



## Bazy danych do gry MMO RPG, inspirowane grą Shakes & Fidget

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mongoDB®



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## Wprowadzenie

Projekt zakłada stworzenie bazy danych inspirowanej grą MMO RPG Shakes & Fidget. Opracowany model odwzorowuje elementy świata gry, takie jak postacie graczy, ich ekwipunek, umiejętności, gildie, wykonywane zadania (questy), a także statystyki i inne powiązane obiekty. Celem projektu jest nie tylko zaprojektowanie struktury danych w formacie JSON, ale również porównanie trzech różnych podejść do ich przechowywania: w bazie NoSQL (MongoDB), w PostgreSQL z użyciem kolumn JSONB oraz w PostgreSQL po konwersji do klasycznego modelu relacyjnego

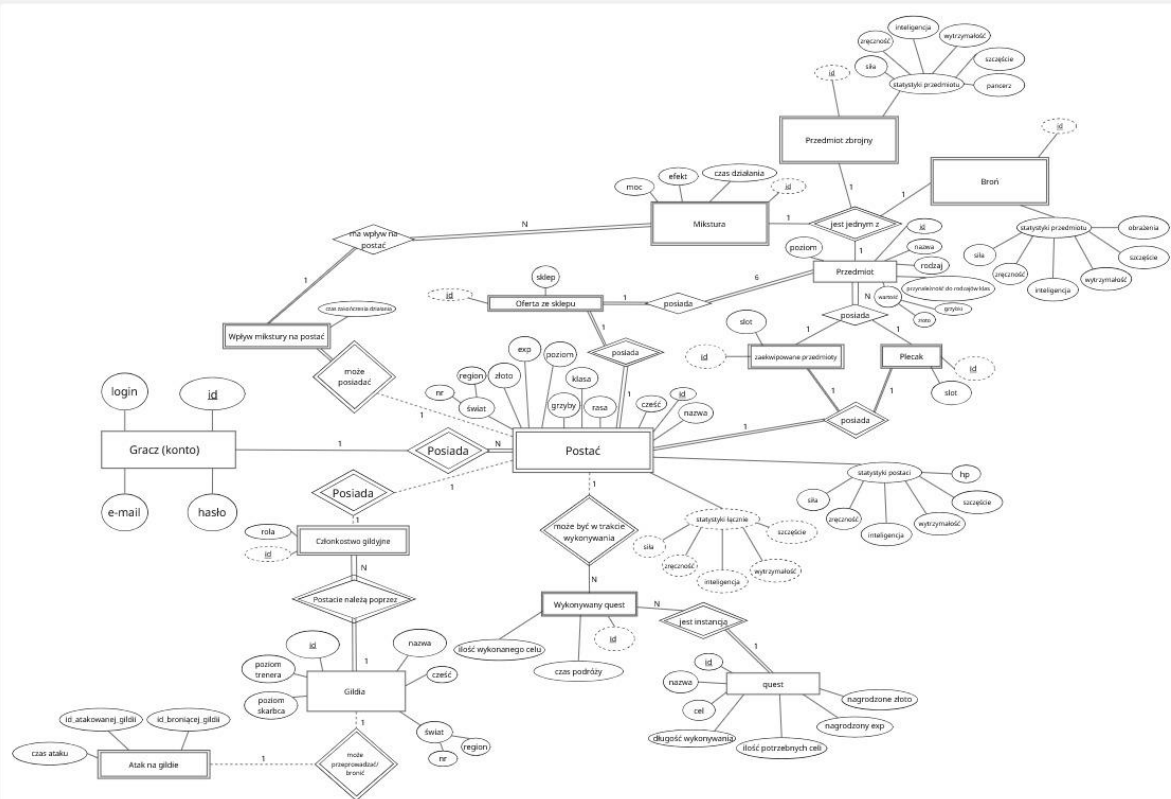
## Github

Wszystkie pliki używane w projekcie można znaleźć na platformie Github pod adresem:

<https://github.com/PanMelonn/Projekt-Bazodanowy---MD-MP>

## Diagram EER – model danych gry RPG

Diagram przedstawia rozszerzony model encji i związków (EER – Enhanced Entity-Relationship), który odzwierciedla kluczowe zależności między obiektami w systemie gry RPG. Model stanowi podstawę do projektowania struktury dokumentów JSON oraz odpowiadającej im bazy danych. Schemat logiczny bazy danych został opracowany w notacji Chen.

