

# SPACE DEBRIS MANAGEMENT

Milestone: NOSQL IMPLEMENTATION

## Group 18

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Percentage of Effort Contributed by Student 1: 50%

Percentage of Effort Contributed by Student 2: 50%

Signature of Student 1: 

Signature of Student 2: 

Submission Date: 03 December, 2023

## 1. Simple query

### QUERY 1

```
db.countries.findOne({ "C_NAME": "Canada" })
```

In JSON format:

```
{ "C_NAME": "Canada" }
```

The screenshot shows the MongoDB Compass web interface. The top bar indicates the connection to 'DMA Project/DMA\_Project.country'. The left sidebar shows the database structure with 'DMA\_Project' expanded, listing various collections like 'country', 'country\_manufacturer', etc. The main panel displays the 'DMA\_Project.country' collection with 30 documents and 1 index. A query filter is applied: `{ "C_NAME": "Canada" }`. The results show a single document with the following fields: `_id` (ObjectId), `COUNTRY_ID` (W00112), `C_NAME` (Canada), and `C_ISO` (ISO 31000:2018). A notification at the bottom states 'Import completed. 30 documents imported.'

## QUERY 2

In JSON format:

```
[
  { "$match": {} }
]
```

The screenshot shows the MongoDB Compass interface for the **DMA Project** database. The **country** collection is selected, and the **Aggregations** tab is active. A pipeline with a single **\$match** stage is defined. The interface shows 30 documents and 1 index for the collection. The pipeline output displays a sample of 10 documents, including details for the United States, Canada, and Mexico.

**Aggregations**

DMA\_Project.country

Documents Aggregations Schema Indexes Validation

Pipeline **\$match** Generate aggregation Explain Export Run More Options

Untitled - modified SAVE CREATE NEW EXPORT TO LANGUAGE PREVIEW STAGES TEXT

```
1 [
2   { "$match": {} }
3 ]
4
```

**PIPELINE OUTPUT**  
Sample of 10 documents

OUTPUT OPTIONS

\_id: ObjectId('656bbff867a8c131bccdd32db')  
COUNTRY\_ID: "W00111"  
C\_NAME: "United States"  
C\_ISO: "ISO 9001:2015"

\_id: ObjectId('656bbff867a8c131bccdd32dc')  
COUNTRY\_ID: "W00112"  
C\_NAME: "Canada"  
C\_ISO: "ISO 31000:2018"

\_id: ObjectId('656bbff867a8c131bccdd32dd')  
COUNTRY\_ID: "W00113"  
C\_NAME: "Mexico"

>\_MONGOSH

## 2. Complex query

### QUERY 1

In JSON format:

```
[
  { "$match": { "C_NAME": { "$regex": "^Uni", "$options": "i" } } }
]
```

The screenshot shows the MongoDB Compass interface for the DMA\_Project database. The left sidebar displays the database structure, including the 'country' collection. The main panel shows the 'Aggregations' tab for the 'DMA\_Project.country' collection. A pipeline with one stage, '\$match', is defined with the query: `{ "$match": { "C_NAME": { "$regex": "^Uni", "$options": "i" } } }`. The pipeline output is displayed on the right, showing a sample of 3 documents. The status bar at the bottom indicates the connection is to the '\_MONGOSH' instance.

**Aggregations**  
DMA\_Project.cou...

**30** DOCUMENTS **1** INDEXES

Documents **Aggregations** Schema Indexes Validation

Pipeline **\$match** Generate aggregation Explain Export Run More Options

Untitled - modified SAVE CREATE NEW EXPORT TO LANGUAGE PREVIEW STAGES TEXT

**PIPELINE OUTPUT**  
Sample of 3 documents

<code>_id: ObjectId('656bbff867a8c131bccdd32db')</code> <code>COUNTRY_ID: "W00111"</code> <code>C_NAME: "United States"</code> <code>C_ISO: "ISO 9001:2015"</code>
<code>_id: ObjectId('656bbff867a8c131bccdd32e0')</code> <code>COUNTRY_ID: "W00116"</code> <code>C_NAME: "United Kingdom"</code> <code>C_ISO: "ISO 19600:2014"</code>
<code>_id: ObjectId('656bbff867a8c131bccdd32ef')</code> <code>COUNTRY_ID: "W00131"</code> <code>C_NAME: "United Arab Emirates"</code> <code>C_ISO: "ISO 14001:2015"</code>

