

FAF GAME ANALYSIS

Big Data Architecture and Governance

Group 3:

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Dataset Summary

FAF (Forged Alliance Forever) is a gaming community driven project designed to facilitate online play for the game Supreme Commander: Forged Alliance. It is being supported by various fan volunteers who maintain the community, add unofficial patches, maps, mods and release regular context for the FAF Supreme Commander.

FAF game has a scrapable API tracking every game ever played by a player, and a parseable binary replay of every command issued by each player in every game.

Our dataset is picked from Kaggle which is the online community for finding and publishing various datasets and the dataset was published there by scraping the game data of around 10M FAF games about who played who, on which map, what's the scoreboard etc.

There were 5 datasets related to FAF all of which were used for creating a central graph database for storing player, game, map, command statistics for analysis purposes. The datasets were extracted from the website <https://www.kaggle.com/code/yanivaknin/introducing-faf-datasets/data?scriptVersionId=100892524&select=playerstats.csv>, were of the comma separated values (.csv) format and were named as below-











- issue_cmds.feb22.csv
- issue_cmds.jan22.csv
- issue_cmds.mar22.csv
- issue_stats.csv
- playerstats.csv

Data Profiling Instructions

Our first step towards understanding the datasets is data profiling which is the process of examining the data available from an existing information source and collecting statistics or informative summaries about that data. We have profiled our datasets using Python, Jupyter Notebook and below are the instructions for the same:

1. Download Python (follow instructions on [Download Python | Python.org](https://www.python.org/downloads/))
2. Download and Install Anaconda distribution depending on your operating system (follow instructions on [Anaconda | Anaconda Distribution](https://www.anaconda.com/distribution/))
3. Open Anaconda Navigator
4. Select and Install Jupyter Lab environment from the menu
5. Open the Jupyter Lab or Jupyter notebook by selecting from the menu in Anaconda navigator or running the command 'jupyter notebook' in the command prompt. This opens the Jupyter web interface

6. Install various libraries which will be required for profiling (!pip install pandas , !pip install numpy , !pip install pandas-profiling
7. Download the 5 datasets from the link
<https://www.kaggle.com/code/yanivaknin/introducing-faf-datasets/data?scriptVersionId=100892524&select=playerstats.csv>
8. Ensure that the downloaded csv files are in the same folder as the Jupyter notebook
9. Run Profiling.ipynb script and <output>.html profiling file will be created for 5 datasets as given below in the same path







 ProfileReportFeb22		7/28/2022 12:01 AM	Microsoft Edge HTM...	6,239 KB
 ProfileReportIssueStats		7/28/2022 12:01 AM	Microsoft Edge HTM...	12,328 KB
 ProfileReportJan22		7/28/2022 12:01 AM	Microsoft Edge HTM...	7,971 KB
 ProfileReportMar22		7/28/2022 12:01 AM	Microsoft Edge HTM...	7,791 KB
 ProfileReportPlayerStats		7/28/2022 12:01 AM	Microsoft Edge HTM...	34,806 KB

- 9.1.
10. Open <output>.html on browser to view data profile report

Data Wrangling/Cleansing Instructions

Our next step will be cleaning the datasets and getting them to usable formats before loading to Neo4j graph database. Data wrangling, sometimes referred to as data munging, is the process of transforming and mapping data from one "raw" data form into another format with the intent of making it more appropriate and valuable. Detailed instructions on how the data was cleaned are mentioned in the Jupyter notebook [Data Wrangling and Cleaning.ipynb](#) and below are the instructions for using the same:

1. Download the file [Data Wrangling and Cleaning.ipynb](#) and save it in the same data path as all team 3 projects
2. We will be using Jupyter notebook for data wrangling and cleaning and installing Jupyter has been already covered in our previous Data Profiling section
3. Make sure pandas, numpy library is installed (should have been installed during data profiling)
4. Run [Data Wrangling and Cleaning.ipynb](#) script
5. Once the script is finished running, [issues_stats_clean.csv](#) , [janfebmar_combine_clean.csv](#) , [player_stats_clean.csv](#) files will be created in the same path as the Jupyter notebook

 issues_stats_clean		8/16/2022 9:41 PM	Microsoft Excel Com...	133,381 KB
 janfebmar_combine_clean		8/16/2022 9:55 PM	Microsoft Excel Com...	2,342,315 KB
 player_stats_clean		8/16/2022 8:57 PM	Microsoft Excel Com...	4,806,851 KB

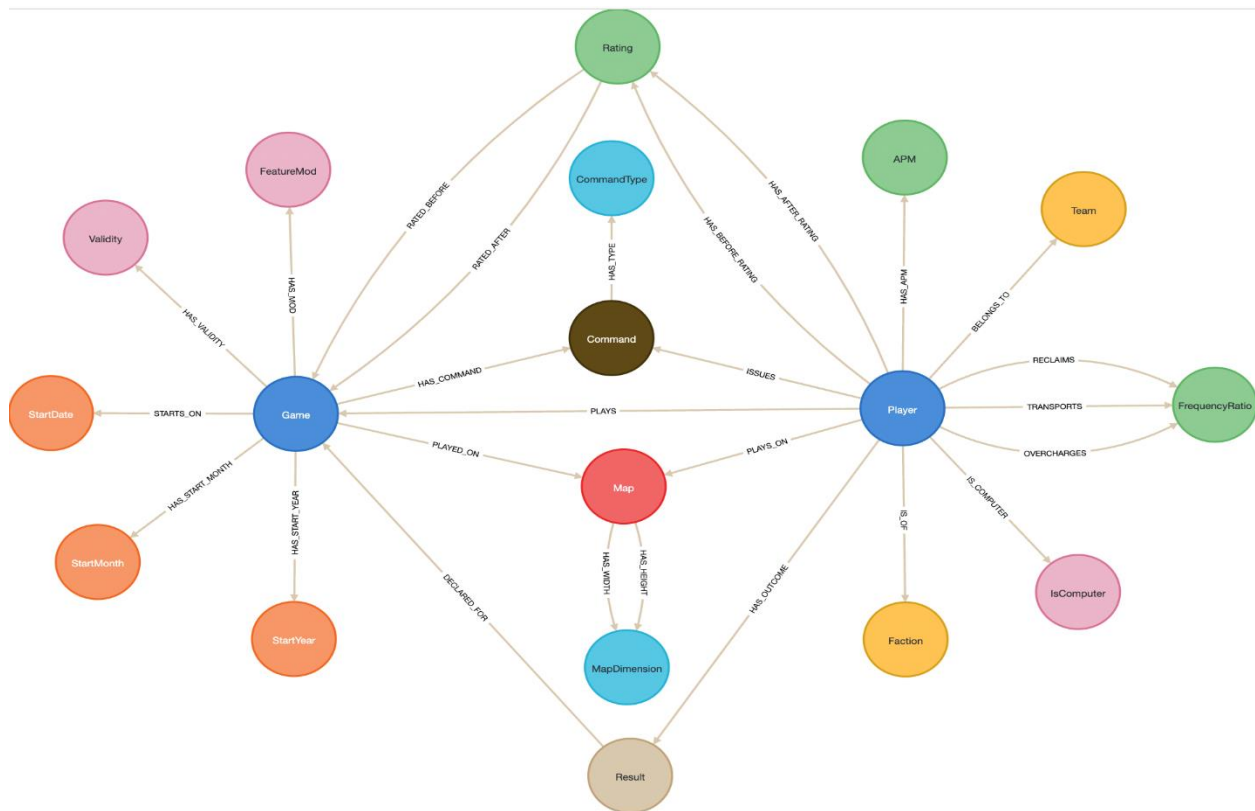
6. Use these new cleaned datasets for database/visualization

Neo4J Database Intallation Instructions:

