Problem Statement: Design & Develop MongoDB Queries using Aggregation and Indexing with suitable example using MongoDB.

test> show dbs;

Abhi 8.00 KiB

Data 208.00 KiB

GG 264.00 KiB

TE 220.00 KiB

admin 40.00 KiB

config 96.00 KiB

local 40.00 KiB

test> use TEA;

switched to db TEA

TEA> db.createCollection('staff1');

{ ok: 1 }

TEA> db.staff1.insert({tid:01,tname:"neha",dname:"comp",salary:30000,hiredate:new Date('2014-04-05'),bonus:100,dob:new DDate('1987-09-08')});

DeprecationWarning: Collection.insert() is deprecated. Use insertOne, insertMany, or bulkWrite.

{

acknowledged: true,

insertedIds: { '0': ObjectId("6715068ac8eae763a41d974a") }

}

TEA> db.staff1.insert({tid:02,tname:"minal",dname:"it",salary:45000,hiredate:new Date('2013-03-05'),bonus:100,dob:new DaDate('1984-08-09')})

{

acknowledged: true,

insertedIds: { '0': ObjectId("671506a0c8eae763a41d974b") }

}

TEA> db.staff1.insert({tid:03,tname:"shubhda",dname:"entc",salary:40000,hiredate:new Date('2011-08-08'),bonus:100,dob:nenew Date('1985-08-07')})

{

acknowledged: true,

insertedIds: { '0': ObjectId("671506b1c8eae763a41d974c") }

}

TEA> db.staff1.insert({tid:04,tname:"ketan",dname:"comp",salary:30000,hiredate:new Date('2011-07-08'),bonus:100,dob:new Date('1988-07-07')})

{

acknowledged: true,

insertedIds: { '0': ObjectId("671506c7c8eae763a41d974d") }

}

TEA> db.staff1.find().pretty();

[

{

\_id: ObjectId("6715068ac8eae763a41d974a"),

tid: 1,

tname: 'neha',

dname: 'comp',

salary: 30000,

hiredate: ISODate("2014-04-05T00:00:00.000Z"),

bonus: 100,

dob: ISODate("1987-09-08T00:00:00.000Z")

},

{

\_id: ObjectId("671506a0c8eae763a41d974b"),

tid: 2,

tname: 'minal',

dname: 'it',

salary: 45000,

hiredate: ISODate("2013-03-05T00:00:00.000Z"),

bonus: 100,

dob: ISODate("1984-08-09T00:00:00.000Z")

},

{

\_id: ObjectId("671506b1c8eae763a41d974c"),

tid: 3,

tname: 'shubhda',

dname: 'entc',

salary: 40000,

hiredate: ISODate("2011-08-08T00:00:00.000Z"),

bonus: 100,

dob: ISODate("1985-08-07T00:00:00.000Z")

},

{

\_id: ObjectId("671506c7c8eae763a41d974d"),

tid: 4,

tname: 'ketan',

dname: 'comp',

salary: 30000,

hiredate: ISODate("2011-07-08T00:00:00.000Z"),

bonus: 100,

dob: ISODate("1988-07-07T00:00:00.000Z")

}

]

\*for loop

TEA> for(i=5;i<=2500;i++){db.staff1.insert({tid:i,tname:'teacher'+i,age:Math.floor(Math.random()\*120),doj:new Date()})};

{

acknowledged: true,

insertedIds: { '0': ObjectId("67150715c8eae763a41da10d") }

}

TEA> db.staff1.find({tname:'teacher1001'}).explain();

{

explainVersion: '2',

queryPlanner: {

namespace: 'TEA.staff1',

indexFilterSet: false,

parsedQuery: { tname: { '$eq': 'teacher1001' } },

queryHash: '552EEEDA',

planCacheKey: 'EDC9597A',

maxIndexedOrSolutionsReached: false,

maxIndexedAndSolutionsReached: false,

maxScansToExplodeReached: false,

winningPlan: {

queryPlan: {

stage: 'COLLSCAN',

planNodeId: 1,

filter: { tname: { '$eq': 'teacher1001' } },

direction: 'forward'

