

Geospatial Indexes and Queries

- * Surface
- * Location Data
- * Query Operations
- * Geospatial Indexes

Surface

2 surface types:

Spherical

2dsphere - GeoJSON - WGS84

Flat

2d - legacy coordinate pairs - Euclidean plane

Location Data

GeoJSON objects:

Point, LineString, Polygon, MultiPoint, MultiLineString, MultiPolygon, GeometryCollection.

legacy coordinate pairs [x, y]

Query Operations

Inclusion : `$geoWithin`

Intersection : `$geoIntersects`

(only 2dsphere)

Proximity : `$near`

Geospatial Indexes

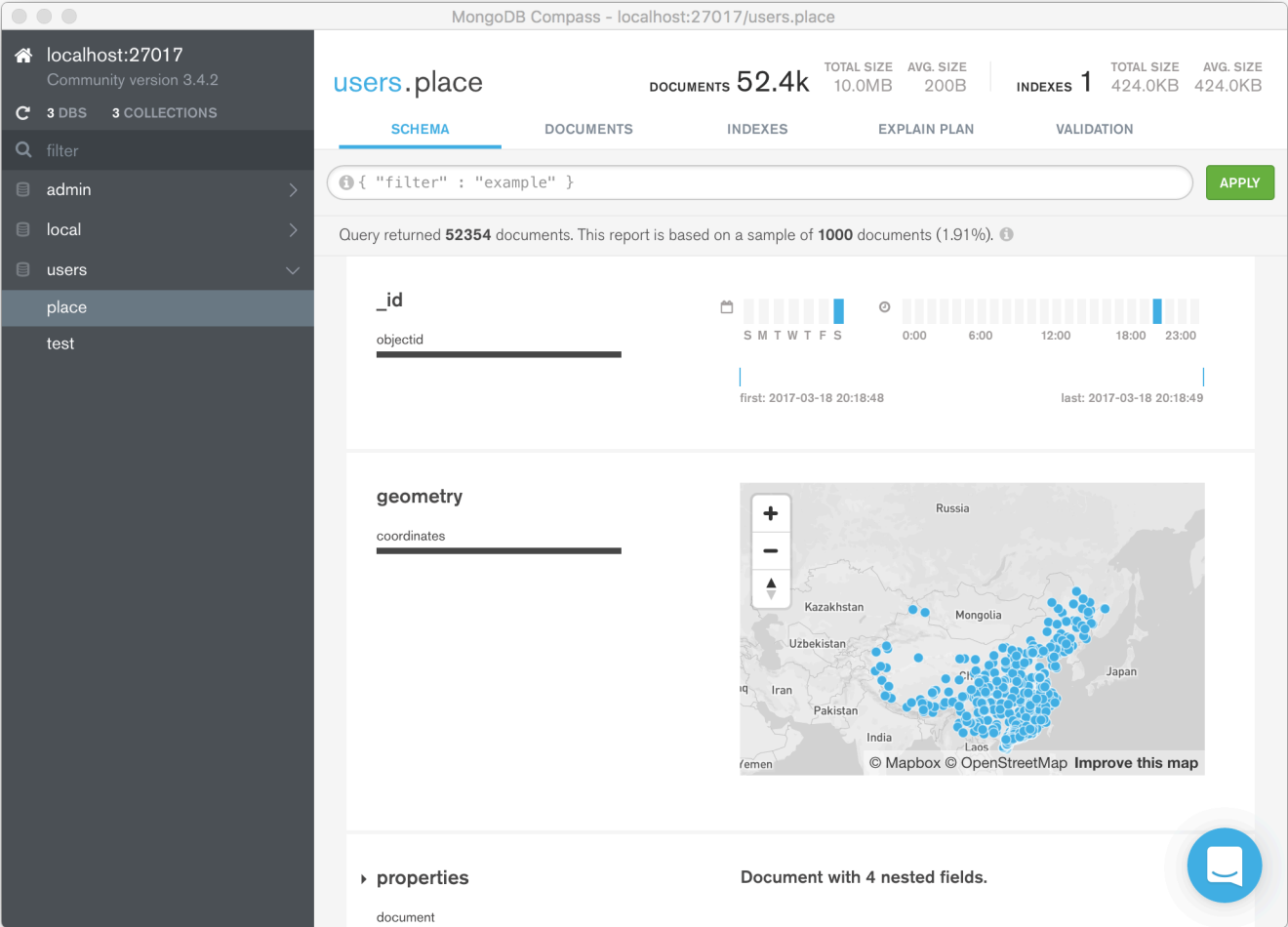
2dsphere

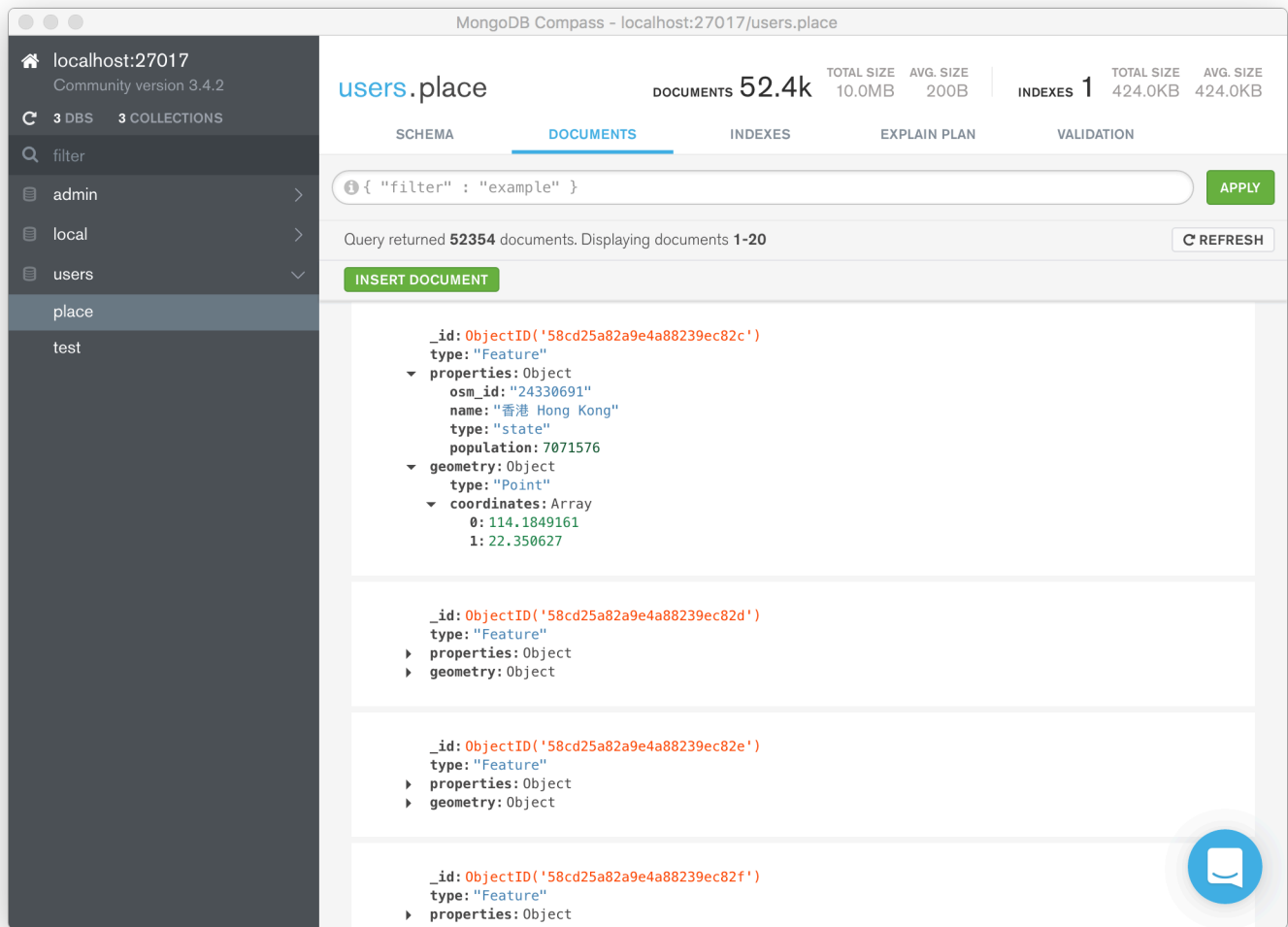
2d

EXAMPLE

Dataset: a shp file from OSM

In MongoDB COMPASS





In Terminal

`createIndex()` Add Geospatial Index

```
db.place.createIndex({ geometry: "2dsphere"})
```