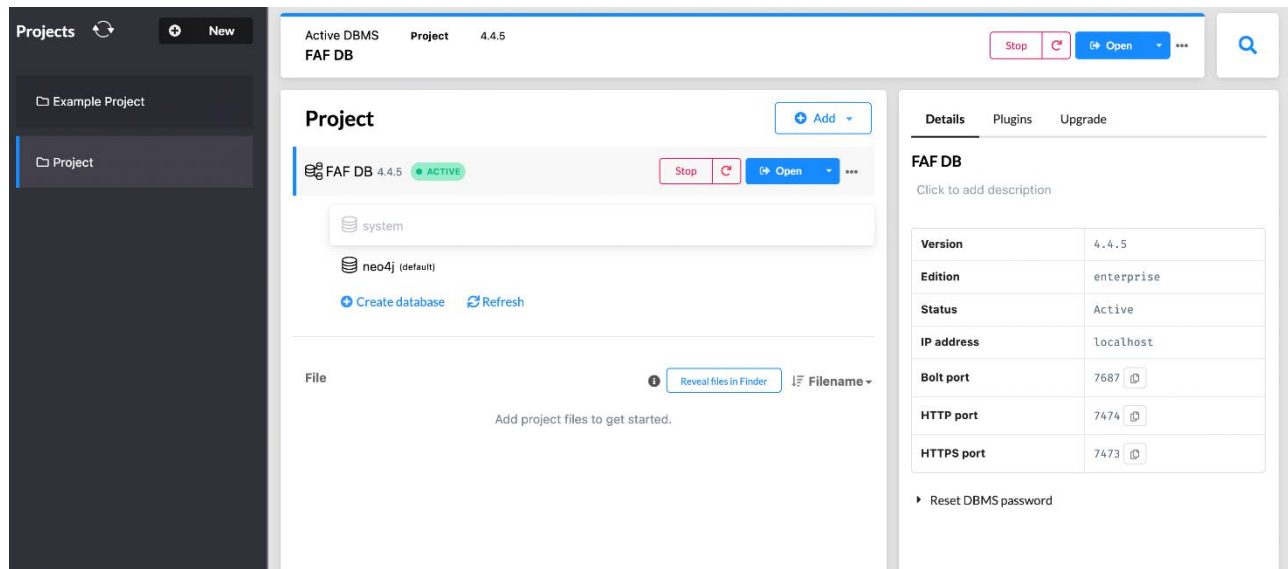
We will be using Neo4j graph database for loading all our FAF data.

1. Download and Install Neo4j Graph database using the link [Neo4j Desktop Download | Free Graph Database Download](#)
2. Follow the instructions for installation as per your operating system
3. After installing review the user instructions and start loading the data in Neo4j as per the loading documentation below.

Graph Database Design:



Neo4J Database Loading Instructions:



1. Create a new Database in Neo4j named FAF DB – Click on Add button under Project --> Give database name as FAF DB, username and password and select Create
2. Copy the cleaned csv files into the DBMS import folder of the database created.
3. Start the database and open the database.
4. Download the Neo4j Scripts named 'Cypher queries.txt' and run the queries by copying and pasting in the Neo4j browser
5. The scripts will run one by one and will take some time due to the large dataset size
6. Once the scripts have been completed running the graph database will be created

Constraint Creation:

```
// Uniqueness constraints

CREATE CONSTRAINT ON (frequencyratio:FrequencyRatio) ASSERT frequencyratio.FrequencyRatio is UNIQUE;

CREATE CONSTRAINT ON (player:Player) ASSERT player.PlayerId IS UNIQUE;

CREATE CONSTRAINT ON (game:Game) ASSERT game.GameId is UNIQUE;

CREATE CONSTRAINT ON (apm:APM) ASSERT apm.IssueAPM is UNIQUE;

CREATE CONSTRAINT ON (map:Map) ASSERT map.MapId is UNIQUE;

CREATE CONSTRAINT ON (mapdimension:MapDimension) ASSERT mapdimension.MapDimension is UNIQUE;

CREATE CONSTRAINT ON (command:Command) ASSERT command.CommandName is UNIQUE;

CREATE CONSTRAINT ON (commandtype:CommandType) ASSERT commandtype.CommandType is UNIQUE;

CREATE CONSTRAINT ON (faction:Faction) ASSERT faction.FactionName is UNIQUE;

CREATE CONSTRAINT ON (iscomputer:IsComputer) ASSERT iscomputer.IsComputer is UNIQUE;

CREATE CONSTRAINT ON (validity:Validity) ASSERT validity.Validity is UNIQUE;

CREATE CONSTRAINT ON (featuremod:FeatureMod) ASSERT featuremod.FeatureModName is UNIQUE;

CREATE CONSTRAINT ON (rating:Rating) ASSERT rating.Rating is UNIQUE;

CREATE CONSTRAINT ON (team:Team) ASSERT team.TeamId is UNIQUE;

CREATE CONSTRAINT ON (result:Result) ASSERT result.Result is UNIQUE;

CREATE CONSTRAINT ON (startdate:StartDate) ASSERT startdate.StartDate is UNIQUE;

CREATE CONSTRAINT ON (startmonth:StartMonth) ASSERT startmonth.StartMonth is UNIQUE;

CREATE CONSTRAINT ON (startyear:StartYear) ASSERT startyear.StartYear is UNIQUE;

//
```

Node Creation:

```
// Create Player node

:auto USING PERIODIC COMMIT 500

LOAD CSV With HEADERS FROM 'file:///player_stats_clean.csv' AS row

MERGE

    (player:Player {PlayerId:row.player_id})

ON CREATE SET player.Login=row. player_login;

//

//Creating Game Node

:auto USING PERIODIC COMMIT 1000

LOAD CSV With HEADERS FROM 'file:///player_stats_clean.csv' AS row

MERGE (game:Game {GameId:row.game_id});

//

//Creating Map Node

:auto USING PERIODIC COMMIT 1000

LOAD CSV With HEADERS FROM 'file:///player_stats_clean.csv' AS row

MERGE (map:Map {MapId:row.map_id})

    ON CREATE SET map.MapName=row.map_name;

//
```

neo4j\$

neo4j\$ MATCH (n:Command) RETURN n LIMIT 25



Graph



Table



Text



Code



Relationships Establishing:

```
Relations

// Player plays game relation

:auto USING PERIODIC COMMIT 500

LOAD CSV With HEADERS FROM 'file:///player_stats_clean.csv' AS row

    MATCH (player:Player {PlayerId:row.player_id})

    MATCH (game:Game {GameId:row.game_id})

    MERGE (player)-[:PLAYS]->(game);

//

// Player issues command relation

:auto USING PERIODIC COMMIT 500

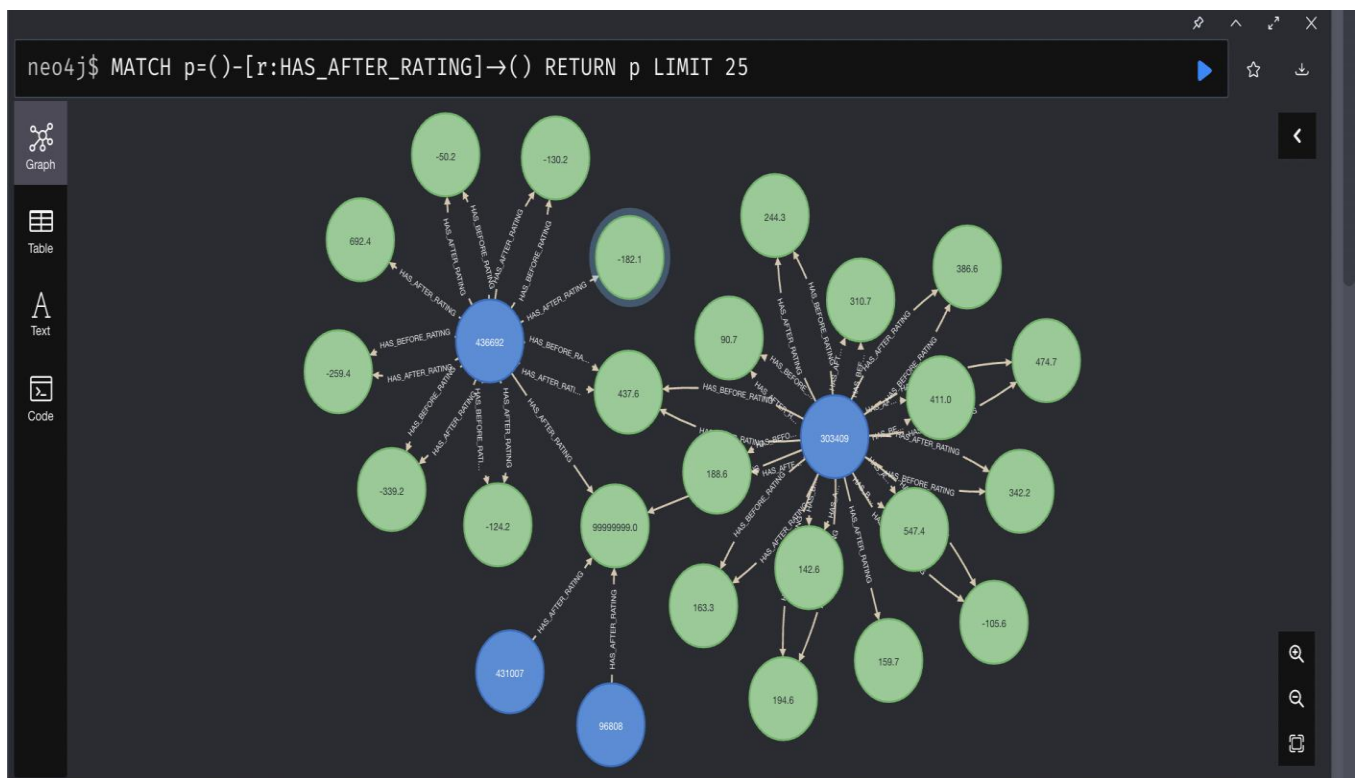
LOAD CSV With HEADERS FROM 'file:///janfebmar_combine_clean.csv' AS row

    MATCH (player:Player {PlayerId:row.player_id})

    MATCH (command:Command {CommandName:row.command_name})

    MERGE (player)-[:ISSUES]->(command);

//
```



Neo4J Python Data Visualization Instructions:

We will be creating FAF data visualizations using Python's Matplotlib library using Jupyter notebook.

