

Index

A		
Apple	14	
Apricot	31, 47	
B		
Banana	7	
C		
Cherry	3, 58, 93	


back-of-the-book index

Last Name	First Name	Title
Apple	Juice	Beverage
Apricot
Banana
Cherry

database table

index

Key	Position (byte offset)
Apple	256



...Apple Juice Beverage...

data file on disk

Index

How to implement the index for the messaging system?

one index (hash table) for all segments

(message id, segment id + position)

index (hash table) per segment

(message id, position)

- ✓ allows to load only actively used indexes into memory
- ✓ makes it easy to drop indices along with segments

How to identify which index stores the message id we need?

Option 1: iterate over all per-segment indices

Option 2: create one more index

Index

option 2: create one more index

Apache Kafka uses this approach

problem

retrieve the message with id = 2

id range index

Id range	Segment
0-3	segment-0
4-7	segment-1
8-11	segment-2



segment-0 index

Message Id	Position
0	0
1	104
2	316
3	426

run a binary search against this index

1

retrieve message bytes from the segment-0 log

3

lookup message position in the segment-0 index

2