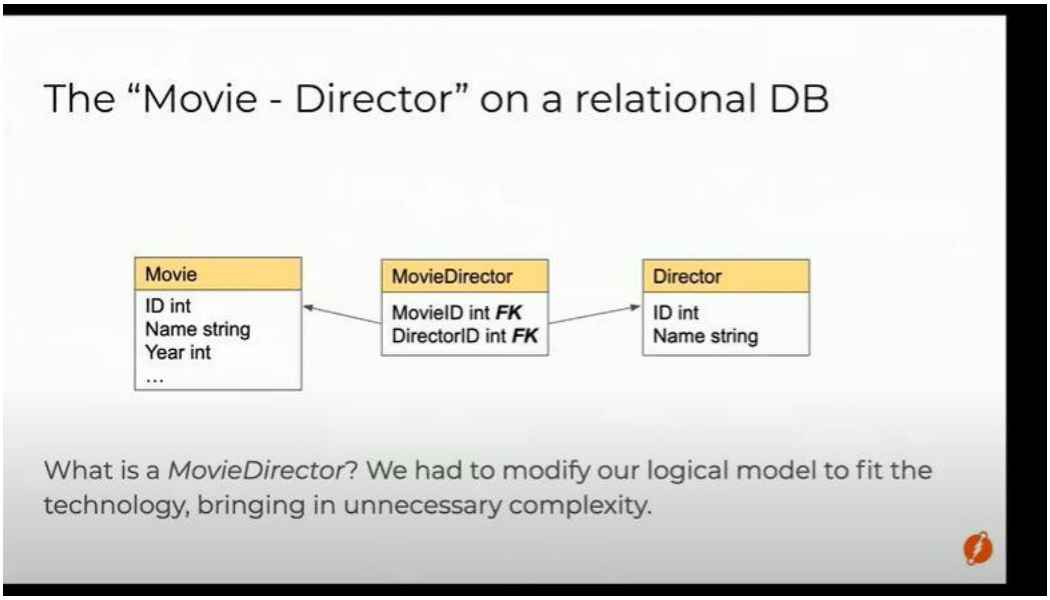
Twitter User -> Followers

A.RDBMS



B. NoSQL (key-value) Database - HBase, Cassandra, Amazon DynamoDB, BigTable + In-Memory (key-value) Database - Redis

1. NoSQL Key Value Database:

User Database:

(key) UID 1 - Sachin Tendulkar -> Details of Sachin (Object)

-> List of Follower keys IDs (1, 2, 3)

(key) UID 2 - Ramesh - Details of Ramesh (Object)

(key) UID 3 - Suresh - Details of Suresh (Object)

2. To achieve Low Latency:

Cache the below in Redis (In-Memory key value DB)

Followers Database:

(key) Sachin Tendulkar - List of Follower keys IDs (1, 2, 3)

Now this allows us to get the followers in O(1)

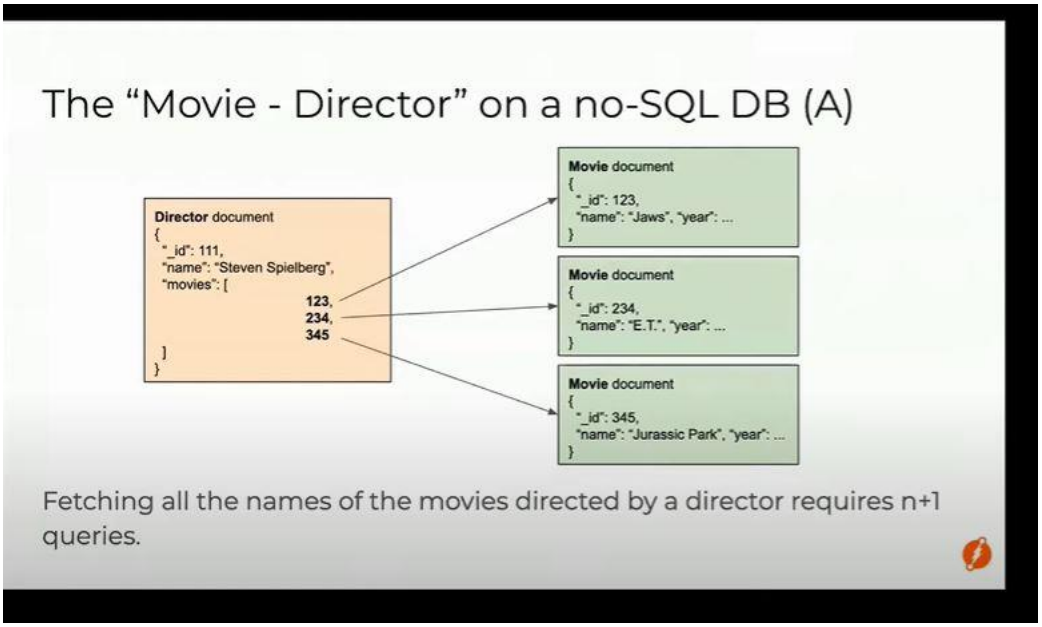
The list can fit in one Redis instance.