1. Download and install Python, Anaconda, Jupyter notebook if not already downloaded and follow instructions in the Data Profiling steps
2. Open jupyter notebook by running command `jupyter notebook` on Anaconda command prompt
3. Install the necessary python packages as below using command `!pip install <package_name>` in Jupyter notebook
 - a. Pandas
 - b. Numpy
 - c. Matplotlib
 - d. Neo4j
4. Navigate to the folder containing dataset for team 3 and open [Data Visualizations.ipynb](#) Ensure all files are in the same folder.
5. We have made a connection to Neo4j FAF DB to query the database using the following line of code. Make sure you enter your own Neo4j credentials previously set on your local laptop in place of the url, user and pwd fields in the second line below

```
In [4]: 1 from neo4j import GraphDatabase
2 class Neo4jConnection:
3
4     def __init__(self, uri, user, pwd):
5         self.__uri = uri
6         self.__user = user
7         self.__pwd = pwd
8         self.__driver = None
9         try:
10            self.__driver = GraphDatabase.driver(self.__uri, auth=(self.__user, self.__pwd))
11        except Exception as e:
12            print("Failed to create the driver:", e)
13
14    def close(self):
15        if self.__driver is not None:
16            self.__driver.close()
17
18    def query(self, query, db=None):
19        assert self.__driver is not None, "Driver not initialized!"
20        session = None
21        response = None
22        try:
23            session = self.__driver.session(database=db) if db is not None else self.__driver.session()
24            response = list(session.run(query))
25        except Exception as e:
26            print("Query failed:", e)
27        finally:
28            if session is not None:
29                session.close()
30        return response
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```

Metadata:

We have extracted the technical meta data for our database from Neo4j by running the below commands in the Neo4j browser. The business metadata has also been explained below.

- CALL apoc.meta.data()
 - CALL apoc.meta.schema() YIELD value as schemaMap
- ```
UNWIND keys(schemaMap) as label
WITH label, schemaMap[label] as data
WHERE data.type = "node"
UNWIND keys(data.properties) as property
WITH label, property, data.properties[property] as propData
RETURN label,
property,
propData.type as type,
propData.indexed as isIndexed,
propData.unique as uniqueConstraint,
propData.existence as existenceConstraint
```

## Technical Metadata:

Detailed technical metadata has been given in the files named metadata.xlsx

| label          | property       | type    | isIndexed | Unique Constraint | Existence Constraint |
|----------------|----------------|---------|-----------|-------------------|----------------------|
| Rating         | Rating         | FLOAT   | TRUE      | TRUE              | FALSE                |
| Result         | Result         | STRING  | TRUE      | TRUE              | FALSE                |
| StartDate      | Startdate      | STRING  | FALSE     | FALSE             | FALSE                |
| StartMonth     | StartMonth     | STRING  | TRUE      | TRUE              | FALSE                |
| CommandType    | CommandType    | STRING  | TRUE      | TRUE              | FALSE                |
| IsComputer     | IsComputer     | STRING  | TRUE      | TRUE              | FALSE                |
| StartYear      | StartYear      | INTEGER | TRUE      | TRUE              | FALSE                |
| FeatureMod     | FeatureModName | STRING  | TRUE      | TRUE              | FALSE                |
| Team           | TeamId         | INTEGER | TRUE      | TRUE              | FALSE                |
| Faction        | FactionName    | STRING  | TRUE      | TRUE              | FALSE                |
| FrequencyRatio | FrequencyRatio | STRING  | TRUE      | TRUE              | FALSE                |

|              |              |         |       |       |       |
|--------------|--------------|---------|-------|-------|-------|
| Player       | PlayerId     | INTEGER | TRUE  | TRUE  | FALSE |
| Player       | Login        | STRING  | FALSE | FALSE | FALSE |
| MapDimension | MapDimension | INTEGER | TRUE  | TRUE  | FALSE |
| Validity     | Validity     | STRING  | TRUE  | TRUE  | FALSE |
| Game         | GameId       | STRING  | TRUE  | TRUE  | FALSE |
| Command      | CommandName  | STRING  | TRUE  | TRUE  | FALSE |
| Map          | MapId        | INTEGER | TRUE  | TRUE  | FALSE |
| Map          | MapName      | STRING  | FALSE | FALSE | FALSE |
| APM          | IssueAPM     | STRING  | TRUE  | TRUE  | FALSE |

### Business Metadata:

From a business perspective, the dataset and visualizations helps in understanding the FAF game related data from a high level, where we could draw conclusions on different metrics for the dataset as follows:

1. Players with highest number of games played.
2. Most popular maps where the players have played, with this we could make further more enhancements to the maps to increase the players.
3. Determine the most frequently used commands.
4. Determine the various statistics related data like Transport ratio, Over change ratio, Actions per minute etc.

| attribute      | business term        | description                                                         |
|----------------|----------------------|---------------------------------------------------------------------|
| Rating         | after_rating         | The rating of this player, after the game                           |
| Rating         | before_rating        | The rating of this player, at the start of the game                 |
| Result         | player_result        | Final result of the player in the game                              |
| Startdate      | game_start_time      | The database recorded date of the game's start                      |
| CommandType    | type                 | The type of command given; there are many command types in the game |
| IsComputer     | player_is_computer   | Whether or not the player was a computer AI.                        |
| FeatureModName | game_featuremod_name | It is the feature modification name of the game                     |

|                 |                           |                                                                                                                                                                                  |
|-----------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TeamId          | player_team               | The team ID of the player                                                                                                                                                        |
| FactionName     | player_faction   faction  | Which faction ("race" or "culture") the player played as.                                                                                                                        |
| Frequency Ratio | reclaim_ratio             | What proportion of issue commands were `reclaim` commands (obtain excess resources left on the map).                                                                             |
| Frequency Ratio | overcharge_ratio          | What proportion of issue commands were "Overcharge" commands ( <a href="https://supcom.fandom.com/wiki/Overcharge_Cannon">https://supcom.fandom.com/wiki/Overcharge_Cannon</a> ) |
| FrequencyRatio  | transport_ratio           | What proportion of issue commands were `transport` commands (use transport units to load/unload/ferry etc                                                                        |
| PlayerId        | player_id   faf_player_id | The ID of the player in FAF                                                                                                                                                      |
| Login           | player_login   login      | Players login ID                                                                                                                                                                 |
| MapDimension    | map_width                 | It is a dimension, width of map.                                                                                                                                                 |
| MapDimension    | map_height                | It is a dimension, height of map.                                                                                                                                                |
| Validity        | game_validity             | Validity of the games player. It alter players rating in the ladder.                                                                                                             |
| Gameld          | id   game_id              | ID of the "Game" model in the API                                                                                                                                                |
| CommandName     | command_name              | The name of the specific `issue` or `factory_issue` command that was given.                                                                                                      |
| MapId           | map_id                    | ID of Map in FAF                                                                                                                                                                 |
| MapName         | map_name                  | Human-readable name of the map in the game                                                                                                                                       |
| IssueAPM        | issue_apm                 | Actions Per Minute for `issue` type commands (most common command type, telling game units what to do).                                                                          |

### Data Challenges encountered and how we resolved them?

| Challenges                                                                          | Mitigation                                                              |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| 1. Issue with profiling on the local server due to huge size of the dataset.        | Used different machine with a better configuration to perform profiling |
| 2. Lack of knowledge about FAF Supreme Commander game                               | Researched thoroughly about the FAF game commands and rules.            |
| 3. Command Ratio related columns are highly skewed and when observing distribution. | Classified the ratio data into categories.                              |

|                                                                                                                          |                                                                        |
|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| 4. Incorrect datatypes in the neo4j while loading leading to incorrect minimum and maximum values of the fields.         | Corrected the datatypes in the database after loading.                 |
| 5. Faced Java Heap Space memory exception while uploading the data related to the game node due to the data being large. | Updated the neo4j memory configuration by increasing memory allocated. |

#### Risks and Issues:

| Type  | Description                                                                                    | Mitigation                                                                   |
|-------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Risk  | Less knowledge of cypher (Neo 4J)                                                              | Watched and learnt through online tutorials                                  |
| Issue | Lack of Knowledge about the FAF game among team members which could lead to incorrect analysis | Performed prior research and understanding of FAF game dataset.              |
| Issue | Metadata were vague                                                                            | Researched and tried to make sense of the data and relation between entities |
| Issue | Dataset is too large for profiling and loading into database.                                  | Tried loading data on a better and high- performance system                  |

## System Integration and User Acceptance Testing

### Test 1 : Checking Count of Null Values Before and After Loading

There were 5 datasets (playerstats – 1 file, issuestats – 1 file, command stats – 3 files combined into 1 file) in all which were used as data sources. The number of null values for every dataset was handled by replacing them with a standard value defined by the team.

#### Before Handling Null Values