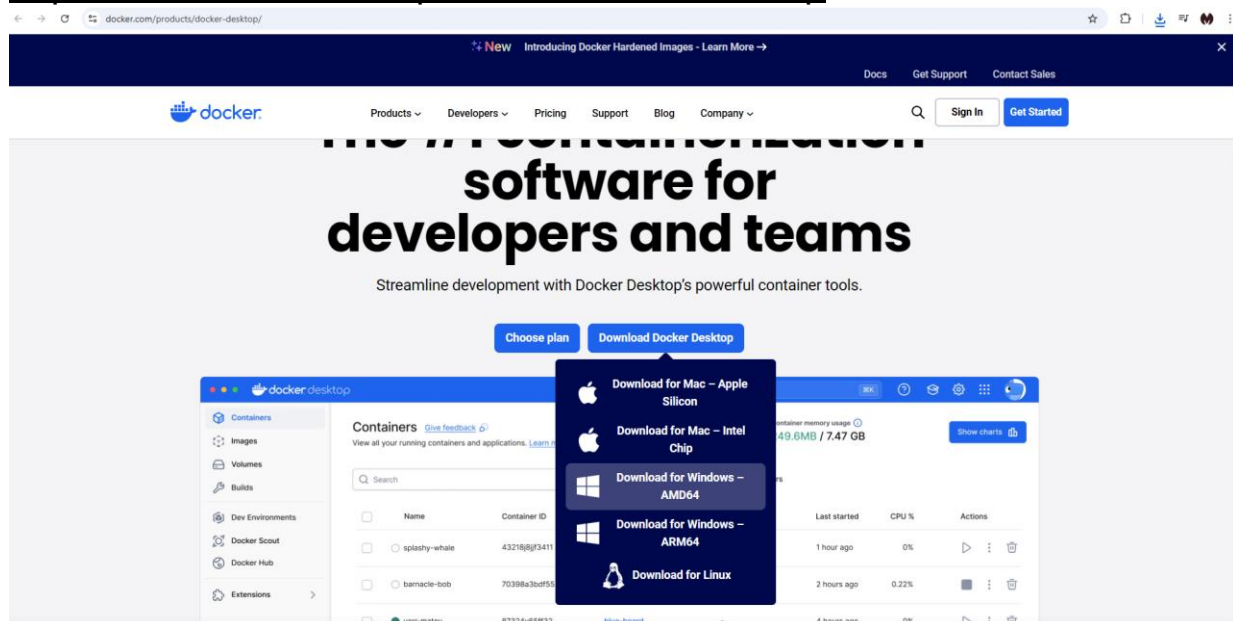


# INSTALACJA

## Docker

Pobranie instalatora z oficjalnej strony i instalacja:

<https://www.docker.com/products/docker-desktop>



## MongoDB

Instalacja i uruchomienie kontenera:

```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\WINDOWS\system32> docker run --name mongo-db -d -p 27017:27017 mongo
Unable to find image 'mongo:latest' locally
latest: Pulling from library/mongo
35581a5e0588: Pull complete
ebd0c6090698: Pull complete
e88cb4c0b31e: Pull complete
0a4282d2a9c9: Pull complete
d9d352c11bbd: Pull complete
06b43d55bbbc: Pull complete
697905244caf: Pull complete
3e961522d85c: Pull complete
Digest: sha256:98028cf281bb5d49ace5e1ddb4509e8f1382fe80ef1cf101eeefdc106d76cd4
Status: Downloaded newer image for mongo:latest
docker: Error response from daemon: Conflict. The container name "/mongo-db" is already in use by container "99316e60726fe079491f30f507f94f59e4c4f7b4d98de27a39c635555a2a08f0". You have to remove (or rename) that container to be able to reuse that name.
```

(błąd wynika z istniejącego już kontenera)

	mongo-db	1/420/0014e1	<a href="#">mongo</a>	27017/27017	0%			
	docker-projekt	-	-	-	0.85% 8 minutes ago			

Sprawdzenie:

```
mongosh mongodb://127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000
PS C:\WINDOWS\system32> docker exec -it mongo-db mongosh
Current Mongosh Log ID: 6853f3c66de8ef0ebad861df
Connecting to: mongodb://127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000&appName=mongosh+2.5.0
Using MongoDB: 6.0.23
Using Mongosh: 2.5.0

For mongosh info see: https://www.mongodb.com/docs/mongosh-shell/

-----
The server generated these startup warnings when booting
2025-06-19T11:16:57.276+00:00: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine. See http://
dochub.mongodb.org/core/prodnotes-filesystem
2025-06-19T11:16:58.935+00:00: Access control is not enabled for the database. Read and write access to data and configuration
is unrestricted
2025-06-19T11:16:58.935+00:00: vm.max_map_count is too low
-----

test> █
```

## PostgreSQL

```
Administrator: Windows PowerShell
PS C:\WINDOWS\system32> docker run --name postgres-db `
>> -e POSTGRES_USER=user `
>> -e POSTGRES_PASSWORD=admin123 `
>> -e POSTGRES_DB=projectdb `
>> -v "C:\Users\grzag\Desktop\bazy\Projekt-Bazodanowy---MD-MP-main\jsonMerged_fixed:/jsonMerged_fixed" `
>> -p 5432:5432 -d postgres
docker: Error response from daemon: Conflict. The container name "/postgres-db" is already in use by container "101391808f89781c9f
4ddeb6cfaea95adcee68699b960d7fb3b40c5422608700". You have to remove (or rename) that container to be able to reuse that name.

Run 'docker run --help' for more information
PS C:\WINDOWS\system32> █
```

(błąd wynika z istniejącego już kontenera)

- name postgres-db - Nadaje kontenerowi nazwę postgres-db
- e POSTGRES\_USER=user - Tworzy użytkownika user
- e POSTGRES\_PASSWORD=... - Ustawia hasło (admin123)
- e POSTGRES\_DB=projectdb - Tworzy bazę danych o nazwie projectdb
- v "...:/jsonMerged\_fixed" - Montuje folder z plikami .jsonl (na później, nie jest to import)
- p 5432:5432 - Otwiera port bazy na zewnątrz – domyślnie PostgreSQL
- d postgres Używa oficjalnego obrazu PostgreSQL i uruchamia w tle

Container CPU usage ⓘ

0.48% / 400% (4 CPUs available)

Container memory usage ⓘ

330.54MB / 7.52GB

Show charts

Q Search

Only show running containers

<input type="checkbox"/>	Name	Container ID	Image	Port(s)	CPU (%)	Last started	Actions
<input type="checkbox"/>	<div><div></div>postgres-db</div>	101391808f89	<a href="#">postgres</a>	<a href="#">5432:5432</a>	0.05%	6 seconds ago	<div><div></div><div></div><div></div></div>
<input type="checkbox"/>	<div><div>&gt;</div>docker-projekt</div>	-	-	-	0.81%	15 minutes ago	<div><div></div><div></div><div></div></div>

