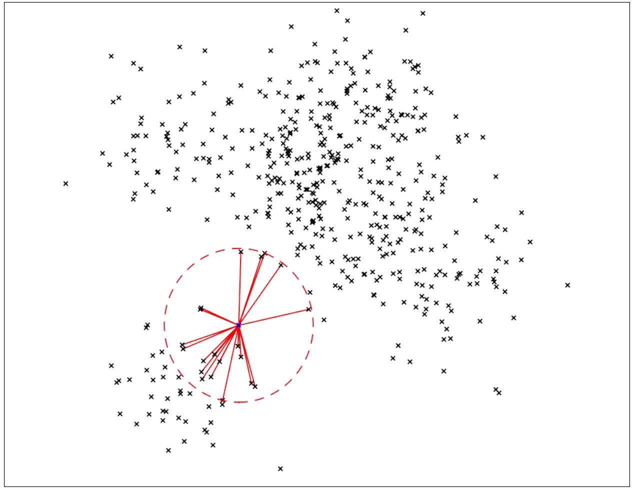


Model

Match Space

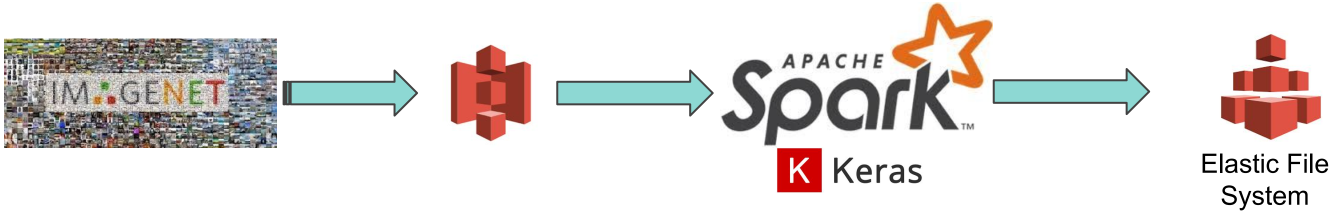
Item

Match Framework



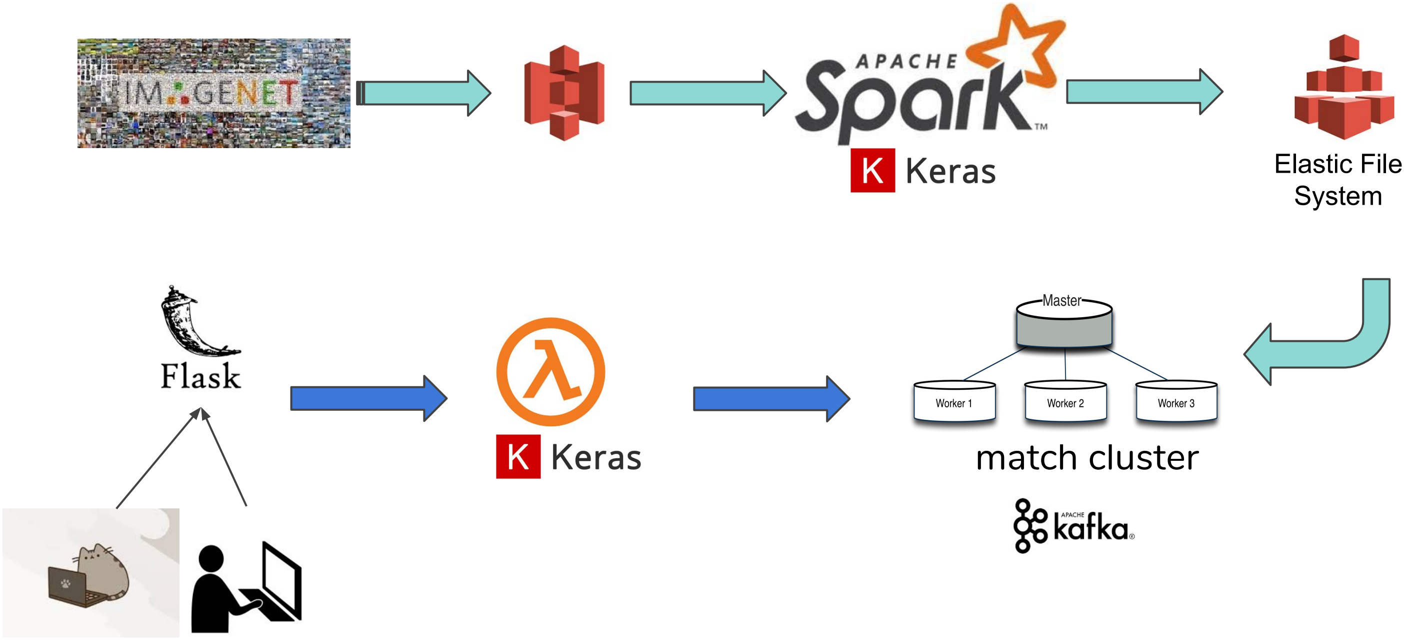
Output:

