

# In this lecture, we will discuss...

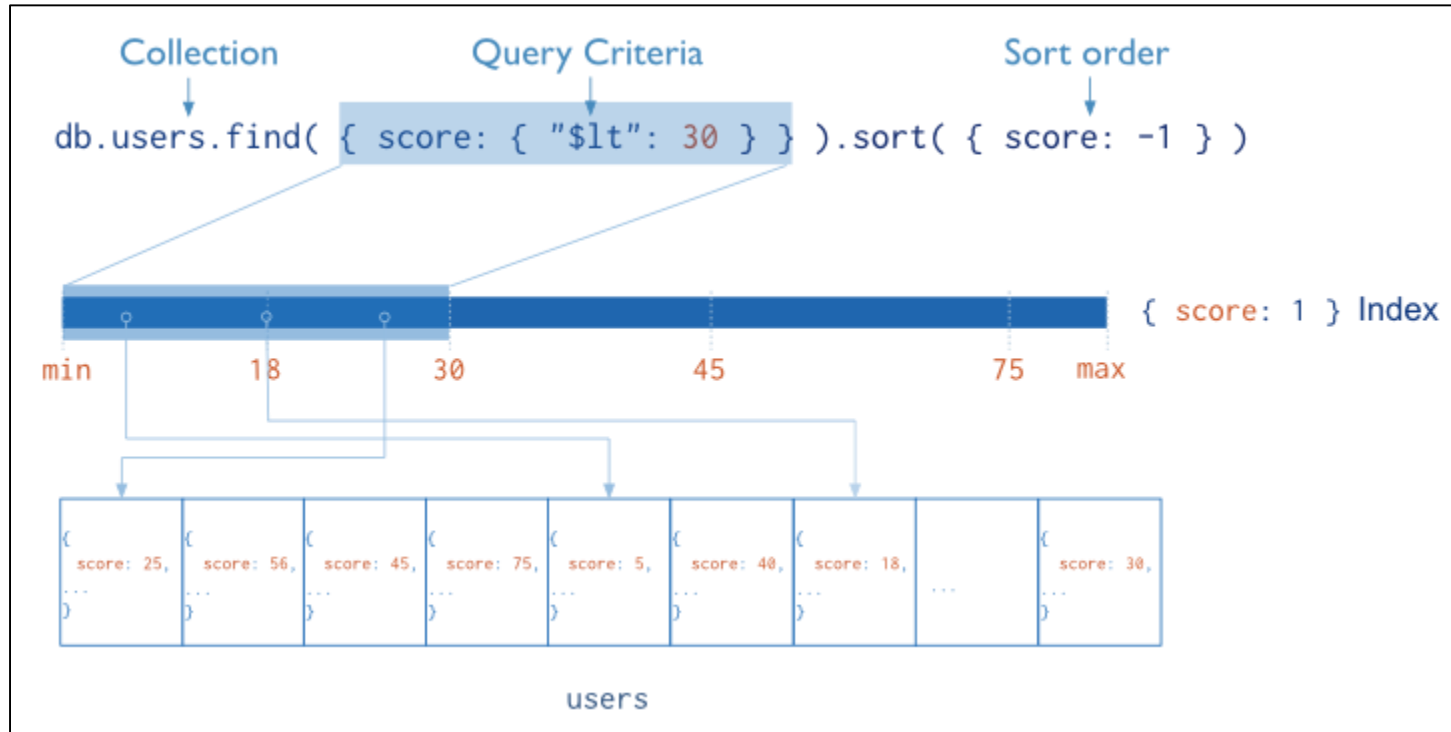
- ✧ Impact of indexes
- ✧ Indexes

# Indexes - Introduction

- ✧ Efficient execution of queries in MongoDB
- ✧ Without indexes, MongoDB must perform a **collection scan**, i.e. scan **every** document in a collection
- ✧ Indexes store a **small portion** of the collection's data set in an **easy to traverse** form
- ✧ The index stores the **value** of a specific field or set of fields, ordered by the value of the field



# Indexes - Introduction



*source: [mongodb.org](http://mongodb.org)*



# MongoDB – Impact of Indexes

- ✧ Data on disk (typically some random order)
- ✧ Must scan every document in collection
- ✧ Inefficient because process large volume of data

_id	City	State	Loc	Pop
1	Baltimore	MD	10,10	1000
2	Rockville	MD	20,20	1500
3	Chicago	IL	30,30	2000
4	Reston	VA	30, 35	2500
5	Bethesda	MD	10, 10	2200
6	Potomac	MD	45, 45	3300



# MongoDB – indexes

State		<b>_id</b>	<b>City</b>	<b>State</b>	<b>Loc</b>	<b>Pop</b>
CA		1	Baltimore	MD	10,10	1000
IL		2	Rockville	MD	20,20	1500
MD		3	Chicago	IL	30,30	2000
VA		4	Reston	VA	30, 35	2500
		5	Bethesda	MD	10, 10	2200
		6	San Jose	CA	45, 45	3300

Diagram illustrating index lookups for a MongoDB collection. The left table shows the index structure, and the right table shows the data. Arrows indicate the mapping from the index to the data rows.

# Indexes - Definition

- ✧ Special data structures that store a small portion of the collection's data set in an easy to traverse form
- ✧ Index has a pointer to document in the collection
- ✧ Ordered set that allows searches – uses B-Tree
- ✧ Supports indexes with multiple fields (example later)



# Summary

- ✧ Indexes support the efficient execution of queries in MongoDB
- ✧ MongoDB can use the index to limit the number of documents it must inspect.

## What's Next?

- ✧ Index concepts