# IMPORTY

## 1. NoSQL

Administrator: Windows PowerShell

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\WINDOWS\system32> cd $env:USERPROFILE\Desktop
PS C:\Users\grzag\Desktop> mkdir docker-projekt

Directory: C:\Users\grzag\Desktop

Mode                LastWriteTime         Length Name
----                -
d-----          07.06.2025   12:21             docker-projekt

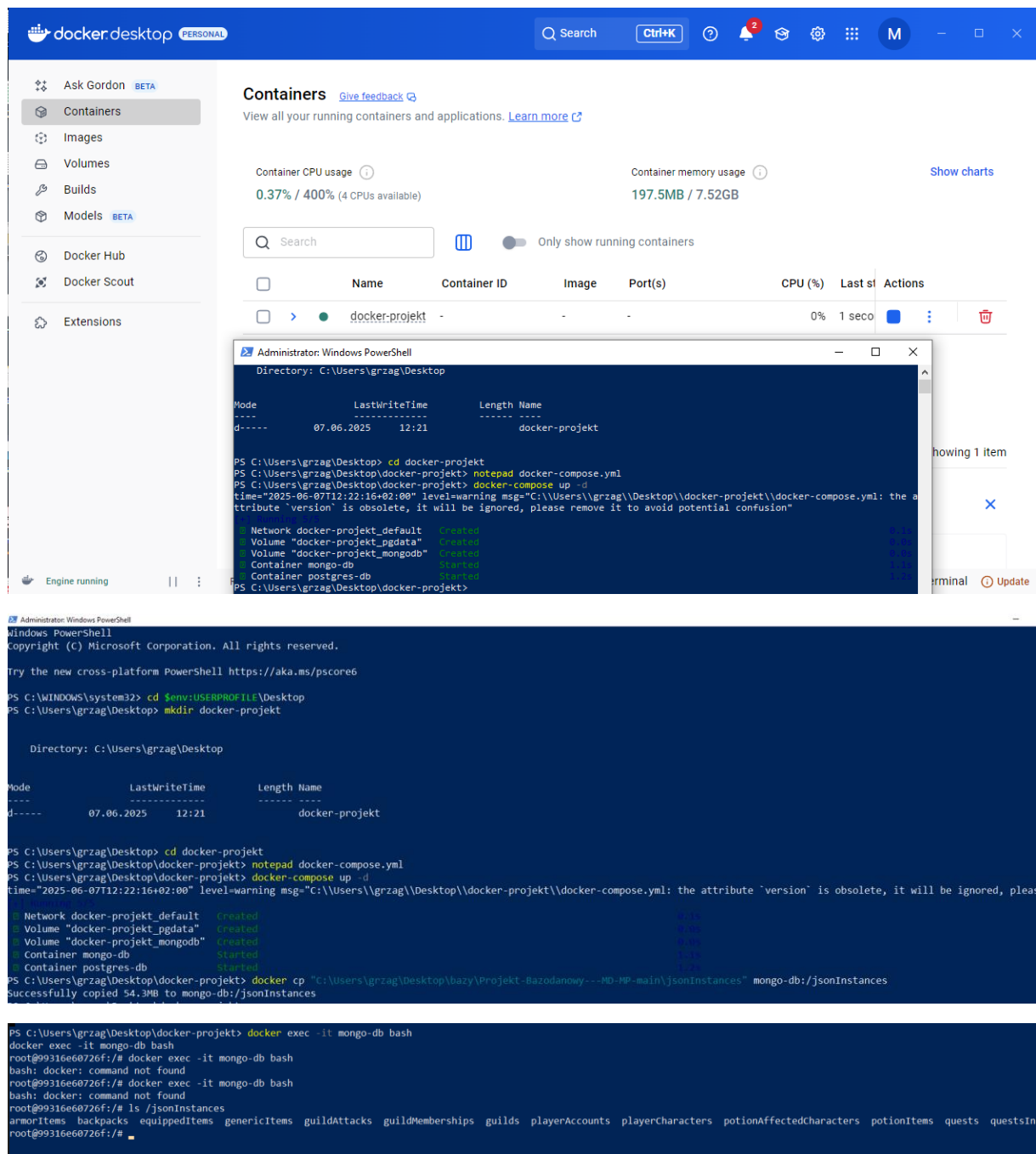
PS C:\Users\grzag\Desktop> cd docker-projekt
PS C:\Users\grzag\Desktop\docker-projekt> notepad docker-compose.yml
PS C:\Users\grzag\Desktop\docker-projekt>
```

```
*docker-compose.yml — Notatnik
Plik Edycja Format Widok Pomoc
version: '3.8'

services:
  postgres:
    image: postgres:15
    container_name: postgres-db
    environment:
      POSTGRES_USER: user
      POSTGRES_PASSWORD: password
      POSTGRES_DB: projectdb
    ports:
      - "5432:5432"
    volumes:
      - pgdata:/var/lib/postgresql/data
    restart: unless-stopped

  mongo:
    image: mongo:6
    container_name: mongo-db
    ports:
      - "27017:27017"
    volumes:
      - mongodb:/data/db
    restart: unless-stopped

volumes:
  pgdata:
  mongodb:
```



```
cd /jsonInstances
```

```
for dir in */ ; do
```

```
    name=$(basename "$dir")
```

```
    for file in "$dir"/*.json; do
```

```
        if [ -f "$file" ]; then
```

```
            echo "Importing $file into collection $name using mongoimport..."
```

```
            mongoimport --db projectdb --collection "$name" --file "$file"
```

fi  
done  
Done