},

slotBasedPlan: {

slots: '$$RESULT=s5 env: { s3 = 1729431341652 (NOW), s2 = Nothing (SEARCH\_META), s7 = "teacher1001", s1 = TimeZoneDatabase(ROK...Asia/Yangon) (timeZoneDB) }',

stages: '[1] filter {traverseF(s4, lambda(l1.0) { ((l1.0 == s7) ?: false) }, false)} \n' +

'[1] scan s5 s6 none none none none lowPriority [s4 = tname] @"88d84624-1c7b-4187-8f49-4e8992bf04a2" true false '

}

},

rejectedPlans: []

},

command: { find: 'staff1', filter: { tname: 'teacher1001' }, '$db': 'TEA' },

serverInfo: {

host: 'LAPTOP-LHTCK2MG',

port: 27017,

version: '7.0.2',

gitVersion: '02b3c655e1302209ef046da6ba3ef6749dd0b62a'

},

serverParameters: {

internalQueryFacetBufferSizeBytes: 104857600,

internalQueryFacetMaxOutputDocSizeBytes: 104857600,

internalLookupStageIntermediateDocumentMaxSizeBytes: 104857600,

internalDocumentSourceGroupMaxMemoryBytes: 104857600,

internalQueryMaxBlockingSortMemoryUsageBytes: 104857600,

internalQueryProhibitBlockingMergeOnMongoS: 0,

internalQueryMaxAddToSetBytes: 104857600,

internalDocumentSourceSetWindowFieldsMaxMemoryBytes: 104857600,

internalQueryFrameworkControl: 'trySbeEngine'

},

ok: 1

}

//creating index

TEA> db.staff1.ensureIndex({"tname":1})

[ 'tname\_1' ]

TEA> db.staff1.getIndexes();

[

{ v: 2, key: { \_id: 1 }, name: '\_id\_' },

{ v: 2, key: { tname: 1 }, name: 'tname\_1' }

]

TEA> db.staff1.dropIndex("tname\_1")

{ nIndexesWas: 2, ok: 1 }

TEA> db.staff1.ensureIndex({"age":1,"tname":1})

[ 'age\_1\_tname\_1' ]

TEA> db.staff1.find({"age":40,"tname":{$gt:"Teacher5",$lt:"Teacher10"}}).explain()

{

explainVersion: '2',

queryPlanner: {

namespace: 'TEA.staff1',

indexFilterSet: false,

parsedQuery: {

'$and': [

{ age: { '$eq': 40 } },

{ tname: { '$lt': 'Teacher10' } },

{ tname: { '$gt': 'Teacher5' } }

]

},

queryHash: '13C36A8C',

planCacheKey: '0AE99321',

maxIndexedOrSolutionsReached: false,

maxIndexedAndSolutionsReached: false,

maxScansToExplodeReached: false,

winningPlan: {

queryPlan: {

stage: 'FETCH',

planNodeId: 2,

inputStage: {

stage: 'IXSCAN',

planNodeId: 1,

keyPattern: { age: 1, tname: 1 },

indexName: 'age\_1\_tname\_1',

isMultiKey: false,

multiKeyPaths: { age: [], tname: [] },

isUnique: false,

isSparse: false,

isPartial: false,

indexVersion: 2,

direction: 'forward',

indexBounds: { age: [ '[40, 40]' ], tname: [] }

}

},

slotBasedPlan: {

slots: '$$RESULT=s11 env: { s3 = 1729431692143 (NOW), s6 = Nothing, s1 = TimeZoneDatabase(ROK...Asia/Yangon) (timeZoneDB), s10 = {"age" : 1, "tname" : 1}, s2 = Nothing (SEARCH\_META), s5 = Nothing }',

stages: '[2] nlj inner [] [s4, s7, s8, s9, s10] \n' +

' left \n' +

' [1] cfilter {(exists(s5) && exists(s6))} \n' +

' [1] ixseek s5 s6 s9 s4 s7 s8 [] @"88d84624-1c7b-4187-8f49-4e8992bf04a2" @"age\_1\_tname\_1" true \n' +

