



NoSQL Assignment

By

Group 6

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I. Data Selection

A. Purposes of data

The purpose that we select this data is we see the insight of tv shows and movies on Netflix. For example, type, genres, and rating.

B. Data Model

1. **Show_id** – This column contains the id of the show on Netflix (Format: stxxx).
2. **Type** – This column contains the type of show on Netflix.
3. **Title** – This column contains the title name of the show on Netflix.
4. **Director** – This column contains the name of the director of each show on Netflix.
5. **Cast** – This column contains the name of the actor or actress of each show on Netflix.
6. **Country** – This column contains the country that produces the show which is published on Netflix.
7. **Date_added** – This column contains the date, month, and year of the show that was published on Netflix.
8. **Realease_year** – This column contains the date, month, and year of the show that was published on Netflix.
9. **Rating** – This column contains the type of movie rating of each show on Netflix.
10. **Duration** – This column contains the time duration of the show on Netflix.
11. **Genres** – This column contains the genres of the show on Netflix.
12. **Description** – This column contains the description of the show on Netflix.

C. Motivation

We do it for people who like movies and want to see information about movies of interest such as who is the director or where the movie is made and can show users the type of movie they like or are interested in.

II. NoSQL Technology Selection

A. Main Features

The main feature used in this assignment is MongoDB technology. MongoDB is a well-known open-source NoSQL Database that provides a document-oriented database regarding JSON-like documents. [1] It can perform data without any data structures to query rather than RDBMS. In addition, MongoDB is suitable for hierarchical data storage that centers around the CAP theorem (Consistency, Availability, and Partition tolerance) and also has main features including [2]

- **Schema-less Database** - A schema-less database provides a collection that can keep different types of documents. To clarify easily, users could insert multiple types of data whether numbers of fields, content, and size. A document doesn't have to be similar to another document like the RDBMS.
- **Scalability** - MongoDB can distribute data on multiple servers, so a large amount of data can be partitioned into data chunks using the Shard key. In addition, those data chunks are evenly distributed across Shards that reside across several Physical Servers.
- **Replication** - MongoDB provides high availability and redundancy by creating multiple copies of data and sending the copies to a different server to prevent one server fails, so users can receive data from another server.
- **Indexing** - Every field in the documents is indexed with primary and secondary indices, providing less time to get and search each document's data.

B. Tools and Services

There are several tools, applications, and services that could be used to develop the NoSQL script. However, we came up with three technologies that are important and famous technologies providing built-in platforms, online document databases, and cloud services. The three technologies are included as follows:

- **NoSQL Booster for MongoDB**

[1] NoSQL Booster is the cross-platform tool with a graphical user interface (GUI) for MongoDB that contains multiple built-in including:

- MongoDB Script Debugger

- Comprehensive Server Monitoring Tools
- Query Code Generator
- Advanced IntelliSense Support

[3] NoSQL Booster admires its ability to automatically complete variables, methodologies, keywords, properties as well as collection names. In addition, it could write a script query faster and provides several features including:

- **Chaining Fluent Query Interface** - NoSQL Booster provides a fluent query builder API that allows query construction using chaining syntax.
- **Collection Re-Schema Tool** - The re-schema tool provides a GUI in order to update the MongoDB Collection Schema. It is essentially generating a code when users update by clicking only a few clicks.
- **One-Click Grouping/Filtering** - The One-Click grouping feature allows grouping the selected field in query results to calculate counts, totals, maximums, minimums, and averages.
- **Test Data Generator** - The Test Data Generator allows users to create random fake data for testing purposes. Because real data cannot always be distributed and restricted by the data's owner, fake data can mimic it. So, users could ensure the statistically significant without any restrictions.