```
mongosh mongodb://127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000
2025-06-07T18:55:19.295+0000    connected to: mongodb://localhost/
2025-06-07T18:55:19.300+0000    1 document(s) imported successfully. 0 document(s) failed to import.
Importing weaponItems/weaponItem8.json into collection weaponItems using mongoimport...
2025-06-07T18:55:19.329+0000    connected to: mongodb://localhost/
2025-06-07T18:55:19.324+0000    1 document(s) imported successfully. 0 document(s) failed to import.
Importing weaponItems/weaponItem9.json into collection weaponItems using mongoimport...
2025-06-07T18:55:19.344+0000    connected to: mongodb://localhost/
2025-06-07T18:55:19.348+0000    1 document(s) imported successfully. 0 document(s) failed to import.
Importing weaponItems/weaponItem2.json into collection weaponItems using mongoimport...
2025-06-07T18:55:19.371+0000    connected to: mongodb://localhost/
2025-06-07T18:55:19.376+0000    1 document(s) imported successfully. 0 document(s) failed to import.
Importing weaponItems/weaponItem3.json into collection weaponItems using mongoimport...
2025-06-07T18:55:19.395+0000    connected to: mongodb://localhost/
2025-06-07T18:55:19.399+0000    1 document(s) imported successfully. 0 document(s) failed to import.
Importing weaponItems/weaponItem4.json into collection weaponItems using mongoimport...
2025-06-07T18:55:19.421+0000    connected to: mongodb://localhost/
2025-06-07T18:55:19.426+0000    1 document(s) imported successfully. 0 document(s) failed to import.
Importing weaponItems/weaponItem5.json into collection weaponItems using mongoimport...
2025-06-07T18:55:19.450+0000    connected to: mongodb://localhost/
2025-06-07T18:55:19.454+0000    1 document(s) imported successfully. 0 document(s) failed to import.
Importing weaponItems/weaponItem6.json into collection weaponItems using mongoimport...
2025-06-07T18:55:19.473+0000    connected to: mongodb://localhost/
2025-06-07T18:55:19.480+0000    1 document(s) imported successfully. 0 document(s) failed to import.
Importing weaponItems/weaponItem7.json into collection weaponItems using mongoimport...
2025-06-07T18:55:19.502+0000    connected to: mongodb://localhost/
2025-06-07T18:55:19.510+0000    1 document(s) imported successfully. 0 document(s) failed to import.
Importing weaponItems/weaponItem8.json into collection weaponItems using mongoimport...
2025-06-07T18:55:19.531+0000    1 document(s) imported successfully. 0 document(s) failed to import.
Importing weaponItems/weaponItem9.json into collection weaponItems using mongoimport...
2025-06-07T18:55:19.554+0000    1 document(s) imported successfully. 0 document(s) failed to import.
root@p9116c69726f:/jsomInstances# mongosh
Current Mongosh Log ID: 65441b28bdcf886bd881df
Connecting to:      mongodb://127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000&appName=mongosh+2.5.0
Using MongoDB:      6.0.23
Using Mongosh:      2.5.0

For mongosh info see: https://www.mongodb.com/docs/mongosh-shell/

To help improve our products, anonymous usage data is collected and sent to MongoDB periodically (https://www.mongodb.com/legal/privacy-policy).
You can opt-out by running the disableTelemetry() command.

-----
The server generated these startup warnings when booting
2025-06-07T18:22:17.859+00:00: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine. See http://dochub.mongodb.org/core/production-file-system
2025-06-07T18:22:18.780+00:00: Access control is not enabled for the database. Read and write access to data and configuration is unrestricted
2025-06-07T18:22:18.780+00:00: vm.max_map_count is too low
-----

test> use projectdb
switched to db projectdb
projectdb> show collections
armorsItems
backpacks
equippedItems
genericItems
guildAttacks
guildMemberships
guilds
playerAccounts
playerCharacters
potionsEffectOnCharacters
potionsItems
quests
questsInProgress
shopOffers
weaponItems
projectdb>
```



```

mongosh mongodb://127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000
2025-06-07T10:55:19.421+0000    connected to: mongodb://localhost/
2025-06-07T10:55:19.426+0000    1 document(s) imported successfully. 0 document(s) failed to import.
Importing weaponItems/weaponItem95.json into collection weaponItems using mongoimport...
2025-06-07T10:55:19.450+0000    connected to: mongodb://localhost/
2025-06-07T10:55:19.454+0000    1 document(s) imported successfully. 0 document(s) failed to import.
Importing weaponItems/weaponItem96.json into collection weaponItems using mongoimport...
2025-06-07T10:55:19.473+0000    connected to: mongodb://localhost/
2025-06-07T10:55:19.480+0000    1 document(s) imported successfully. 0 document(s) failed to import.
Importing weaponItems/weaponItem97.json into collection weaponItems using mongoimport...
2025-06-07T10:55:19.502+0000    connected to: mongodb://localhost/
2025-06-07T10:55:19.510+0000    1 document(s) imported successfully. 0 document(s) failed to import.
Importing weaponItems/weaponItem98.json into collection weaponItems using mongoimport...
2025-06-07T10:55:19.527+0000    connected to: mongodb://localhost/
2025-06-07T10:55:19.531+0000    1 document(s) imported successfully. 0 document(s) failed to import.
Importing weaponItems/weaponItem99.json into collection weaponItems using mongoimport...
2025-06-07T10:55:19.540+0000    connected to: mongodb://localhost/
2025-06-07T10:55:19.554+0000    1 document(s) imported successfully. 0 document(s) failed to import.
root@99316e0726f:/jsonInstances# mongosh
Current Mongosh Log ID: 68441b28abdef806bdd861df
Connecting to:    mongodb://127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000&appName=mongosh+2.5.0
Using MongoDB:    6.0.23
Using Mongosh:    2.5.0

For mongosh info see: https://www.mongodb.com/docs/mongosh-shell/

To help improve our products, anonymous usage data is collected and sent to MongoDB periodically (https://www.mongodb.com/legal/privacy-policy).
You can opt-out by running the disableTelemetry() command.