Tech Stack



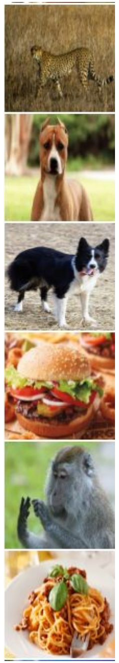
Elastic File System

Tech Stack

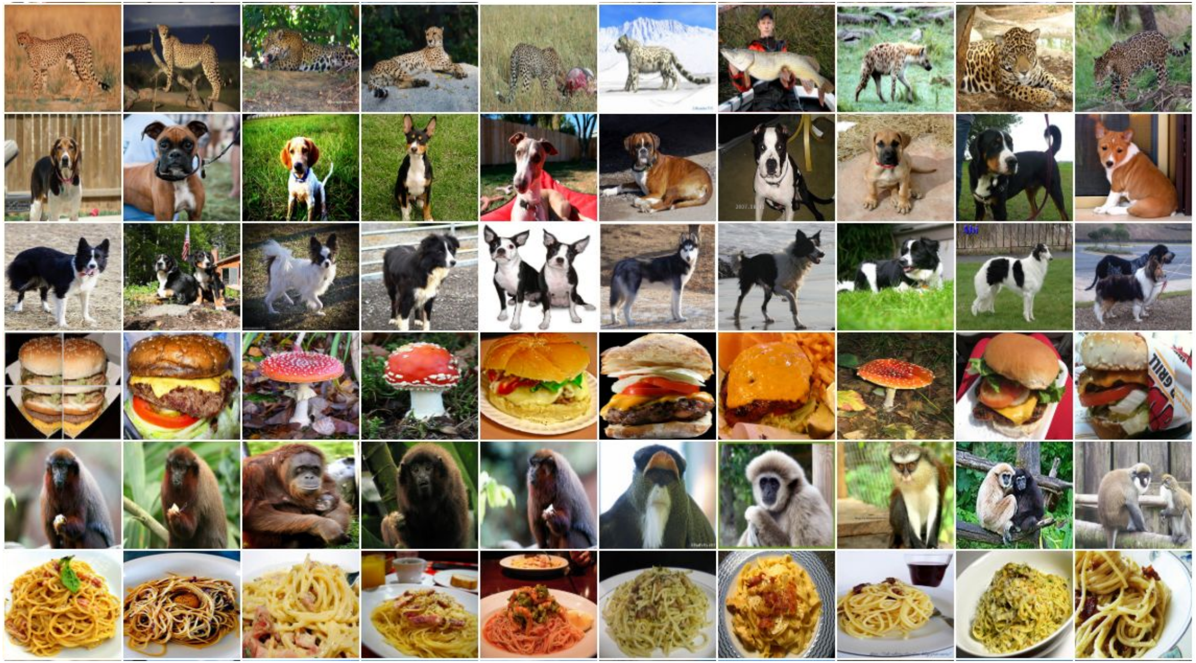

IMAGENET
APACHE Spark
K Keras
Elastic File System
Flask
K Keras
Master
Worker 1
Worker 2
Worker 3
match cluster
APACHE kafka