- **MongoDB Atlas**

The difficulty of installing, administering, and healing their deployments on the cloud service provider of their choice is handled by MongoDB Atlas, a fully managed cloud database (AWS, Azure, and GCP). The best approach to install, run, and scale MongoDB in the cloud is using the MongoDB Atlas. With Atlas, users can quickly and easily launch a MongoDB database with a few mouse clicks. [4] There are several features of MongoDB Atlas including: [5]

- **Built-in Automation Features** – MongoDB Atlas has Automation tools for database administration that help users gain a competitive advantage. The automation features include as follows:
 - 1) Provisioning, setup, and configuration of hardware
 - 2) Upgrades and patches for software
 - 3) Disaster recovery and backups

- **Easier Scalability** – Apps and systems must react to unanticipated needs and the company's usual growth rate. MongoDB is a NoSQL database that allows for horizontal scalability via a technique known as Sharding.
- **Strong Security Measures** – MongoDB Atlas employs a multilayered strategy. MongoDB Atlas has security features like authentication, authorization, encryption, and more. These features help prevent data breaches and improve security.
- **Extensive Analytics and Monitoring** – MongoDB Atlas has built-in tracking and monitoring functions that provide valuable insights into the performance of your database. In addition, it gets real-time intuitions into its server clusters and set up personalized alerts, allowing users to fix issues before they affect performance or the end-user experience.
- **Google Cloud Platform (GCP)**

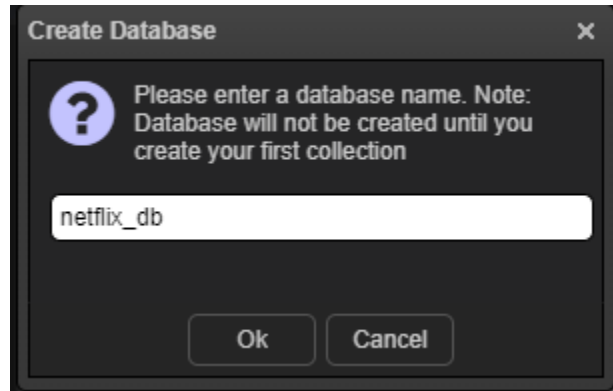
Google cloud platform or GCP is the public cloud that has various services such as Big Data, IoT, Data storage or etc. I can help the user develop the application or server that MongoDB can use Google cloud to make the easy work with data and take the operational heavy lifting away from the application teams and developers. [6] There are several features in GCP as follows:

 - **Fault Tolerance and High Availability** – GCP makes sure that applications are not just consistently and conveniently accessible, but also very resilient to difficulties. The availability of GCP's services and products is also intended to assist with application deployment concerns.
 - **Scalability and Elasticity** – The built-in services of Google Cloud allow for automatic application scaling and load distribution. In addition, Users can automatically add or delete instances and set a policy that scales up or down the number of instances based on measured load and target utilization using Managed Instance Groups, a feature of GCP that allows you to manage identical instances as a single entity in a single zone.
 - **Disaster Recovery** – GCP has a robust global network, redundant points of presence throughout the world, a scalable service infrastructure, a highly

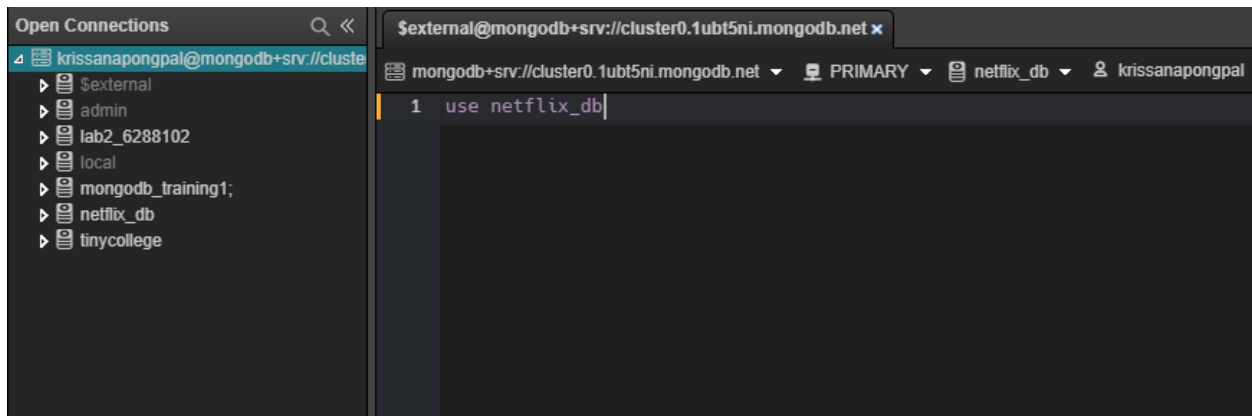
secure network, and is generally privacy compliant, all of which help it meet an application's SLA needs.