-----
The server generated these startup warnings when booting
2025-06-07T10:22:17.059+00:00: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine. See http://dochub.mongodb.org/core/prodnotes-filesystem
2025-06-07T10:22:18.789+00:00: Access control is not enabled for the database. Read and write access to data and configuration is unrestricted
2025-06-07T10:22:18.789+00:00: vm.max_map_count is too low
-----

test> use projectdb
switched to db projectdb
projectdb> show collections
armorItems
backpacks
equippedItems
genericItems
guildAttacks
guildMemberships
guilds
playerAccounts
playerCharacters
potionAffectedCharacters
potionItems
quests
questsInProgress
shopOffers
weaponItems
projectdb> db.equippedItems.countDocuments()
18495
projectdb> db.playerAccounts.countDocuments()
1600
projectdb> db.quests.findOne()
{
  _id: ObjectId('68441b28abdef806bdd861df'),
  questId: '68441b28abdef806bdd861df',
  name: 'Battle for Dark Hollow',
  goal: 'Defeat the Brunt',
  goalsDoneRequired: 5,
  travelTime: 300,
  goldReward: 952,
  expReward: 17103
}
projectdb>

```

## 2. PostgreSQL do kolumn typu JSONB

```

PS C:\Users\grzag\Desktop\bazy\Projekt-Bazodanowy---MD-MP-main> docker run --name postgres-db `
>> -e POSTGRES_USER=user `
>> -e POSTGRES_PASSWORD=admin123 `
>> -e POSTGRES_DB=projectdb `
>> -v "C:\Users\grzag\Desktop\bazy\Projekt-Bazodanowy---MD-MP-main\jsonMerged_fixed:/jsonMerged_fixed" `
>> -p 5432:5432 -d postgres
101391808f89781c9f4ddeb6cf8a95adcee68699b960d7fb3b40c5422608700
PS C:\Users\grzag\Desktop\bazy\Projekt-Bazodanowy---MD-MP-main> CREATE TABLE armorItems_jsonb (data JSONB);

```

```

PS C:\Users\grag\Desktop\baz\Projekt-Bazodanowy---MD-HP-main> docker cp create_jsonb_tables.sql postgres-db:/create_jsonb_tables.sql
Successfully copied 2.56kB to postgres-db:/create_jsonb_tables.sql
PS C:\Users\grag\Desktop\baz\Projekt-Bazodanowy---MD-HP-main> docker exec -i postgres-db psql -U user -d projectdb -f /create_jsonb_tables.sql
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
CREATE TABLE
PS C:\Users\grag\Desktop\baz\Projekt-Bazodanowy---MD-HP-main> $tables = @(
>> "armorItems", "backpacks", "equippedItems", "genericItems", "guildAttacks",
>> "guildMemberships", "guilds", "playerAccounts", "playerCharacters",
>> "potionAffectedCharacters", "potionItems", "quests", "questsInProgress",
>> "shopOffers", "weaponItems"
>> )
PS C:\Users\grag\Desktop\baz\Projekt-Bazodanowy---MD-HP-main>
PS C:\Users\grag\Desktop\baz\Projekt-Bazodanowy---MD-HP-main> foreach ($table in $tables) {
>> write-host "Importing $table"
>> docker exec -i postgres-db psql -U user -d projectdb -c "copy $(table)_jsonb(data) FROM '/jsonmerged_fixed/$table.jsonl'"
>> }
Importing armorItems...
COPY 1880
Importing backpacks...
COPY 7287
Importing equippedItems...
COPY 18495
Importing genericItems...
COPY 2558
Importing guildAttacks...
COPY 189
Importing guildMemberships...
COPY 2187
Importing guilds...
COPY 588
Importing playerAccounts...
COPY 1680
Importing playerCharacters...
COPY 2261
Importing potionAffectedCharacters...
COPY 695
Importing potionItems...
COPY 158
Importing quests...
COPY 288
Importing questsInProgress...
COPY 1121
Importing shopOffers...
COPY 13566
Importing weaponItems...
COPY 688
PS C:\Users\grag\Desktop\baz\Projekt-Bazodanowy---MD-HP-main> docker exec -it postgres-db psql -U user -d projectdb
psql (17.5 (Debian 17.5-1.pgdg12b1))
Type "help" for help.

projectdb=# SELECT COUNT(*) FROM playerCharacters_jsonb;
 count
-----
    2051
(1 row)

projectdb=# SELECT data FROM guilds_jsonb LIMIT 1;
 data
-----
{"name": "Shadowborn Vanguard", "glory": 7588, "world": {"nr": 2,
44159", "trainerLevel": 131, "treasuryLevel": 23}
(1 row)