' right \n' +

' [2] limit 1 \n' +

' [2] seek s4 s11 s12 s7 s8 s9 s10 [] @"88d84624-1c7b-4187-8f49-4e8992bf04a2" true false \n'

}

},

rejectedPlans: []

},

command: {

find: 'staff1',

filter: { age: 40, tname: { '$gt': 'Teacher5', '$lt': 'Teacher10' } },

'$db': 'TEA'

},

serverInfo: {

host: 'LAPTOP-LHTCK2MG',

port: 27017,

version: '7.0.2',

gitVersion: '02b3c655e1302209ef046da6ba3ef6749dd0b62a'

},

serverParameters: {

internalQueryFacetBufferSizeBytes: 104857600,

internalQueryFacetMaxOutputDocSizeBytes: 104857600,

internalLookupStageIntermediateDocumentMaxSizeBytes: 104857600,

internalDocumentSourceGroupMaxMemoryBytes: 104857600,

internalQueryMaxBlockingSortMemoryUsageBytes: 104857600,

internalQueryProhibitBlockingMergeOnMongoS: 0,

internalQueryMaxAddToSetBytes: 104857600,

internalDocumentSourceSetWindowFieldsMaxMemoryBytes: 104857600,

internalQueryFrameworkControl: 'trySbeEngine'

},

ok: 1

}

TEA> db.staff.find({"$or":[{"age":48},{"tname":"Teacher5"},{"dname":"comp"}]})

TEA> db.staff1.find({"$or":[{"age":48},{"tname":"Teacher5"},{"dname":"comp"}]})

[

{

\_id: ObjectId("6715068ac8eae763a41d974a"),

tid: 1,

tname: 'neha',

dname: 'comp',

salary: 30000,

hiredate: ISODate("2014-04-05T00:00:00.000Z"),

bonus: 100,

dob: ISODate("1987-09-08T00:00:00.000Z")

},

{

\_id: ObjectId("671506c7c8eae763a41d974d"),

tid: 4,

tname: 'ketan',

dname: 'comp',

salary: 30000,

hiredate: ISODate("2011-07-08T00:00:00.000Z"),

bonus: 100,

dob: ISODate("1988-07-07T00:00:00.000Z")

},

{

\_id: ObjectId("6715070cc8eae763a41d9829"),

tid: 224,

tname: 'teacher224',

age: 48,

doj: ISODate("2024-10-20T13:35:08.665Z")

},

{

\_id: ObjectId("6715070dc8eae763a41d98c7"),

tid: 382,

tname: 'teacher382',

age: 48,

doj: ISODate("2024-10-20T13:35:09.346Z")

},

{

\_id: ObjectId("6715070ec8eae763a41d995e"),

tid: 533,

tname: 'teacher533',

age: 48,

doj: ISODate("2024-10-20T13:35:10.052Z")

},

{

\_id: ObjectId("6715070ec8eae763a41d99fb"),

tid: 690,

tname: 'teacher690',

age: 48,

doj: ISODate("2024-10-20T13:35:10.769Z")

},

{

\_id: ObjectId("67150710c8eae763a41d9bb9"),

tid: 1136,

tname: 'teacher1136',

age: 48,

doj: ISODate("2024-10-20T13:35:12.546Z")

},

{

\_id: ObjectId("67150711c8eae763a41d9c51"),

tid: 1288,

tname: 'teacher1288',

age: 48,

doj: ISODate("2024-10-20T13:35:13.119Z")

},

{

\_id: ObjectId("67150711c8eae763a41d9cb5"),

tid: 1388,

tname: 'teacher1388',

age: 48,

doj: ISODate("2024-10-20T13:35:13.532Z")

},

{

\_id: ObjectId("67150711c8eae763a41d9cff"),

tid: 1462,

tname: 'teacher1462',

age: 48,

doj: ISODate("2024-10-20T13:35:13.812Z")