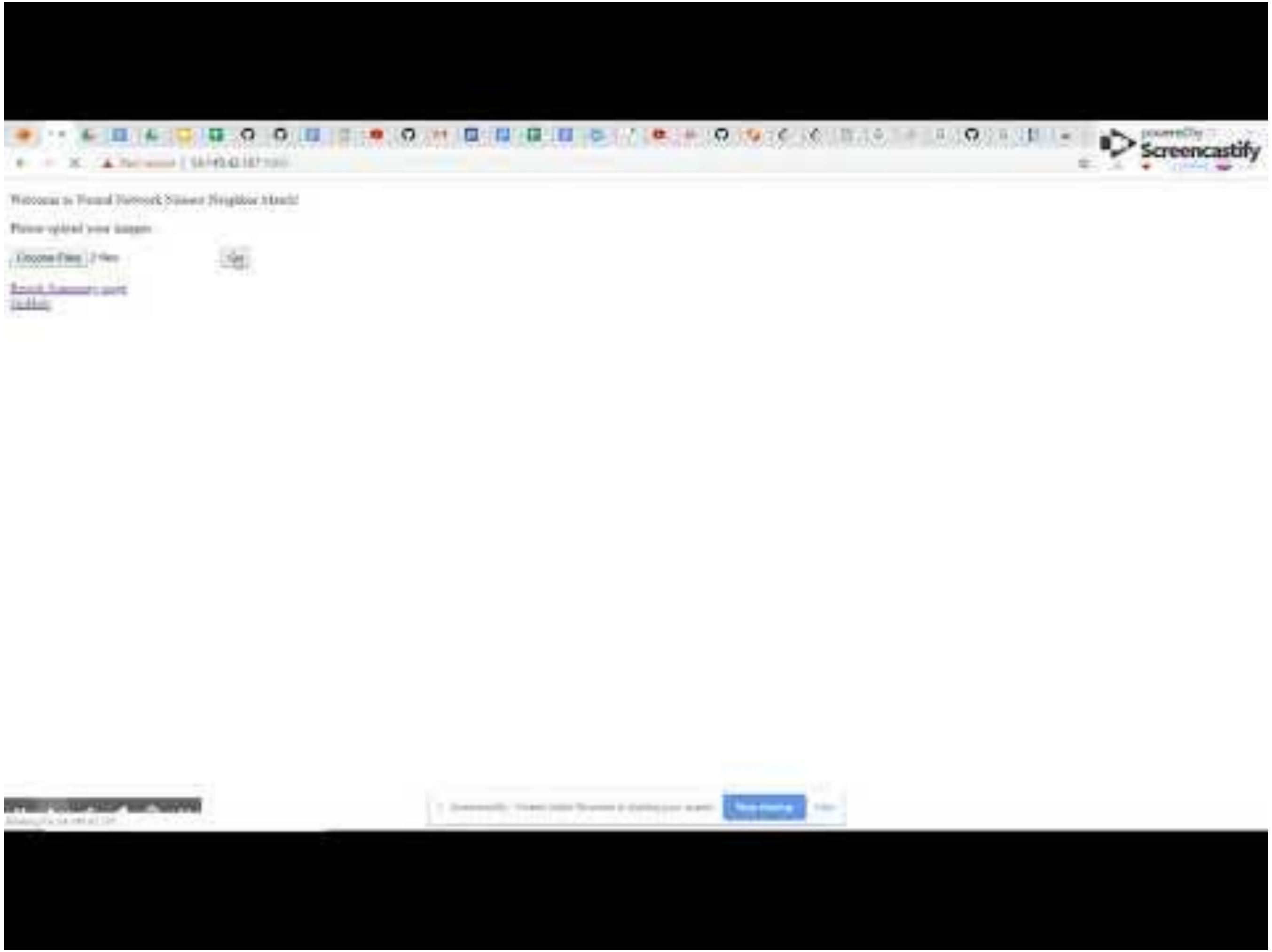
Demo: Nearest Images

input



output





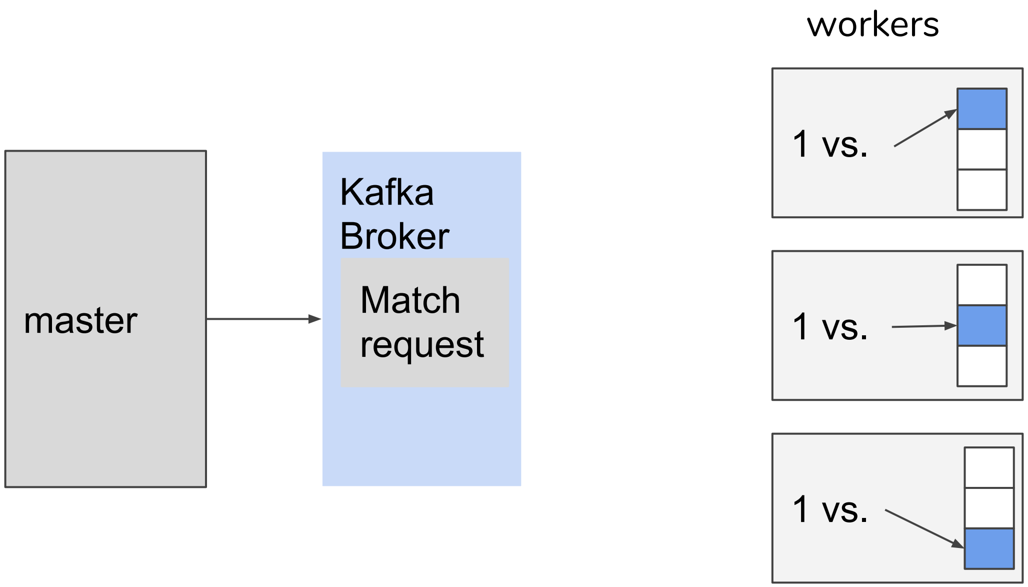
Welcome to Neural Network Nearest Neighbor Match!