III. NoSQL Implementation

A. Database Creation

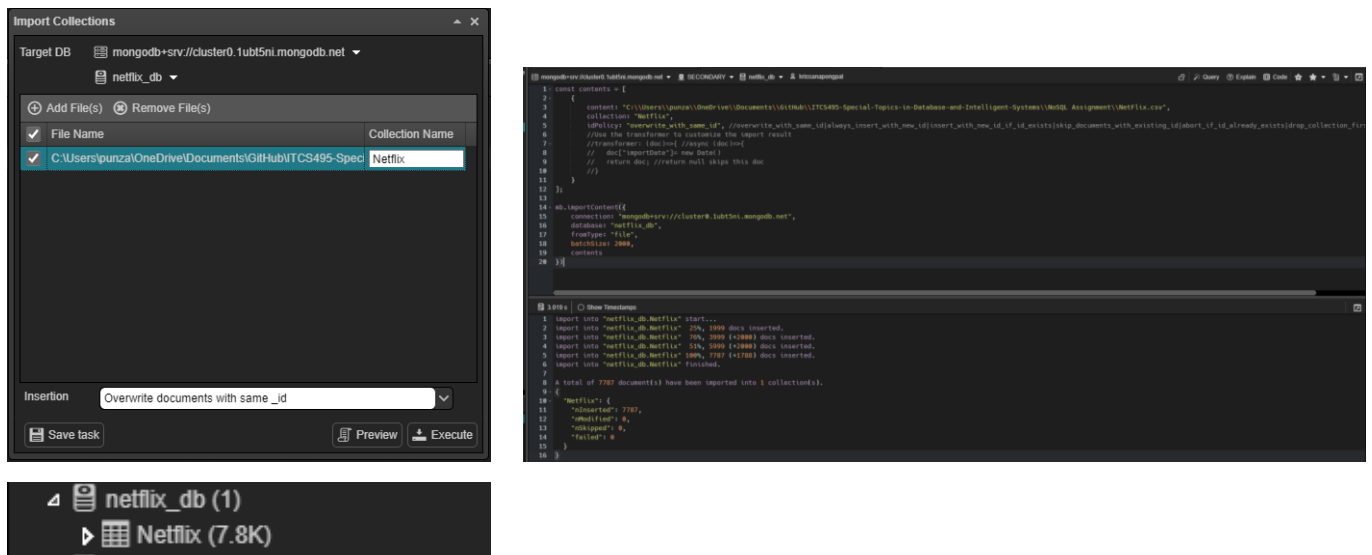


Firstly, we create the current database that we are working with. We will set the name of the database as “netflix_db”. After that, we click the “Ok” button, the MongoDB will create the database.



After MongoDB creates the database, the database will show on the left of the program. Then, we call to use the "netflix_db" command to use the database we are working with. Finally, we will change the database type to “netflix_db”.

B. Data Import



After we create the database, we import the collection name “Netflix” to “netflix_db” as a target DB and select “Overwrite documents with same_id” for the insertion. Finally, select the execute to show up in the Netflix collection and continuously work with it.

C. Testing Data Queries

- Query the Restricted movies that show title, type, rating, and title show in ascending order

```
db.Netflix.find({rating: 'R'}, {title:1,type:1,rating:1}).sort({title:1})
```

For the first query, we want to find the restricted movies and show the title, type, rating, and title show in ascending order. We write a find command that the rating is ‘R’ and use the projection to specify the title, type, and rating. We add a “sort function” to sort the tile in ascending order.