```
In [7]: # Finding nulls
df_pstats.isnull().sum()

Out[7]: game_id 0
game_start_time 0
game_validity 0
game_featuremod_name 0
game_total_players 0
map_id 2564564
map_name 2564564
map_width 2564564
map_height 2564564
player_id 0
player_login 557
faction 0
player_team 0
player_result 0
player_is_computer 0
before_rating 0
after_rating 18327390
dtype: int64
```

```
In [60]: df_issue.isnull().sum()

Out[60]: game_id 0
player_id 0
issue_apm 263
reclaim_ratio 0
overcharge_ratio 0
transport_ratio 0
dtype: int64
```

```
In [87]: df_union_com.isnull().sum()

Out[87]: id 0
start_time 0
type 0
units_number 0
blueprint 20345040
command_name 0
faf_player_id 0
map_name 0
dtype: int64
```

#### After Handling Null Values

```
In [27]: # Finding nulls
df_pstats.isnull().sum()

Out[27]: game_id 0
game_start_time 0
game_validity 0
game_featuremod_name 0
game_total_players 0
map_id 0
map_name 0
map_width 0
map_height 0
player_id 0
player_login 0
faction 0
player_team 0
player_result 0
player_is_computer 0
before_rating 0
after_rating 0
timezone 0
start_date 0
start_time 0
start_year 0
start_month 0
dtype: int64
```

```
In [61]: df_issue.isnull().sum()

Out[61]: game_id 0
player_id 0
issue_apm 0
reclaim_ratio 0
overcharge_ratio 0
transport_ratio 0
```

```
In [40]: df_union_com.isnull().sum()

Out[40]: game_id 0
start_time 0
issue_type 0
units_number 0
blueprint_id 0
command_name 0
player_id 0
map_name 0
dtype: int64
```

Test 2 : Checking unique Counts for Nodes before and after loading

From the screenshots below which were taken from our Profiling files and Neo4j after running queries, it is evident that the number of distinct counts for all the nodes remains same before and after the data load.

Run in Neo4j Browser: CALL apoc.meta.stats() YIELD labels RETURN labels

Neo4j

Unique Values before load

```
CALL apoc.meta.stats() YIELD labels
RETURN labels

labels
1
{
 "FrequencyRatio": 10,
 "Player": 270421,
 "Rating": 33111,
 "MapDimension": 12,
 "Result": 5,
 "StartDate": 3781,
 "Validity": 23,
 "Game": 10811711,
 "StartMonth": 12,
 "Command": 31,
 "CommandType": 2,
 "IsComputer": 2,
 "StartYear": 11,
 "FeatureMod": 15,
 "Team": 16,
 "Map": 19025,
 "APM": 11,
 "Faction": 5
}
```

Other unique values are available in the profiling files in the document. Please refer them for data before load.

game\_id  
Real number ( $\mathbb{R}_{\geq 0}$ )

|              |          |
|--------------|----------|
| Distinct     | 10811711 |
| Distinct (%) | 33.6%    |

|         |          |
|---------|----------|
| Minimum | 535      |
| Maximum | 17405720 |

map\_id  
Real number ( $\mathbb{R}_{\geq 0}$ )

|              |       |
|--------------|-------|
| Distinct     | 19024 |
| Distinct (%) | 0.1%  |

|         |       |
|---------|-------|
| Minimum | 1     |
| Maximum | 22655 |

player\_id  
Real number ( $\mathbb{R}_{\geq 0}$ )

|              |        |
|--------------|--------|
| Distinct     | 270421 |
| Distinct (%) | 0.8%   |

|         |        |
|---------|--------|
| Minimum | 5      |
| Maximum | 449760 |

game\_validity

|          |    |
|----------|----|
| Distinct | 23 |
|----------|----|

game\_featuremod\_name

|          |    |
|----------|----|
| Distinct | 15 |
|----------|----|

player\_faction

|          |   |
|----------|---|
| Distinct | 5 |
|----------|---|



Test 3 : Checking minimum and maximum counts for Nodes before and after loading

The minimum and maximum counts for all the nodes before and after data loading matched exactly.

```
MATCH (player:Player)
RETURN min(player.PlayerId) AS min, max(player.PlayerId) AS max
```

|   | min | max    |
|---|-----|--------|
| 1 | 5   | 449760 |

player\_id  
Real number ( $\mathbb{R}_{\geq 0}$ )

|              |        |         |        |
|--------------|--------|---------|--------|
| Distinct     | 270421 | Minimum | 5      |
| Distinct (%) | 0.8%   | Maximum | 449760 |

```
MATCH (map:Map)
RETURN min(map.MapId) AS min, max(map.MapId) AS max
```

|   | min | max   |
|---|-----|-------|
| 1 | -1  | 22655 |

```
In [62]: #Testing map id min max
df_pstats['map_id'].min()
Out[62]: -1.0

In [63]: #Testing map id min max
df_pstats['map_id'].max()
Out[63]: 22655.0
```



game\_id  
Real number ( $\mathbb{R}_{\geq 0}$ )

|              |          |         |          |
|--------------|----------|---------|----------|
| Distinct     | 10811711 | Minimum | 535      |
| Distinct (%) | 33.6%    | Maximum | 17405720 |

## Test 4 : Checking Neo4j data and before load data

Run the Neo4j queries given before every screenshot in the Neo4j browser and then run the Python testing only cells for before load tests in the Data Wrangling and Cleaning.ipynb notebook(Make sure to follow installation steps in Data Profiling step). The test cases have passed as the values of the queries below before data load and after data load are same.

### A : Count of games as per featuremod

#### Neo4j after load

MATCH (game:Game)-[:HAS\_MOD]->(featuremod:FeatureMod)

RETURN featuremod.FeatureModName as FeatureMod, count(game) as count;

```
1 MATCH (game:Game)-[:HAS_MOD]->(featuremod:FeatureMod)
2 RETURN featuremod.FeatureModName as FeatureMod, count(game) as count
```

| FeatureMod       | count   |
|------------------|---------|
| "FAF"            | 7597873 |
| "Coop"           | 1296793 |
| "Claustrophobia" | 8427    |
| "Nomads"         | 282513  |
| "FAF Develop"    | 42808   |
| "Xtreme Wars"    | 205318  |

#### Python test before load

```
In [57]: test3 = t_game.sort_values(['game_id', 'game_featuremod_name'], ascending=True).groupby('game_featuremod_name').
```