Please upload your images:

Choose Files 2 files Go

Result Summary page (table)

Parallelized the work



workers

master

Kafka Broker

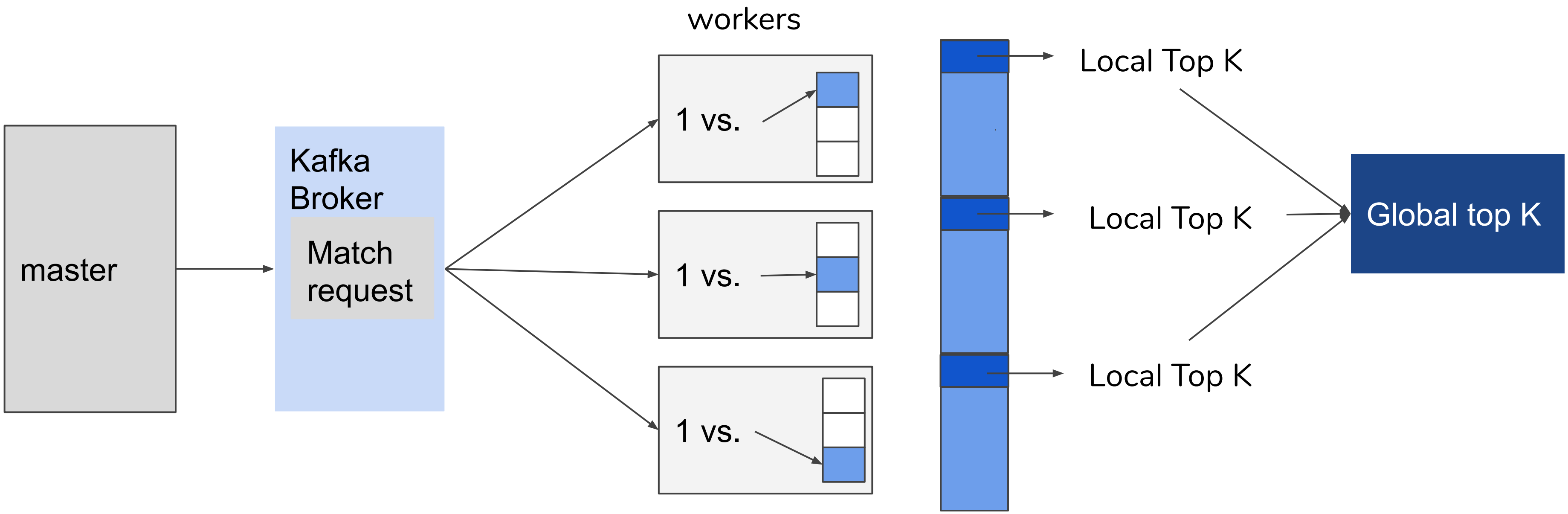
Match request

1 vs.