projectdb=#

```

### 3. PostgreSQLa przy jednoczesnej konwersji JSON na tabele

```

PS C:\WINDOWS\system32> Set-ExecutionPolicy Bypass -Scope Process -Force
PS C:\WINDOWS\system32> & "C:\Users\grzag\Desktop\bazy\Projekt-Bazodanowy---MD-MP-main\import-csv-final.ps1"
dź,, Importuj™ armorItems.csv do tabeli armorItems
Successfully copied 62kB to postgres-db:/tmp/csv/armorItems.csv
COPY 1000
dź,, Importuj™ backpacks.csv do tabeli backpacks
Successfully copied 77.8kB to postgres-db:/tmp/csv/backpacks.csv
COPY 1000
dź,, Importuj™ equippedItems.csv do tabeli equippedItems
Successfully copied 82.9kB to postgres-db:/tmp/csv/equippedItems.csv
COPY 1000
dź,, Importuj™ genericItems.csv do tabeli genericItems
Successfully copied 94.2kB to postgres-db:/tmp/csv/genericItems.csv
COPY 1000
dź,, Importuj™ guildAttacks.csv do tabeli guildAttacks
Successfully copied 12.3kB to postgres-db:/tmp/csv/guildAttacks.csv
COPY 109
dź,, Importuj™ guildMemberships.csv do tabeli guildMemberships
Successfully copied 83.5kB to postgres-db:/tmp/csv/guildMemberships.csv
COPY 1000
dź,, Importuj™ guilds.csv do tabeli guilds
Successfully copied 39.9kB to postgres-db:/tmp/csv/guilds.csv
COPY 500
dź,, Importuj™ playerAccounts.csv do tabeli playerAccounts
Successfully copied 155kB to postgres-db:/tmp/csv/playerAccounts.csv
COPY 1000
dź,, Importuj™ playerCharacters.csv do tabeli playerCharacters
Successfully copied 165kB to postgres-db:/tmp/csv/playerCharacters.csv
COPY 1000
dź,, Importuj™ potionAffectedCharacters.csv do tabeli potionAffectedCharacters
Successfully copied 67.1kB to postgres-db:/tmp/csv/potionAffectedCharacters.csv
COPY 695
dź,, Importuj™ potionItems.csv do tabeli potionItems
Successfully copied 10.2kB to postgres-db:/tmp/csv/potionItems.csv
COPY 150
dź,, Importuj™ quests.csv do tabeli quests
Successfully copied 21.5kB to postgres-db:/tmp/csv/quests.csv
ERROR: invalid input syntax for type timestamp: "308"
CONTEXT: COPY quests, line 2, column traveltime: "308"
dź,, Importuj™ questsInProgress.csv do tabeli questsInProgress
Successfully copied 97.8kB to postgres-db:/tmp/csv/questsInProgress.csv

```

```

$csvFolder = "C:\Users\grzag\Desktop\bazy\Projekt-Bazodanowy---MD-MP-main\CSV"

Get-ChildItem -Path $csvFolder -Filter *.csv | ForEach-Object {
    $fileName = $_.Name
    $tableName = $_.BaseName.ToLower()
    $remotePath = "/tmp/csv/$fileName"

    Write-Host "Importuję $fileName do tabeli $tableName"

    # Skopiuj plik do kontenera
    docker cp "$($_.FullName)" postgres-db:$remotePath

    # Wykonaj COPY wewnątrz kontenera
    $escapedCommand = "\copy $tableName FROM '$remotePath' WITH (FORMAT csv, HEADER true)"
    docker exec -it postgres-db psql -U user -d projectdb -c "$escapedCommand"
}

```

## Zapytania i ich pomiary.

### MongoDB:

1. Postacie powyżej 100 poziomu

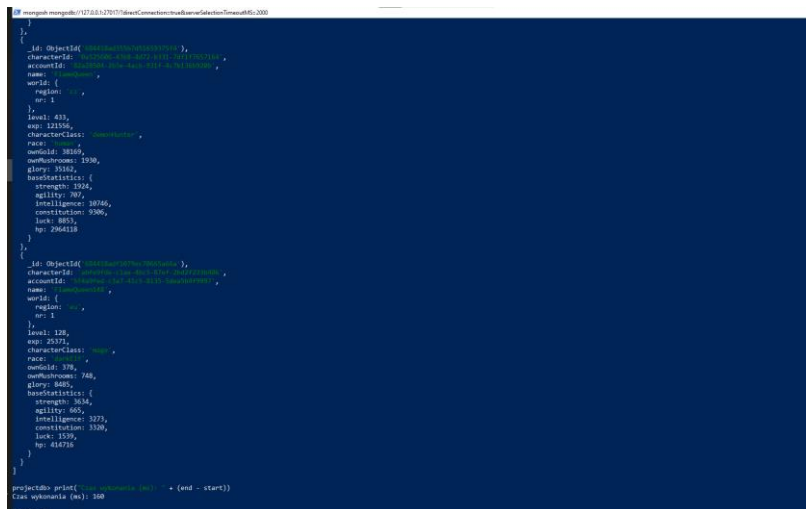
```
var start = new Date()
```

```
var result = db.playerCharacters.find({ level: { $gt: 100 } }).toArray()
```

```
var end = new Date()
```

```
printjson(result)
```

```
print("Czas wykonania (ms): " + (end - start))
```



```
{
  "_id": ObjectId("5a1b1a1a1a1a1a1a1a1a1a1a"),
  "characterId": "5a1b1a1a1a1a1a1a1a1a1a1a",
  "accountId": "5a1b1a1a1a1a1a1a1a1a1a1a",
  "name": "Gandalf",
  "world": {
    "region": "EU",
    "set": 1
  },
  "level": 433,
  "exp": 121556,
  "characterClass": "Wizard",
  "race": "Elf",
  "objectId": "5a1b1a1a1a1a1a1a1a1a1a1a",
  "ownMushrooms": 1950,
  "glory": 15162,
  "baseStatistics": {
    "strength": 1556,
    "agility": 787,
    "intelligence": 88766,
    "constitution": 9306,
    "luck": 8873,
    "hp": 296418
  }
},
{
  "_id": ObjectId("5a1b1a1a1a1a1a1a1a1a1a1a"),
  "characterId": "5a1b1a1a1a1a1a1a1a1a1a1a",
  "accountId": "5a1b1a1a1a1a1a1a1a1a1a1a",
  "name": "Arwen",
  "world": {
    "region": "EU",
    "set": 1
  },
  "level": 128,
  "exp": 25371,
  "characterClass": "Warrior",
  "race": "Elf",
  "objectId": "5a1b1a1a1a1a1a1a1a1a1a1a",
  "ownMushrooms": 748,
  "glory": 8825,
  "baseStatistics": {
    "strength": 2634,
    "agility": 685,
    "intelligence": 1073,
    "constitution": 1109,
    "luck": 1539,
    "hp": 41478
  }
}
projectdb printjson(Characters) + (end - start)
Czas wykonania (ms): 208
```

2. Postacie z więcej niż 200 grzybami.