},

{

\_id: ObjectId("67150712c8eae763a41d9d69"),

tid: 1568,

tname: 'teacher1568',

age: 48,

doj: ISODate("2024-10-20T13:35:14.202Z")

},

{

\_id: ObjectId("67150712c8eae763a41d9dd7"),

tid: 1678,

tname: 'teacher1678',

age: 48,

doj: ISODate("2024-10-20T13:35:14.641Z")

},

{

\_id: ObjectId("67150712c8eae763a41d9dec"),

tid: 1699,

tname: 'teacher1699',

age: 48,

doj: ISODate("2024-10-20T13:35:14.722Z")

},

{

\_id: ObjectId("67150713c8eae763a41d9e98"),

tid: 1871,

tname: 'teacher1871',

age: 48,

doj: ISODate("2024-10-20T13:35:15.395Z")

},

{

\_id: ObjectId("67150713c8eae763a41d9ed3"),

tid: 1930,

tname: 'teacher1930',

age: 48,

doj: ISODate("2024-10-20T13:35:15.621Z")

},

{

\_id: ObjectId("67150713c8eae763a41d9f1e"),

tid: 2005,

tname: 'teacher2005',

age: 48,

doj: ISODate("2024-10-20T13:35:15.920Z")

},

{

\_id: ObjectId("67150715c8eae763a41da08a"),

tid: 2369,

tname: 'teacher2369',

age: 48,

doj: ISODate("2024-10-20T13:35:17.122Z")

}

TEA> db.staff1.getIndexes()

[

{ v: 2, key: { \_id: 1 }, name: '\_id\_' },

{ v: 2, key: { age: 1, tname: 1 }, name: 'age\_1\_tname\_1' },

{ v: 2, key: { dname: 1 }, name: 'dname\_1' }

]

TEA> db.staff1.createIndex( {tname: 1 } )

tname\_1

TEA> db.staff1.getIndexes()

[

{ v: 2, key: { \_id: 1 }, name: '\_id\_' },

{ v: 2, key: { age: 1, tname: 1 }, name: 'age\_1\_tname\_1' },

{ v: 2, key: { dname: 1 }, name: 'dname\_1' },

{ v: 2, key: { tname: 1 }, name: 'tname\_1' }

]

**\*\*//Aggregate functions**

TEA> db.createCollection('website');

{ ok: 1 }

TEA> db.website.insert({'roll':'1','name':'Somesh','amount':1000,'ur l':'www.yahoo.com'});

{

acknowledged: true,

insertedIds: { '0': ObjectId("67151005c8eae763a41da10e") }

}

TEA> db.website.insert({'roll':'2','name':'hariom','amount':2000,'url':'www.yahoo.com '});

{

acknowledged: true,

insertedIds: { '0': ObjectId("67151013c8eae763a41da10f") }

}

TEA> db.website.insert({'roll':'3','name':'rina','amount':3000,'url':'www.google.com'

... });

{

acknowledged: true,

insertedIds: { '0': ObjectId("67151021c8eae763a41da110") }

}

TEA> db.website.insert({'roll':'4','name':'ash','amount':4000,'url':'www.gmail.com'})

{

acknowledged: true,

insertedIds: { '0': ObjectId("67151033c8eae763a41da111") }

}

TEA> ;

TEA> db.website.insert({'roll':'5','name':'ash','amount':1000,'url':'www.pvg.com'});

{

acknowledged: true,

insertedIds: { '0': ObjectId("67151047c8eae763a41da112") }

}

//SUM AGGREGATE

TEA> db.website.aggregate({$group:{\_id:"$name","total":{$sum:"$amount"}}});

[

{ \_id: 'rina', total: 3000 },

{ \_id: 'hariom', total: 2000 },

{ \_id: 'ash', total: 5000 },

{ \_id: 'Somesh', total: 1000 }

]

//AVG AGGREGATE 2

TEA> db.website.aggregate({$group:{\_id:"$name","total":{$avg:"$amount"}}});

[

{ \_id: 'rina', total: 3000 },

{ \_id: 'Somesh', total: 1000 },

{ \_id: 'ash', total: 2500 },

{ \_id: 'hariom', total: 2000 }

]