`$geoWithin` Query Geospatial Index

```
db.place.find( { geometry:
  { $geoWithin:
    { $geometry:
      { type : "Polygon",
        coordinates: [[ [110,20],[115,23],
                        [115,20], [110,20] ] ]
      }
    }
  }
})
```

```
{ "_id" : ObjectId("58cd25a92a9e4a88239f5ee7"), "type" : "Feature", "properties" : { "osm_id" : "2271288752", "name" : "秀英区 - Xiuying District", "type" : "locality", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.2684827, 20.0175502 ] } }
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{ "_id" : ObjectId("58cd25a92a9e4a88239f5dde"), "type" : "Feature", "properties" : { "osm_id" : "2256309636", "name" : "新东村 - Xindong Village", "type" : "village", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.3556946, 20.0722549 ] } }
{ "_id" : ObjectId("58cd25a92a9e4a88239f5ddb"), "type" : "Feature", "properties" : { "osm_id" : "2256309628", "name" : "三联村 - Sanlian Village", "type" : "village", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.3684462, 20.0761261 ] } }
{ "_id" : ObjectId("58cd25a92a9e4a88239f5ddd"), "type" : "Feature", "properties" : { "osm_id" : "2256309633", "name" : "外坪村 - Waiping Village", "type" : "village", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.3715545, 20.0748919 ] } }
{ "_id" : ObjectId("58cd25a92a9e4a88239f5ddc"), "type" : "Feature", "properties" : { "osm_id" : "2256309630", "name" : "土尾村 - Tuwei Village", "type" : "village", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.3677083, 20.068168 ] } }
{ "_id" : ObjectId("58cd25a92a9e4a88239f5dee"), "type" : "Feature", "properties" : { "osm_id" : "2259763363", "name" : "东村 - East Village", "type" : "village", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.3806263, 20.0616521 ] } }
{ "_id" : ObjectId("58cd25a92a9e4a88239f5df0"), "type" : "Feature", "properties" : { "osm_id" : "2259780363", "name" : "外墩村 - Waidun Village", "type" : "village", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.3792541, 20.0685804 ] } }
{ "_id" : ObjectId("58cd25a92a9e4a88239f5def"), "type" : "Feature", "properties" : { "osm_id" : "2259763364", "name" : "西村 - West Village", "type" : "village", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.3797094, 20.0603357 ] } }
{ "_id" : ObjectId("58cd25a92a9e4a88239f5ded"), "type" : "Feature", "properties" : { "osm_id" : "2259681505", "name" : "麻锡村 - Maxi Village", "type" : "village", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.3768484, 20.0605947 ] } }
{ "_id" : ObjectId("58cd25a92a9e4a88239f5de1"), "type" : "Feature", "properties" : { "osm_id" : "2256378465", "name" : "新埠镇 - Xinbu Town", "type" : "town", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.360322, 20.0552473 ] } }
{ "_id" : ObjectId("58cd25a92a9e4a88239f5ddf"), "type" : "Feature", "properties" : { "osm_id" : "2256378456", "name" : "中坡村 - Zhongpo Village", "type" : "village", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.3617503, 20.0572273 ] } }
{ "_id" : ObjectId("58cd25a92a9e4a88239f5de2"), "type" : "Feature", "properties" : { "osm_id" : "2256378467", "name" : "西坡村 - Xipo Village", "type" : "village", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.3618058, 20.0607834 ] } }
{ "_id" : ObjectId("58cd25a92a9e4a88239f5de0"), "type" : "Feature", "properties" : { "osm_id" : "2256378460", "name" : "外沙村 - Waisha Village", "type" : "village", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.3645099, 20.0581651 ] } }
{ "_id" : ObjectId("58cd25a92a9e4a88239f5dd9"), "type" : "Feature", "properties" : { "osm_id" : "2256164750", "name" : "海甸岛 - Haidian Island", "type" : "suburb", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.3309355, 20.0651231 ] } }
{ "_id" : ObjectId("58cd25a92a9e4a88239f5f04"), "type" : "Feature", "properties" : { "osm_id" : "2272766639", "name" : "人民路街道 - Remin Road Subdistrict", "type" : "neighbourhood", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.334651, 20.0556435 ] } }
{ "_id" : ObjectId("58cd25a82a9e4a88239eca87"), "type" : "Feature", "properties" : { "osm_id" : "244080519", "name" : "海口市", "type" : "city", "population" : null }, "geometry" : { "type" : "Point", "coordinates" : [ 110.3409936, 20.0423626 ] } }
Type "it" for more
> □
```