Result:

_id	type	title	rating
6335c067be32c16c16c	Movie	Black Sea	R
6335c067be32c16c16c	Movie	Black Snake Moan	R
6335c067be32c16c16c	Movie	Blaze	R
6335c067be32c16c16c	Movie	Bleed for This	R
6335c067be32c16c16c	Movie	Blood Father	R
6335c067be32c16c16c	Movie	Blow	R
6335c068be32c16c16c	Movie	Blue Mountain State: The Rise of Thailand	R
6335c068be32c16c16c	Movie	Blue Ruin	R
6335c068be32c16c16c	Movie	Blue Valentine	R
6335c068be32c16c16c	Movie	Bonnie and Clyde	R
6335c068be32c16c16c	Movie	Born Racer	R
6335c068be32c16c16c	Movie	Boyka: Undisputed	R
6335c068be32c16c16c	Movie	Braven	R
6335c068be32c16c16c	Movie	Brick	R

- Query movies after or equal to 2010 that show type, title, director, cast, country, rating, duration, genres, description, and genres is action.

```
db.Netflix.find({
  release_year: {$gte: 2010},
  genres: {$regex: /^Action.*$/}
},
{
  type:1, title:1, director:1, cast:1, country:1, release_year:1, rating:1, duration:1, genres:1, description:1
})
```

For the second query, we want to find the action movies that have the release year after 2010 and show the result as type, title, director, cast, country, rating, duration, genres, and description. We write a find command that release_year is greater than or equal to 2010 and genres use regex for find pattern matching that we find the pattern is “Action” and use the projection to specify type, title, director, cast, country, rating, duration, genres, description.

Result:

_id	type	title	director	cast	country	release_yr	rating	duration	genres	description
59	6335c068ba32c16c16c	Movie	John Carter	Andrew Stanton	Taylor Kitsch, Lynn Collins, United States	2012	PG-13	133	Action & Adventure, Sci-Fi	One minute. Civil War veteran John Carter is evading Ap
60	6335c067ba32c16c16c	Movie	Kill Ratio	Paul Tanter	Tom Hopper, Amy Huberman, United States	2016	TV-MA	87	Action & Adventure	Posing as a telecom salesman at a business conference
61	6335c068ba32c16c16c	Movie	Crouching Tiger, Hidden Dr	Yuen Wo-Ping	Michelle Yeoh, Donnie Yen, China, United States	2016	PG-13	101	Action & Adventure, Romar	Renowned warrior Yu Shu-Lien comes out of retirement
62	6335c068ba32c16c16c	Movie	Judwaa 2	David Dhawan	Varun Dhawan, Jacqueline, India	2017	TV-14	145	Action & Adventure, Comed	Separated at birth, twins Raja and Prem couldn't be mor
63	6335c067ba32c16c16c	Movie	Kickboxer: Retaliation	Dimitri Logothetis	Alan Mousli, Jean-Claude, United States	2017	R	110	Action & Adventure	Sloan's vow to never return to Thailand is cut short wher
64	6335c068ba32c16c16c	Movie	Boyka: Undisputed	Todor Chapkanov	Scott Adkins, Teodora Duh, Bulgaria, United States	2016	R	90	Action & Adventure	The fourth film in the action franchise finds Boyka taking
65	6335c068ba32c16c16c	Movie	Jora 10 Numbaria	Amardeep Singh Gill	Deep Sidhu, Dharmendra, India	2017	TV-MA	135	Action & Adventure, Intern	The wounds of a traumatic childhood and a corrupt, unju
66	6335c068ba32c16c16c	Movie	Don't Crack Under Pressur	Thierry Donard	David Carrera, Jesse Rich, France	2015	TV-MA	95	Action & Adventure, Docum	There are risks. Then there are risk-takers. In an around
67	6335c067ba32c16c16c	Movie	Kill the Irishman	Jonathan Hensleigh	Ray Stevenson, Vincent D' United States	2011	R	106	Action & Adventure, Drama	This true crime tale charts the rise and fall of mobster D
68	6335c068ba32c16c16c	Movie	Dehli Belly	Abhinay Deo	Imran Khan, Vir Das, Kunia, India	2011	TV-MA	101	Action & Adventure, Comed	Three flatmates get involved in the shady business belo
69	6335c068ba32c16c16c	Movie	Don't Crack Under Pressur	Thierry Donard	Temari Bullard, Davide Ca France	2017	TV-14	94	Action & Adventure, Docum	Through deserts, above mountains and deep into ocean
70	6335c068ba32c16c16c	Movie	Darc	Julius R. Nasso	Tony Schiena, Armand Ass, United States	2018	TV-MA	98	Action & Adventure, Indepe	To bring down a global human trafficking ring, an Interp
71	6335c068ba32c16c16c	Movie	I Am Vengeance: Retaliali	Ross Boyask	Stu Bennett, Vinnie Jones, United Kingdom	2020	R	82	Action & Adventure	To clear his criminal record, an ex-special forces soldier
72	6335c068ba32c16c16c	Movie	Cave	Henrik Martin Dahlsbakken	Heidi Toen, Benjamin Held, Norway	2016	TV-MA	77	Action & Adventure, Intern	Tom between old camaraderie and recent tensions, three