```
var start = new Date()
```

```
var result = db.playerCharacters.find({ ownMushrooms: { $gt: 200 } }).toArray()
```

```
var end = new Date()
```

```
printjson(result)
```

```
print("Czas wykonania (ms): " + (end - start))
```

mongosh mongodb://127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000

```
}
},
{
  _id: ObjectId('684418ed355b7d51659375f4'),
  characterId: '6a525696-43b8-4d72-b311-7d11f7657164',
  accountId: '83a28584-2b5e-4acb-931f-4c7b136a920b',
  name: 'FlameQueen',
  world: {
    region: 'cz',
    nr: 1
  },
  level: 433,
  exp: 121556,
  characterClass: 'demonHunter',
  race: 'human',
  ownGold: 38169,
  ownMushrooms: 1930,
  glory: 35162,
  baseStatistics: {
    strength: 1924,
    agility: 707,
    intelligence: 10746,
    constitution: 9306,
    luck: 8853,
    hp: 2964118
  }
},
{
  _id: ObjectId('684418adf1079ec70665a66a'),
  characterId: 'abfe9fde-c1ae-4bc9-b7ef-2bd2f23b406',
  accountId: '5f4a9fed-c3a7-41c5-8135-5dea5b4f9997',
  name: 'FlameQueen148',
  world: {
    region: 'eu',
    nr: 1
  },
  level: 128,
  exp: 25371,
  characterClass: 'mage',
  race: 'darkElf',
  ownGold: 378,
  ownMushrooms: 748,
  glory: 8485,
  baseStatistics: {
    strength: 3634,
    agility: 665,
    intelligence: 3273,
    constitution: 3320,
    luck: 1539,
    hp: 414716
  }
}
]
```

```
projectdb> print("Czas wykonania (ms): " + (end - start))
Czas wykonania (ms): 158
```

```
projectdb> ■
```

### 3. Lista członków danej gildii.

```
projectdb> var start = new Date()
projectdb> var result = db.guildMemberships.find({ guildId: "b473f6a8-a138-47c8-a9df-dc26f9c44159" }).toArray()
projectdb> var end = new Date()
projectdb>
projectdb> printjson(result)
[
  {
    _id: ObjectId('684417754ae83905eb15519'),
    characterId: 'a7f79c32-31ce-448e-8298-09a5d294e00e',
    guildId: 'b473f6a8-a138-47c8-a9df-dc26f9c44159',
    role: 'leader'
  },
  {
    _id: ObjectId('684418105c76eb6c9863616d'),
    characterId: '6a4a43ee-ad16-4aa7-ac88-bcb4c90c94a9',
    guildId: 'b473f6a8-a138-47c8-a9df-dc26f9c44159',
    role: 'officer'
  },
  {
    _id: ObjectId('6844182b54dd3e1c5efc95e1'),
    characterId: '2db647f8-15cf-4a45-a593-7c61747a587a',
    guildId: 'b473f6a8-a138-47c8-a9df-dc26f9c44159',
    role: 'officer'
  }
]
projectdb> print("Czas wykonania (ms): " + (end - start))
Czas wykonania (ms): 145
projectdb>
```

### 4. Najczęściej wykonywane questy.

```
projectdb> var start = new Date()
projectdb> var result = db.quests.aggregate([
... { $group: { _id: "Team", count: { $sum: 1 } } },
... { $sort: { count: -1 } },
... { $limit: 5 }
... ]).toArray()
projectdb> var end = new Date()
projectdb>
projectdb> printjson(result)
[
  {
    _id: 'Mystery of Blackfang Fortress',
    count: 1
  },
  {
    _id: 'Mystery of the Lost Temple',
    count: 1
  },
  {
    _id: 'Invasion of the Eternal Forest',
    count: 1
  },
  {
    _id: 'The Lost Skull Caverns',
    count: 1
  },
  {
    _id: 'Legacy of the Bloodfang Tribe',
    count: 1
  }
]
projectdb> print("Czas wykonania (ms): " + (end - start))
Czas wykonania (ms): 152
```

### 5. Liczba postaci danej klasy (np. "druid")

```
var start = new Date()
```

```
var result = db.playerCharacters.find({ characterClass: "druid"
}).toArray()
```

```
var end = new Date()
```

```
printjson(result)
```

```
print("Czas wykonania (ms): " + (end - start))
```

```

    },
    {
      _id: ObjectId('50511b0a010000000000000000000000'),
      characterId: '00000000-0000-0000-0000-000000000000',
      accountId: '00000000-0000-0000-0000-000000000000',
      name: '0000000000',
      world: {
        region: '00',
        nr: 1
      },
      level: 128,
      exp: 86519,
      characterClass: '00000',
      race: '0',
      ownGold: 12434,
      ownMushrooms: 1065,
      glory: 2680,
      baseStatistics: {
        strength: 165,
        agility: 2902,
        intelligence: 987,
        constitution: 922,
        luck: 715,
        hp: 328683
      }
    },
    {
      _id: ObjectId('50511b0a010000000000000000000000'),
      characterId: '00000000-0000-0000-0000-000000000000',
      accountId: '00000000-0000-0000-0000-000000000000',
      name: '0000000000',
      world: {
        region: '00',
        nr: 1
      },
      level: 195,
      exp: 172577,
      characterClass: '00000',
      race: '0',
      ownGold: 1569,
      ownMushrooms: 1612,
      glory: 7344,
      baseStatistics: {
        strength: 4604,
        agility: 5684,
        intelligence: 1423,
        constitution: 589,
        luck: 5659,
        hp: 1122892
      }
    }
  ]
}

projectdb> print("Czas wykonania (ms): " + (end - start))
Czas wykonania (ms): 107

```

6. Lista gildii w regionie "pl" (np. z world.region = "pl")