>\_MONGOSH

## QUERY 2

In JSON format:

```
[
  { "$match": { "C_NAME": { "$in": ["Canada", "Mexico"] } } },
  { "$project": { "C_NAME": 1, "C_ISO": 1 } }
]
```

The screenshot shows the MongoDB Compass interface for the **DMA Project** database. The left sidebar displays the database structure, including the **country** collection. The main panel is titled **DMA\_Project.country** and shows 30 documents and 1 index. The **Aggregations** tab is active, displaying a pipeline with two stages: **\$match** and **\$project**. The **\$match** stage filters documents where **C\_NAME** is either "Canada" or "Mexico". The **\$project** stage projects the **C\_NAME** and **C\_ISO** fields. The **PIPELINE OUTPUT** section shows a sample of 2 documents:

```
{ "_id": ObjectId('656bbff867a8c131bcdd32dc'), "C_NAME": "Canada", "C_ISO": "ISO 31000:2018" }
{ "_id": ObjectId('656bbff867a8c131bcdd32dd'), "C_NAME": "Mexico", "C_ISO": "ISO 14001:2015" }
```

The bottom status bar shows the command prompt **>\_MONGOSH**.

### 3. Aggregate Query

#### QUERY 1

In JSON format:

```
[
  { "$group": { "_id": "$C_ISO", "count": { "$sum": 1 } } }
]
```

The screenshot shows the MongoDB Compass interface for the **DMA Project** database. The **country** collection is selected. The **Aggregations** tab is active, displaying a pipeline with a single **\$group** stage. The query is:

```
1 [
2   { "$group": { "_id": "$C_ISO", "count": { "$sum": 1 } } }
3 ]
4
```

The interface shows 30 documents and 1 index. The **PIPELINE OUTPUT** section displays a sample of 10 documents:

_id	count
ISO 31000:2018	4
ISO 22301:2019	2
ISO 20000-1:2018	2
ISO 19600:2014	1

The bottom status bar shows the command prompt **>\_MONGOSH**.

## QUERY 2

In JSON format:

```
[
  { "$group": { "_id": "$C_ISO", "countries": { "$push": "$C_NAME" } } },
  { "$project": { "ISO_Standard": "$_id", "Countries": "$countries", "Total": { "$size": "$countries" } } }
]
```

The screenshot shows the MongoDB Compass interface for the **DMA Project** database. The left sidebar displays the database structure, including collections like **country**, **country\_manufacturer**, **launch\_facility**, **launch\_license**, **manufacturer**, **orbit**, **organization**, **present\_in**, **reports\_to**, **rocket**, **satellite**, **sensor**, **space\_agency**, and **space\_debris**. The main panel shows the **DMA\_Project.country** collection with 30 documents and 1 index. The **Aggregations** tab is active, displaying a pipeline with two stages: **\$group** and **\$project**. The **\$group** stage groups documents by **C\_ISO** and pushes **C\_NAME** into an array. The **\$project** stage projects the **ISO\_Standard** (from **ISO\_Standard**), **Countries** (from **Countries**), and **Total** (from **Total**). The **PIPELINE OUTPUT** section shows a sample of 10 documents, including:

- \_id:** "ISO 31000:2018"  
**ISO\_Standard:** "ISO 31000:2018"  
**Countries:** Array (4)  
**Total:** 4
- \_id:** "ISO 22301:2019"  
**ISO\_Standard:** "ISO 22301:2019"  
**Countries:** Array (2)  
**Total:** 2
- \_id:** "ISO 20000-1:2018"  
**ISO\_Standard:** "ISO 20000-1:2018"  
**Countries:** Array (2)