```
In [58]: test3
```

```
Out[58]:
```

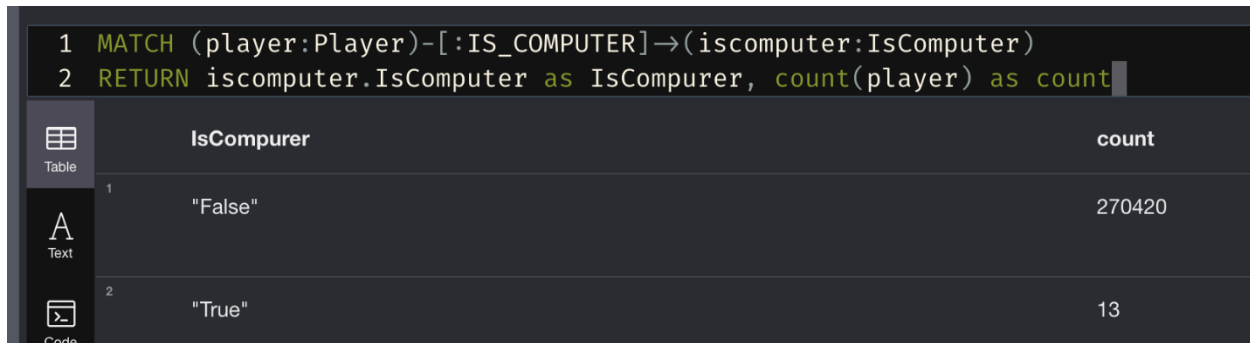
|    | game_featuremod_name | game_id |
|----|----------------------|---------|
| 4  | FAF                  | 7597873 |
| 1  | Coop                 | 1296793 |
| 9  | Ladder1v1            | 1144443 |
| 11 | Nomads               | 282513  |
| 14 | Xtreme Wars          | 205318  |
| 5  | FAF Beta Balance     | 105633  |
| 12 | Phantom-X            | 66335   |
| 6  | FAF Develop          | 42808   |
| 3  | Equilibrium          | 26924   |
| 8  | LABwars              | 12826   |
| 10 | Murder Party         | 11824   |
| 0  | Claustrophobia       | 8427    |
| 7  | King of the Hill     | 7025    |
| 13 | Vanilla              | 1714    |
| 2  | Diamond              | 1255    |

## B : Count of distinct players who are computers and who aren't

### Neo4j After loading

```
MATCH (player:Player)-[:IS_COMPUTER]->(iscomputer:IsComputer)
```

```
RETURN iscomputer.IsComputer as IsCompurer, count(player) as count;
```



The image shows a Neo4j Cypher query editor with two lines of code. Below the editor is a table with two columns: 'IsCompurer' and 'count'. The table has two rows of data.

|   | IsCompurer | count  |
|---|------------|--------|
| 1 | "False"    | 270420 |
| 2 | "True"     | 13     |

### Python before Loading

```
In [52]: test2 = t2.sort_values(['player_id', 'player_is_computer'], ascending=True).groupby('player_is_computer').count()
```

```
In [53]: test2
```

```
Out[53]:
```

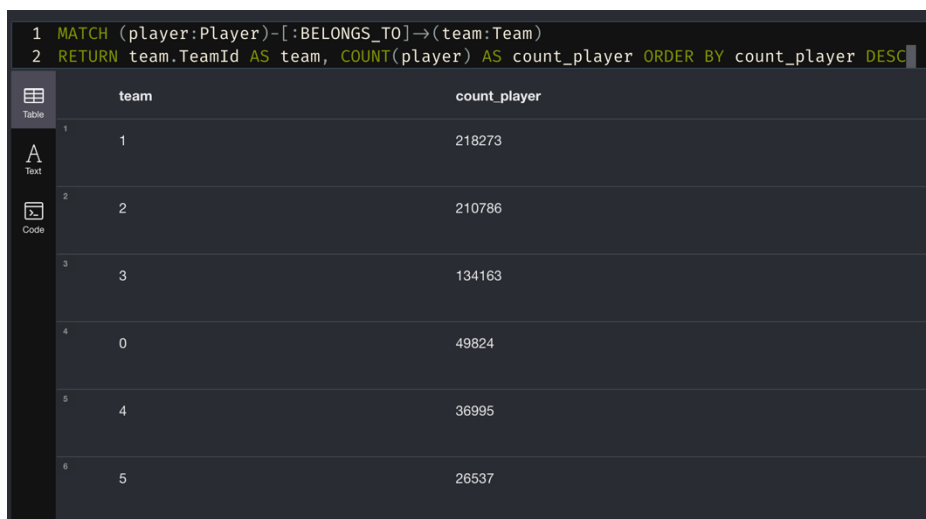
|   | player_is_computer | player_id |
|---|--------------------|-----------|
| 0 | False              | 270420    |
| 1 | True               | 13        |

## C : Count of distinct players who played for a team

### Neo4j After Loading

```
MATCH (player:Player)-[:BELONGS_TO]->(team:Team)
```

```
RETURN team.TeamId AS team, COUNT(player) AS count_player ORDER BY count_player DESC;
```



The image shows a Neo4j Cypher query editor with two lines of code. Below the editor is a table with two columns: 'team' and 'count\_player'. The table has six rows of data.

|   | team | count_player |
|---|------|--------------|
| 1 | 1    | 218273       |
| 2 | 2    | 210786       |
| 3 | 3    | 134163       |
| 4 | 0    | 49824        |
| 5 | 4    | 36995        |
| 6 | 5    | 26537        |

# Python before loading

```
In [47]: t1 = t.sort_values(['player_id', 'player_team'], ascending=True).groupby('player_team').count().reset_index().so
```