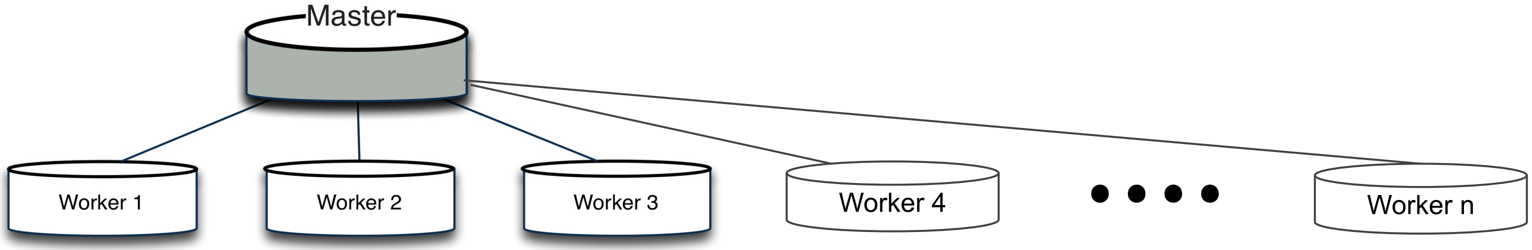
1 vs.

1 vs.

Parallelized the work



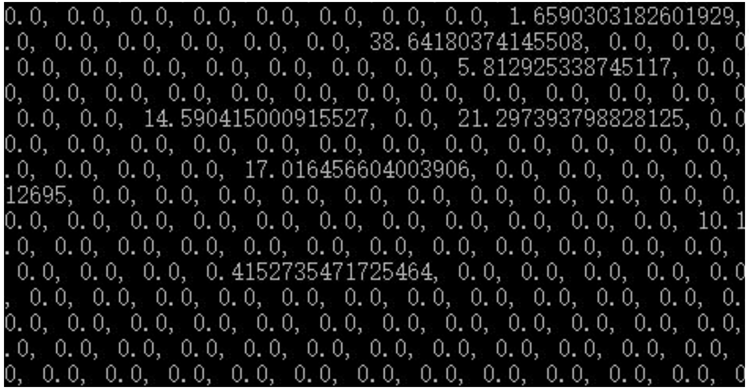
Scalability - match space increase



# of workers = match space size/match ability per worker

Detailed algorithm-Sparse vs. Dense

- Loading is only required when worker starts
- Doc product on sparse is more than **2X faster** than dense



```
0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 1.6590303182601929,
.0, 0.0, 0.0, 0.0, 0.0, 0.0, 38.64180374145508, 0.0, 0.0, 0
 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 5.812925338745117, 0.0,
0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0