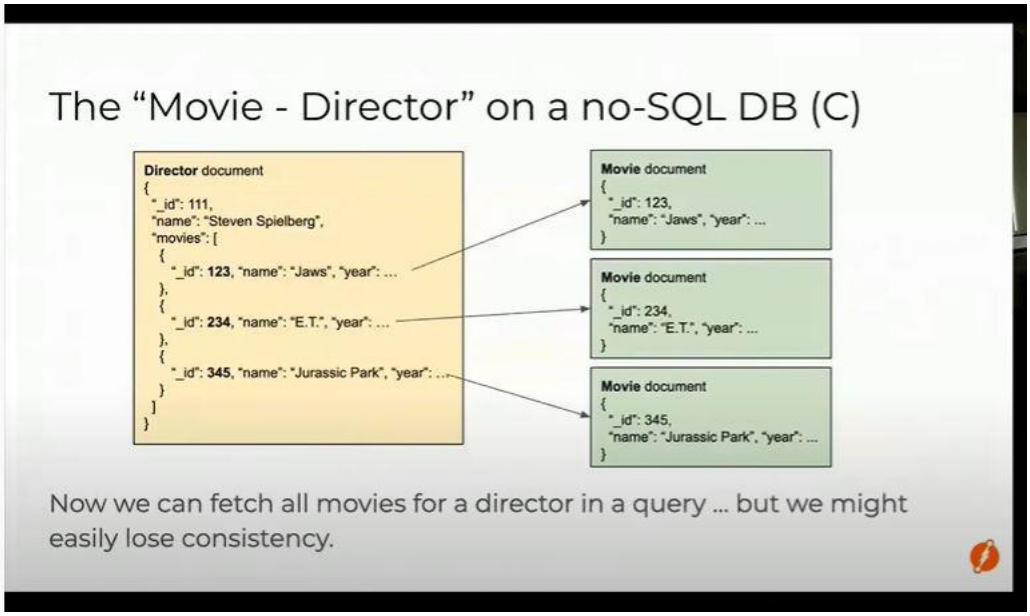
3. Distribute Tasks (like send notification/update timeline of all followers)

* Each task processes a range of follower ids (start to end key) -> it can be a sorted list [or]

  The coordinator can split multiple tasks and tell each one with a range to process.

* The coordinator can split into multiple sub lists and pass sub list to each task.





C. Graph DB on top of Key-Value Database:

UID for every object + Predicate = Value or List of other objects

1 + name = Sachin

1 + followers = 2,3

2 + name = Ramesh

3 + name = Suresh

[Dgraph: The Graph Database written in Go - YouTube]

Dgraph data modeling

Predicates are always attached to UIDs.

We associate values and objects to keys composed by UID + predicate

Keys	Values
0x1:<has name>	"Jaws"
0x1:<was recorded in the year>	1975
0x1:<was directed by>	0x2
0x2:<has name>	"Steven Spielberg"

Sometimes a value can be an array of UIDs or values.