```
In [48]: t1
```

Out[48]:

|    | player_team | player_id |
|----|-------------|-----------|
| 2  | 1           | 218273    |
| 3  | 2           | 210786    |
| 4  | 3           | 134163    |
| 1  | 0           | 49824     |
| 5  | 4           | 36995     |
| 6  | 5           | 26537     |
| 7  | 6           | 21845     |
| 8  | 7           | 20172     |
| 9  | 8           | 4974      |
| 10 | 9           | 3887      |
| 11 | 10          | 1148      |
| 12 | 11          | 269       |
| 13 | 12          | 126       |
| 0  | -1          | 8         |
| 14 | 13          | 8         |
| 15 | 14          | 1         |

## **End Users for Dashboard: Community members of the FAF Game and Data Analysts at FAF Company**

- Which Columns are used for dimensions and columns that are used for measurement.

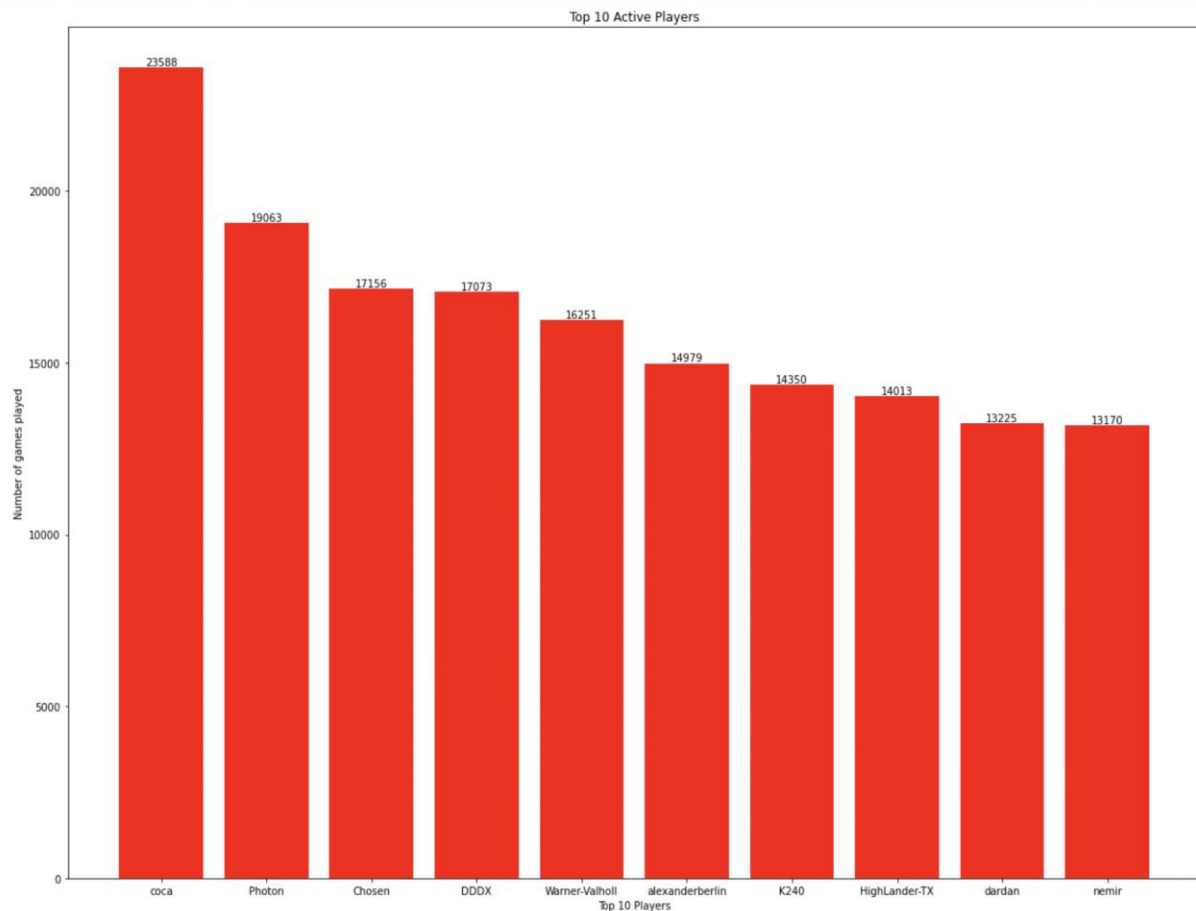
Dimensions : Player , Game, Map, Command, Faction, FeatureMod,

Measures : Before Rating, After Rating, IssueAPM, Dates, Frequency Ratios

- How would you generate new dimensions?
  - Using IssueAPM and dividing it into different categories as per the value, we can generate a new dimension for category of IssueAPM.
  - Using Overcharge ratio, transport ratio, reclaim ratio and dividing it into different categories as per the value, we can generate new dimensions for frequency category of these dimensions
- Who would use this dashboard and how do they benefit from your dashboard?
  - Members of the FAF Game community would need to analyze the data being generated to determine various KPI's for them to develop new enhancements to the multiplayer game.
  - Players of the FAF game who follow this community can also use these dashboards to compare their game with other top players and improve their gameplay.
- What value would be generated using this dashboard?
  - The data such as the top 10 popular maps played would be more useful to determine the nature of maps the user's are more inclined to and these are the areas where the developers could capitalize on business enhancements. And also new players would get to know which map is more popular.
  - New players can go through the stats of the most games played players to understand their game and instigate their statistics.
  - The end user's would be able to fetch the most frequently used commands in the game across the dataset to figure out the best command.
  - The classification of the player statistics would make it easier to find various ratio's with respect to player.
  - These visuals will assist them in identifying and classifying games and player stats for further analysis.

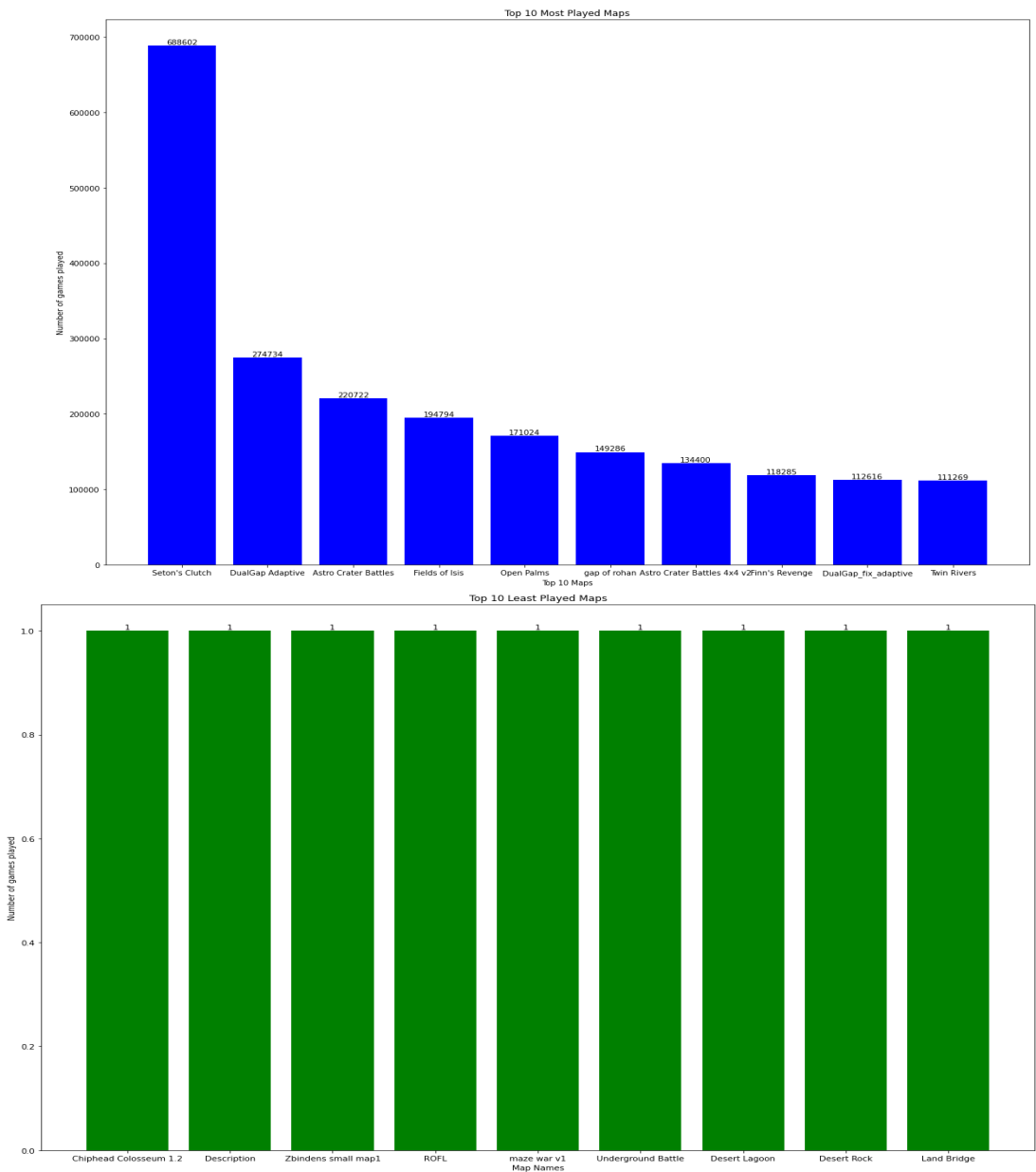