- Query movies' type, title, director, rating, genres, and description that rating is TV-14 or PG-13, also genre is international both movies and TV shows, or title contains “S” at the first letter

```
db.Netflix.find({
  $and: [
    {$or: [
      {rating: 'TV-14'},
      {rating: 'PG-13'}
    ]},
    {$or: [
      {genres: {$regex: /International.*$/}},
      {title: {$regex: /^h.*$/}}
    ]}
  ]
},
{
  type: 1, title: 1, director: 1, rating: 1, genres: 1, description: 1
})
```

The third query is created in order to find the Netflix movies and TV shows that rating “TV-14” or “PG-13” representing content for teens. Moreover, the query not only finds a rating but also contains “International” genres or titles containing “H” at the first letter. We start by using “\$and” in order to retrieve both ratings and others. In the first code for “\$and”, we use “\$or” in order to choose ratings for both “TV-14” and “PG-13”. [7] In the second code for “\$and”, we also use “\$or” in order to choose genres that contain “International” or title that contains “H” at the first letter by using “\$regex” for both scripts. In addition, we also conduct the projection that we set it to 1 in order to represent an only type, title, director, rating, genres, and description from queries.

Result:

50	6135c068ba32c16c16c	Movie	1-0d	Kuntle Afolayan	TV-14	Dramas, International Movies, Thrillers	Against the backdrop of Nigeria's looming independence from Britain, detective Dantadi W
51	6135c067ba32c16c16c	Movie	Alibaba Aur 40 Chor	Latif Faiziyev, Umesh Mehra	TV-14	Action & Adventure, International Movies, Sci-Fi & Fantasy	A simple village man is thrown into a web of political intrigue after he takes on a powerful a
52	6135c067ba32c16c16c	Movie	Amandal! A Revolution in Four Part Harmony	Lee Hirsch	PG-13	Documentaries, International Movies, Music & Musicals	This documentary recounts the fascinating and little-known role that music has played in th
53	6135c068ba32c16c16c	Movie	300 Miles to Heaven	Maciej Dejczer	TV-14	Dramas, International Movies	Hoping to help their dissident parents, two brothers sneak out of Poland and land as refuge
54	6135c068ba32c16c16c	Movie	5 Star Christmas	Marco Risi	TV-14	Comedies, International Movies	When the Italian prime minister meets his lover and political rival while on an official trip to
55	6135c068ba32c16c16c	Movie	A Love Story	Maryo J. De los Reyes	TV-14	Dramas, International Movies, Romantic Movies	Self-made millionaire Ian thinks he's found happiness when he marries caring Joanna, but
56	6135c068ba32c16c16c	Movie	5Gang	Malei Dima	TV-14	Comedies, International Movies	To keep the band together, Selly tries to earn money by making an appearance at the birth
57	6135c067ba32c16c16c	Movie	ATM	Mez Tharatorn	TV-14	Comedies, International Movies, Romantic Movies	When a broken ATM dishes out a fortune, a couple who works at the bank vies to see who
58	6135c068ba32c16c16c	Movie	#cats_the_mewvie	Michael Margolis	TV-14	Documentaries, International Movies	This pawesome documentary explores how our feline friends became online icons, from th