 0.0, 0.0, 14.590415000915527, 0.0, 21.297393798828125, 0.0
0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,
.0, 0.0, 0.0, 0.0, 17.016456604003906, 0.0, 0.0, 0.0, 0.0,
12695, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.
0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 10.1
.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,
 0.0, 0.0, 0.0, 0.4152735471725464, 0.0, 0.0, 0.0, 0.0, 0.0
, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.
0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,
.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,
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```
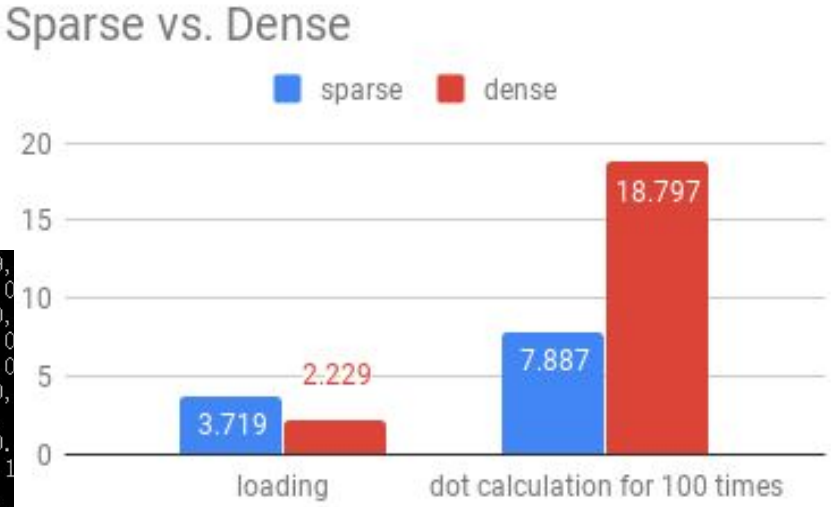