### Visualization 1 : 10 Players who played the most number of games

This bar graph gives the users an idea of who played the highest number of FAF games till date. It depicts the players who are most actively playing the game and will be useful for the other players who wish to improve their game as they can investigate the statistics of these active players and understand their gameplay. This graph can also be useful for the community members at FAF to determine who are the highly engaged players and further they can analyze what type of games/maps/commands are being used by them to enhance the future modifications for games based on these. We can see that the player with login name 'coca' has played highest number of games which is 23,588 till date which is June 2022.



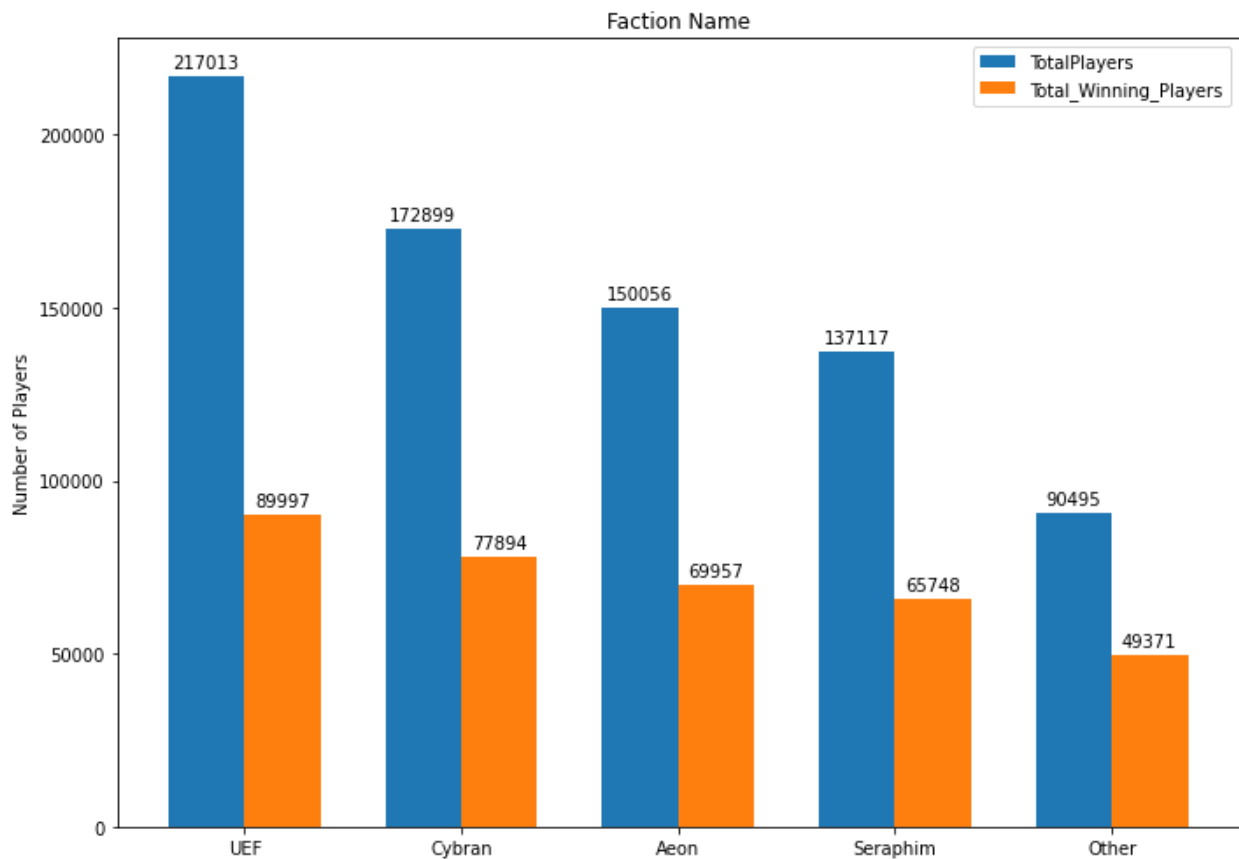
Visualization 2 : Top 9 Most Played Maps

This bar graph shows us the most popular maps in FAF. These maps out of the 19025 available maps in FAF have been played on the most by players. We can see that the Seton’s Clutch was played in 688,602 games till date, and it tops as one of the most popular maps with a huge margin from the rest of the maps. This data can be useful for players in selecting the maps to play on as it helps them understand which map is the most trending one. The community developers can also use this information to understand which map performs the best and the least and this information can be used to improve or upgrade existing maps accordingly.



### Visualization 3 : Player Statistics by Faction

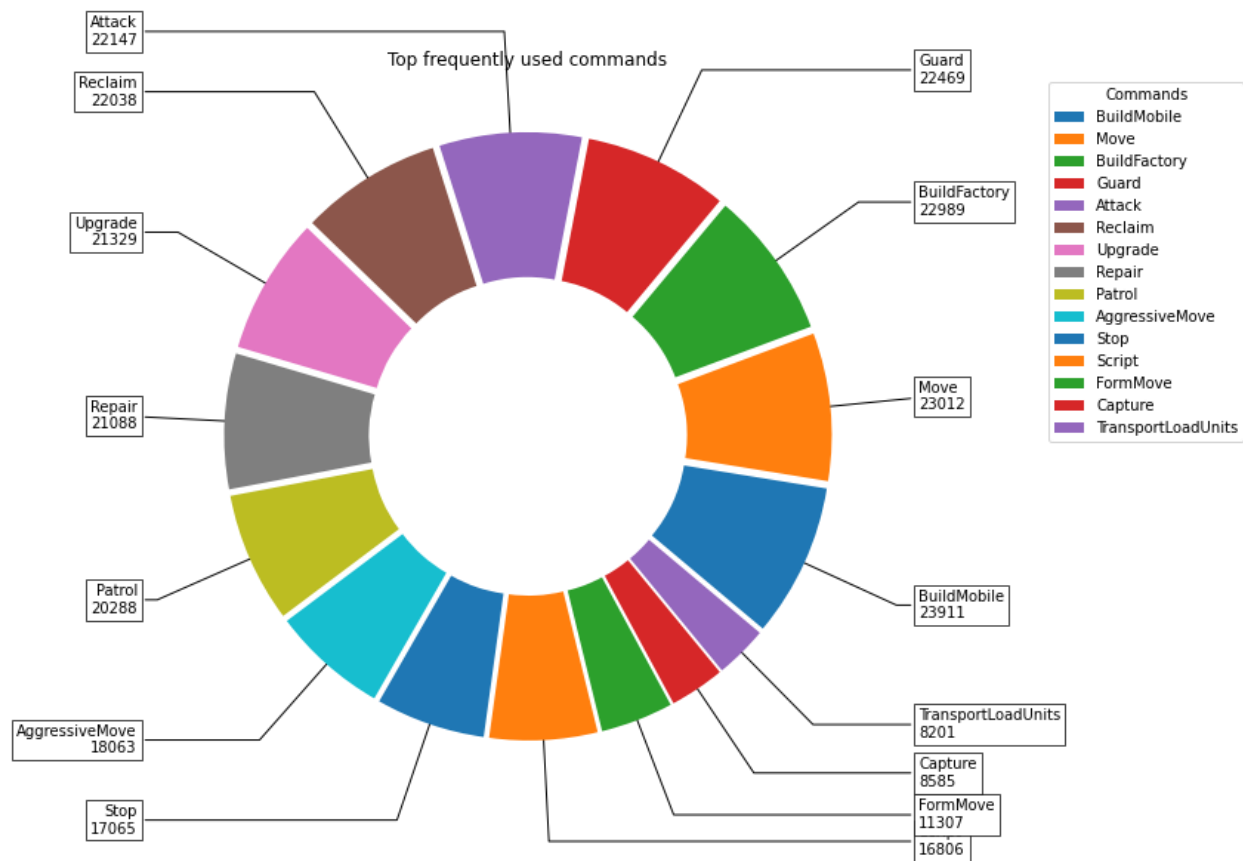
The below bar graph helps us understand how many players played as various factions out of the total available factions. Further it also tells us how many players out of the total won the game by playing as that faction. Faction is like a race/ military group which the player can choose to play during the game. Every faction has different number of military units, weapons to choose from and the below information will be useful for players to understand what number of players were using a particular faction and how many out of them won the game to choose their faction before playing. This data can also be used by the community members to decide which faction is a winning faction and what utilities need to be added to the underperforming factions to improve the game and increase the difficulty.





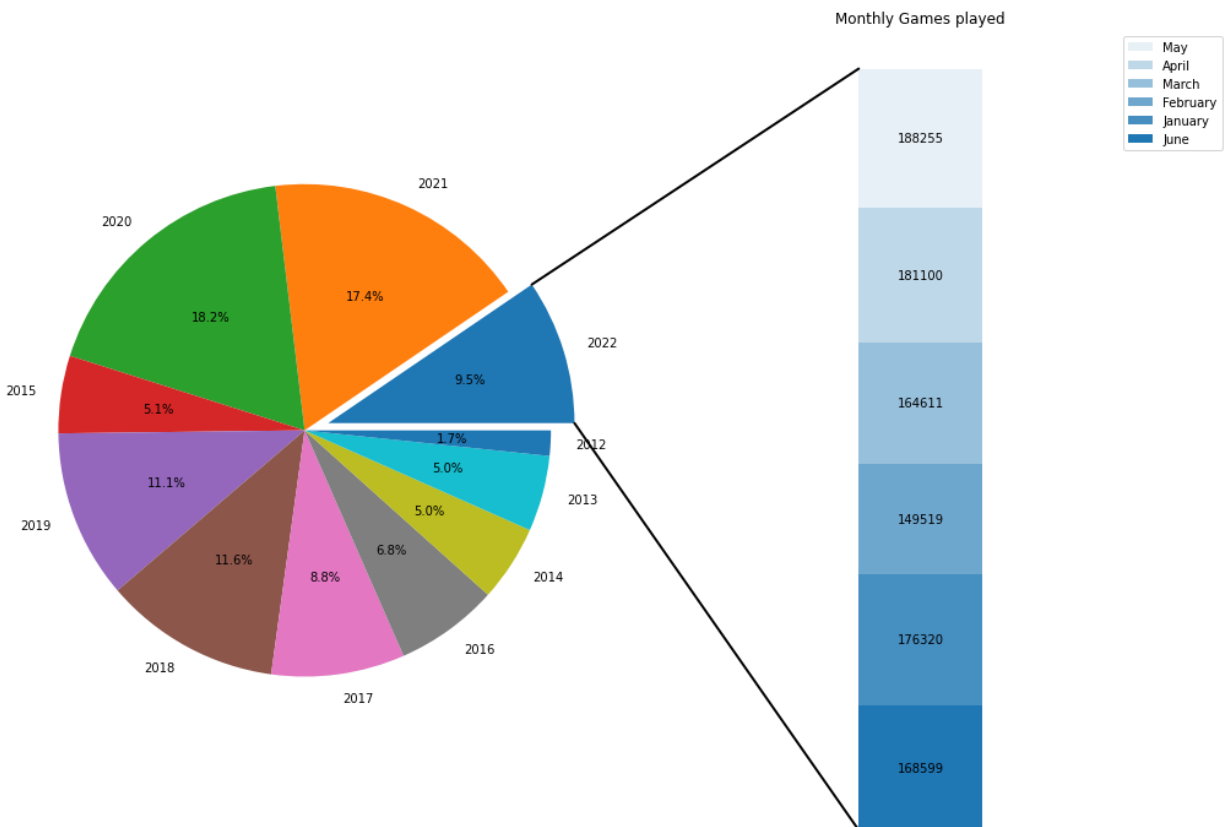
#### Visualization 4 : Most Frequently Used Commands by Players

This donut chart helps us understand the frequency of use of different types of commands by players. The most used commands out of the available set is BuildMobile. This data can be used by the players to understand what commands are popularly used in a game and compare their command use with the rest of the community to improve their game.