////MIN AGGREGATION

TEA> db.website.aggregate({$group:{\_id:"$name","total":{$min:"$amount"}}});

[

{ \_id: 'Somesh', total: 1000 },

{ \_id: 'hariom', total: 2000 },

{ \_id: 'rina', total: 3000 },

{ \_id: 'ash', total: 1000 }

**]**

//MAX AGGREGATION

TEA> db.website.aggregate({$group:{\_id:"$name","total":{$max:"$amount"}}});

[

{ \_id: 'rina', total: 3000 },

{ \_id: 'Somesh', total: 1000 },

{ \_id: 'ash', total: 4000 },

{ \_id: 'hariom', total: 2000 }

]

//FIRST AGGREGATION

TEA> db.website.aggregate({$group:{\_id:"$name","total":{$first:"$amount"}}});

[

{ \_id: 'hariom', total: 2000 },

{ \_id: 'Somesh', total: 1000 },

{ \_id: 'ash', total: 4000 },

{ \_id: 'rina', total: 3000 }

]

//LAST AGGREGATION

TEA> db.website.aggregate({$group:{\_id:"$name","total":{$last:"$amount"}}});

[

{ \_id: 'Somesh', total: 1000 },

{ \_id: 'hariom', total: 2000 },

{ \_id: 'rina', total: 3000 },

{ \_id: 'ash', total: 1000 }

]

//PUSH AGGREGATION

TEA> db.website.aggregate({$group:{\_id:"$name","total":{$push:"$amount"}}});

[

{ \_id: 'Somesh', total: [ 1000 ] },

{ \_id: 'hariom', total: [ 2000 ] },

{ \_id: 'rina', total: [ 3000 ] },

{ \_id: 'ash', total: [ 4000, 1000 ] }

]

//COUNT AGGREGATION

TEA> db.website.aggregate({$group:{\_id:"$name","total": {$sum:1}}});

[

{ \_id: 'Somesh', total: 1 },

{ \_id: 'hariom', total: 1 },

{ \_id: 'rina', total: 1 },

{ \_id: 'ash', total: 2 }

]

//ADDTOSET AGGREGATE

TEA> db.website.aggregate({$group:{\_id:"$name","total":{$addToSet:"$amount"}}});

[

{ \_id: 'Somesh', total: [ 1000 ] },

{ \_id: 'hariom', total: [ 2000 ] },

{ \_id: 'rina', total: [ 3000 ] },

{ \_id: 'ash', total: [ 4000, 1000 ] }

]

**// Count the Number of Documents for Each Name**

TEA> db.website.aggregate([

... {

... $group: {

... \_id: "$name",

... count: { $sum: 1 }

... }

... }

... ]);

[

{ \_id: 'hariom', count: 1 },

{ \_id: 'ash', count: 2 },

{ \_id: 'rina', count: 1 },

{ \_id: 'Somesh', count: 1 }

]

**//Group by Name and Count Unique URLs**

TEA> db.website.aggregate([{$group: {\_id: "$name",uniqueUrls: { $addToSet: "$url" },count: { $sum: 1 }}}]);

[

{ \_id: 'Somesh', uniqueUrls: [], count: 1 },

{ \_id: 'hariom', uniqueUrls: [ 'www.yahoo.com ' ], count: 1 },

{ \_id: 'rina', uniqueUrls: [ 'www.google.com' ], count: 1 },

{

\_id: 'ash',

uniqueUrls: [ 'www.gmail.com', 'www.pvg.com' ],

count: 2

}

]

//  retrieve **the last recorded amount for each name.**

TEA> db.website.aggregate([{$sort: { \_id: 1 }},{$group: {\_id: "$name",lastAmount: { $last:"$amount" }}}]);

[

{ \_id: 'Somesh', lastAmount: 1000 },

{ \_id: 'hariom', lastAmount: 2000 },

{ \_id: 'rina', lastAmount: 3000 },

{ \_id: 'ash', lastAmount: 1000 }

]