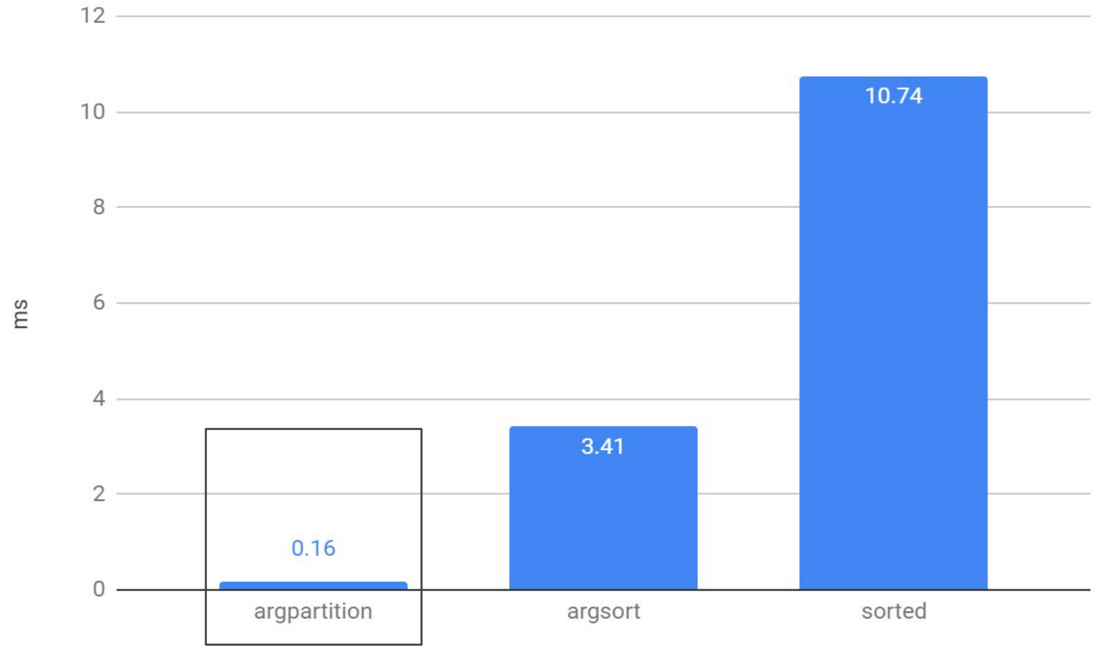



Detailed algorithm-Sorting vs. Argpartition for 20,000 images



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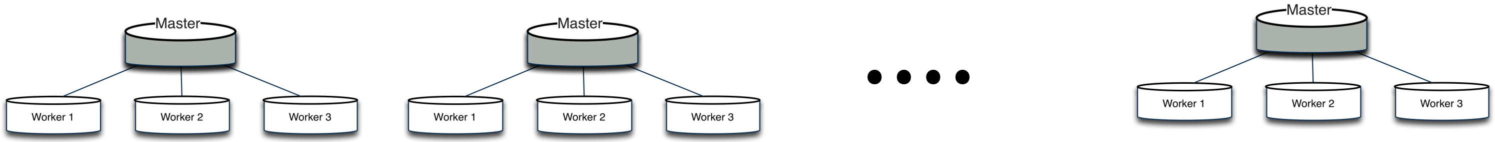
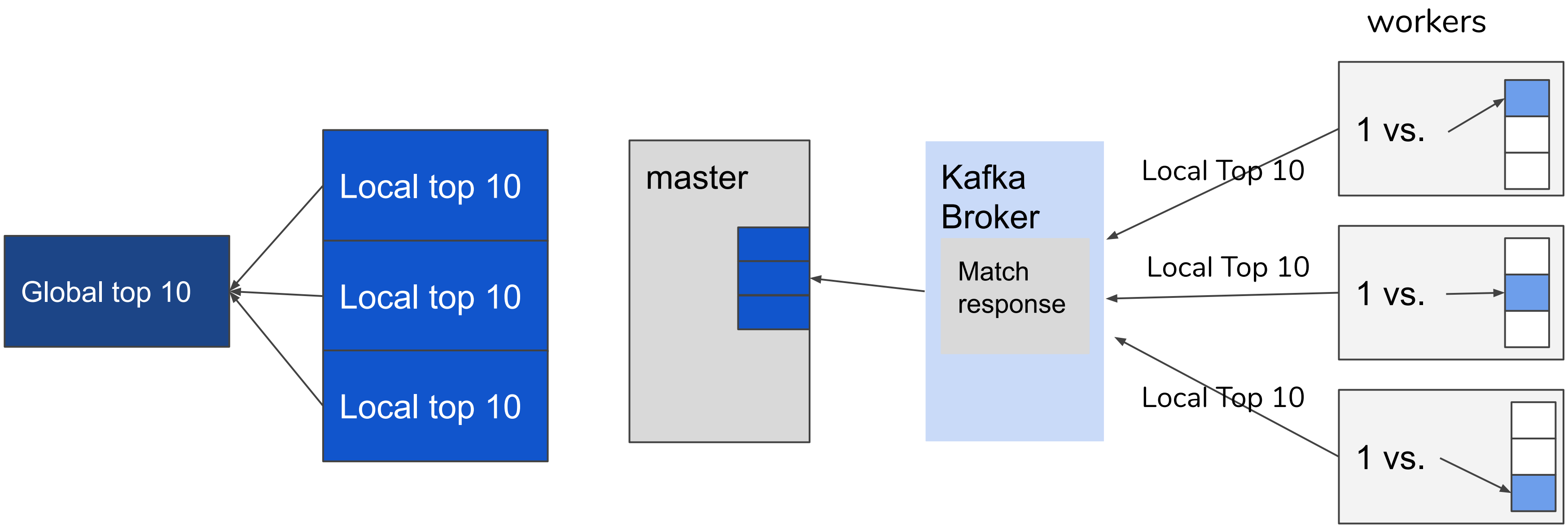
Q&A Backup

Scalability-search queries increase

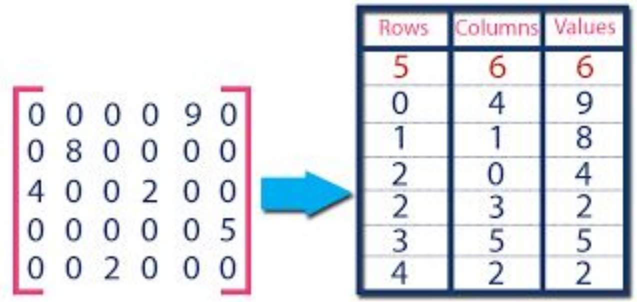


# of master = qps/ qps per cluster (qps: query per second)

Parallelized the work



How sparse matrix stored



$$\begin{bmatrix} 0 & 0 & 0 & 0 & 9 & 0 \\ 0 & 8 & 0 & 0 & 0 & 0 \\ 4 & 0 & 0 & 2 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 5 \\ 0 & 0 & 2 & 0 & 0 & 0 \end{bmatrix}$$

Rows	Columns	Values
5	6	6
0	4	9
1	1	8
2	0	4
2	3	2
3	5	5
4	2	2