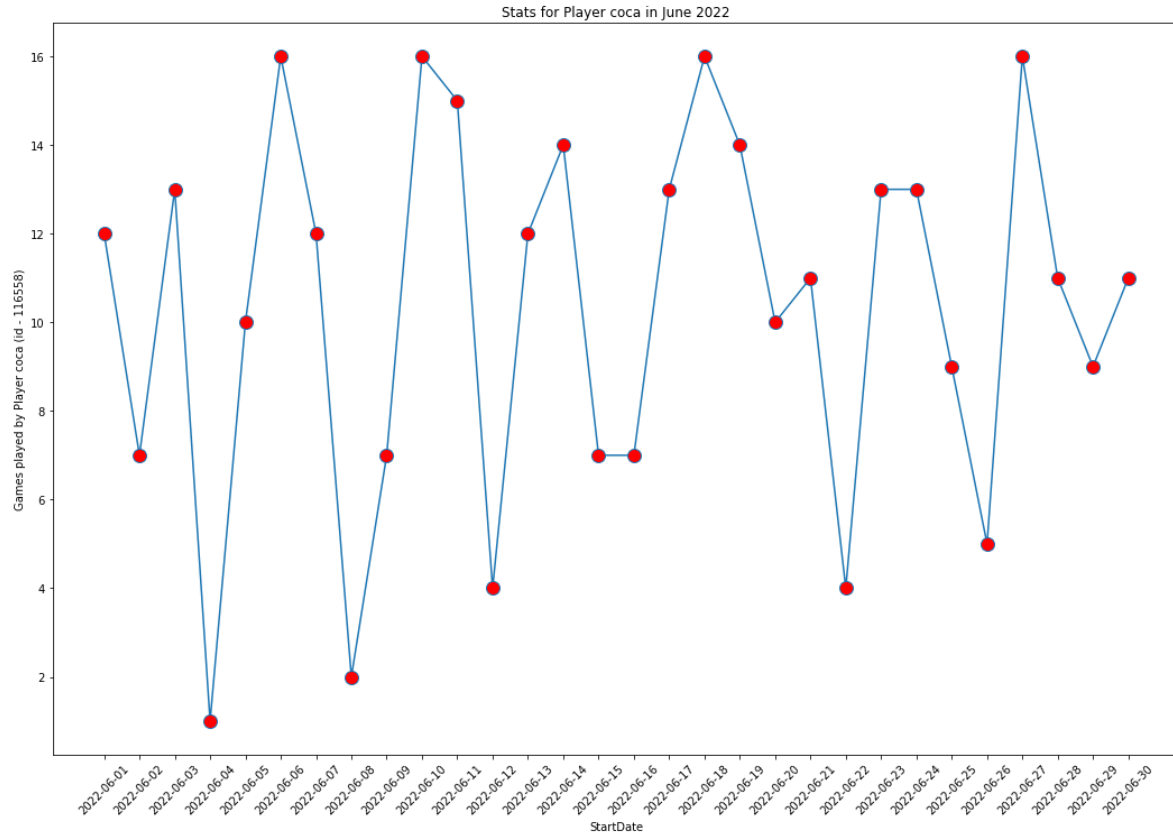
### Visualization 5 : Games Played by Year and Month

This pie chart shows what percent of the total games played till date was played in every year starting 2012 to 2022. Here, we have exploded the percentage of games for 2022 year to explain the number of games played in detail. The bar on the right depicts the number of games played in every month of 2022. This graph is useful for the community members to find in which year more games were played and shows the distribution of games played by months for the most recent year. This can be used in deciding how the game is performing overall year after year and which year had the maximum games played. Further, this information can be used to find out what modifications were prevalent in that year which lead to more number of players playing the game.



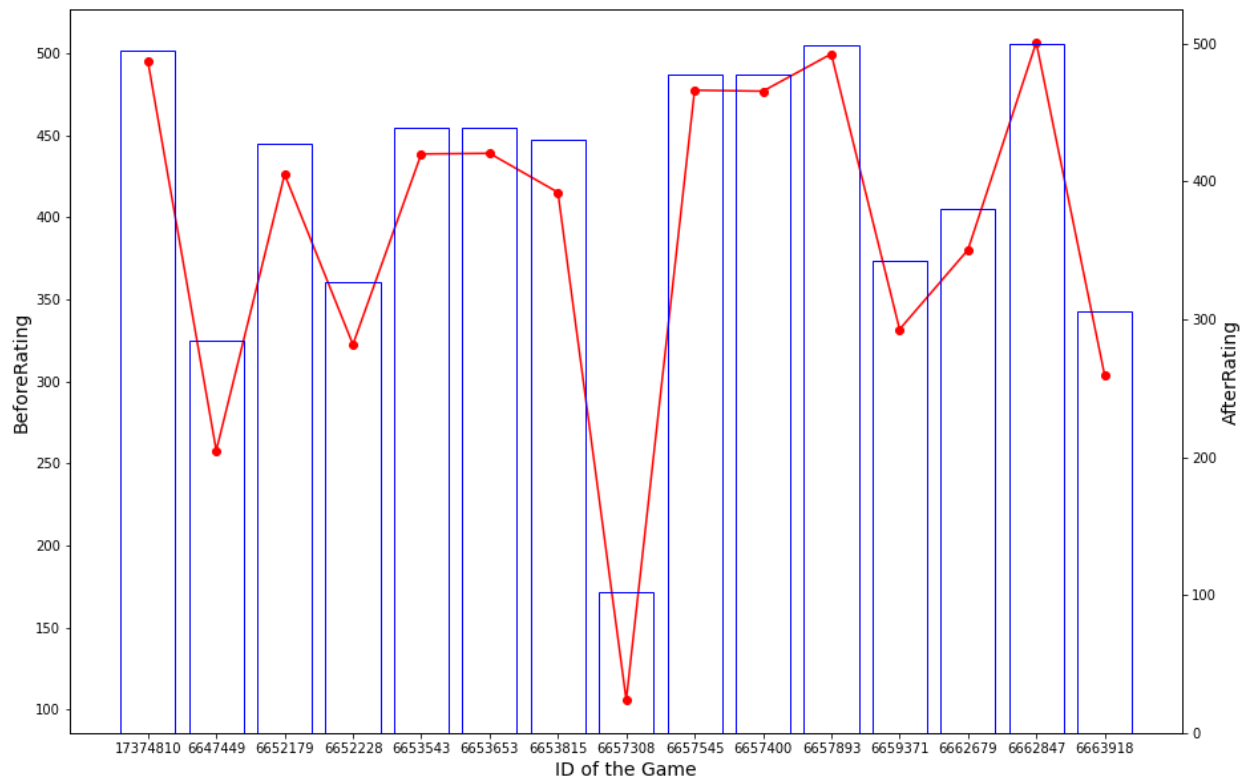
### Visualization 6 : Games Played by Player Coca In the Month of June

This time series graph shows the total number of games played by the player with login id coca daily in the month of June 2022. We chose this player because they have played the greatest number of games to date. This visualization will be useful for the player to understand his statistics and improve his gameplay. You can also change the attribute playerId in the code to look for a particular player's statistics. This can be used to track the player's activity and in future compare it's performance.



### Visualization 7 : Ratings of Player Coca In the Month of June

This bar-line graph is helpful for a player to understand their ratings before and after a particular game they played and how it has improved or reduced over different games played. We selected the player with login coca here whose before and after ratings have been displayed for different games. You can also change the PlayerId and GamelId in the code to view details for the supplied fields. The players can also check other player ratings to compare with their own for improving their game. The community members can also get an insight from this graph as they can track the before and after ratings for different players to understand the difficulty level of various games.



### Visualization 8 : Range of Actions per minute of the players

This horizontal bar diagram is for the command type name issue and shows the actions taken by total players per minute. This has been divided into categories and we can see that most players have an APM between 0 to 25. This data can be useful for the players to determine how many issue command actions are being done by other players and how much they need to improve on their speed of using this command to win.