59	6135c067ba32c16c16c	Movie	Agneepath	Mukul Anand	TV-14	Dramas, International Movies	A boy grows up to become a gangster in pursuit of the mobster who killed his innocent fat
60	6135c067ba32c16c16c	Movie	Anjaan	N. Linguswamy	TV-14	Action & Adventure, Dramas, International Movies	Mild-mannered Krishna comes to Mumbai to search for his gang-leader brother, and quick
61	6135c068ba32c16c16c	Movie	Aashayein	Nagesh Kukunoor	TV-14	Dramas, International Movies	When he learns he has terminal cancer, a cynical gambler and chronic smoker ditches his
62	6135c068ba32c16c16c	Movie	A Silent Voice	Naoko Yamada	TV-14	Anime Features, International Movies	A former class bully reaches out to the deaf girl he'd tormented in grade school. He feels un
63	6135c068ba32c16c16c	Movie	A Tale of Love and Darkness	Natalie Portman	PG-13	Dramas, International Movies	Based on the memoirs of author Amos Oz, this poetic drama shares his family's tale of su
64	6135c067ba32c16c16c	Movie	10 jours en or	Nicolas Brossette	TV-14	Comedies, Dramas, International Movies	When a carefree bachelor is unexpectedly left in charge of a young boy, the two embark on
65	6135c067ba32c16c16c	Movie	Among Family	Ozan Acikitan	TV-14	Comedies, International Movies	Amid a marital crisis, Filaret befriends songstress Solmaz after a wacky encounter and mus
66	6135c068ba32c16c16c	Movie	A Billion Colour Story	Padmakumar Narasimhamurthy	TV-14	Dramas, Independent Movies, International Movies	The curious child of idealistic interfaith parents observes an increasingly intolerant world as
67	6135c067ba32c16c16c	TV Show	Akulah Balqis	Pail Yahya	TV-14	International TV Shows, TV Dramas	A little girl must enter an orphanage after her parents are arrested, but her life takes a dr
68	6135c068ba32c16c16c	Movie	Aarakshan	Prakash Jha	TV-14	Dramas, International Movies	The decision by India's supreme court to establish caste-based reservations for jobs in edu
69	6135c068ba32c16c16c	Movie	Aamir	Raj Kumar Gupta	TV-14	International Movies, Thrillers	In this high-tension thriller, an anonymous caller on a cell phone threatens to harm a man's
70	6135c068ba32c16c16c	Movie	Aakhri Adaalat	Rajiv Mehra	TV-14	Action & Adventure, International Movies	An intrepid police inspector forced into a desk job must take matters into his own hands wh
71	6135c068ba32c16c16c	Movie	3 Idiots	Rakumar Hirani	PG-13	Comedies, Dramas, International Movies	While attending one of India's premier colleges, three miserable engineering students and

D. NoSQL Service Information

We conduct this assignment by using the MongoDB services. However, in order to access the MongoDB databases, users are required to access via NoSQL Booster for MongoDB by following these steps:

1. Open the NoSQL Booster for MongoDB on your computer
2. Open a connection and connect from URI and insert
“mongodb+srv://krissanapongpal:za4DwPWLW560O13X@cluster0.1ubt5ni.mongodb.net/test”
3. Using a database named “netflix_db” and collection “Netflix” in order to retrieve a data

IV. References

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