```
var start = new Date()
```

```
var result = db.guilds.find({ "world.region": "pl" }).toArray()
```

```
var end = new Date()
```

```
printjson(result)
```

```
print("Czas wykonania (ms): " + (end - start))
```

```

mongosh mongod://127.0.0.1:27017?directConnection=true&serverSelectionTimeoutMS=2000
{
  glory: 9429,
  trainerLevel: 13,
  treasuryLevel: 329
},
{
  _id: ObjectId('50511b0a010000000000000000000000'),
  guildId: '00000000-0000-0000-0000-000000000000',
  name: '00000000000000000000000000000000',
  world: {
    region: '00',
    nr: 2
  },
  glory: 8289,
  trainerLevel: 539,
  treasuryLevel: 182
},
{
  _id: ObjectId('50511b0a010000000000000000000000'),
  guildId: '00000000-0000-0000-0000-000000000000',
  name: '00000000000000000000000000000000',
  world: {
    region: '00',
    nr: 2
  },
  glory: 5229,
  trainerLevel: 728,
  treasuryLevel: 434
},
{
  _id: ObjectId('50511b0a010000000000000000000000'),
  guildId: '00000000-0000-0000-0000-000000000000',
  name: '00000000000000000000000000000000',
  world: {
    region: '00',
    nr: 2
  },
  glory: 5215,
  trainerLevel: 36,
  treasuryLevel: 777
},
{
  _id: ObjectId('50511b0a010000000000000000000000'),
  guildId: '00000000-0000-0000-0000-000000000000',
  name: '00000000000000000000000000000000',
  world: {
    region: '00',
    nr: 2
  },
  glory: 9695,
  trainerLevel: 654,
  treasuryLevel: 797
}
}

projectdb> print("Czas wykonania (ms): " + (end - start))
Czas wykonania (ms): 84

```

## 7. Lista przedmiotów typu "weapon" o poziomie > 100.

```
mongosh mongod> use test; useCollection('test.weapon');
{
  "_id": ObjectId("644171605d172640a051"),
  "itemId": "7071214-0001-0100-0000-000000000000",
  "name": "Sword of the Dragon",
  "level": 228,
  "type": "weapon",
  "classTypeBelonging": "sword",
  "rarity": "rare",
  "value": {
    "gold": 22844,
    "mushrooms": 0
  }
},
{
  "_id": ObjectId("644171605d172640a052"),
  "itemId": "7071214-0001-0100-0000-000000000000",
  "name": "Sword of the Dragon",
  "level": 216,
  "type": "weapon",
  "classTypeBelonging": "sword",
  "rarity": "rare",
  "value": {
    "gold": 22695,
    "mushrooms": 11
  }
},
{
  "_id": ObjectId("644171605d172640a053"),
  "itemId": "7071214-0001-0100-0000-000000000000",
  "name": "Sword of the Dragon",
  "level": 295,
  "type": "weapon",
  "classTypeBelonging": "sword",
  "rarity": "rare",
  "value": {
    "gold": 31803,
    "mushrooms": 12
  }
},
{
  "_id": ObjectId("644171605d172640a054"),
  "itemId": "7071214-0001-0100-0000-000000000000",
  "name": "Sword of the Dragon",
  "level": 245,
  "type": "weapon",
  "classTypeBelonging": "sword",
  "rarity": "rare",
  "value": {
    "gold": 25195,
    "mushrooms": 8
  }
}
}

projectdb print('Czas wykonania (ms): ' + (end - start))
Czas wykonania (ms): 127
```

## 8. Postacie z HP większym niż 300 000.

```
var start = new Date()
```

```
var result = db.playerCharacters.find({ "baseStatistics.hp": { $gt:
300000 } }).toArray()
```

```
var end = new Date()
```

```
printjson(result)
```

```
print("Czas wykonania (ms): " + (end - start))
```

```
mongosh mongod> use test; useCollection('test.playerCharacters');
{
  "_id": ObjectId("644171605d172640a051"),
  "characterId": "7071214-0001-0100-0000-000000000000",
  "accountId": "7071214-0001-0100-0000-000000000000",
  "name": "Sword of the Dragon",
  "world": {
    "region": "EU",
    "server": 1
  },
  "level": 432,
  "exp": 121556,
  "characterClass": "Warrior",
  "race": "Human",
  "ownGold": 38169,
  "ownMushrooms": 2390,
  "glory": 35862,
  "baseStatistics": {
    "strength": 3586,
    "agility": 707,
    "intelligence": 38169,
    "constitution": 38169,
    "luck": 38169,
    "hp": 38169
  }
},
{
  "_id": ObjectId("644171605d172640a052"),
  "characterId": "7071214-0001-0100-0000-000000000000",
  "accountId": "7071214-0001-0100-0000-000000000000",
  "name": "Sword of the Dragon",
  "world": {
    "region": "EU",
    "server": 1
  },
  "level": 432,
  "exp": 121556,
  "characterClass": "Warrior",
  "race": "Human",
  "ownGold": 38169,
  "ownMushrooms": 2390,
  "glory": 35862,
  "baseStatistics": {
    "strength": 3586,
    "agility": 707,
    "intelligence": 38169,
    "constitution": 38169,
    "luck": 38169,
    "hp": 38169
  }
}
}

projectdb print('Czas wykonania (ms): ' + (end - start))
Czas wykonania (ms): 148
```



Postacie powyżej 100 poziomu.

```
projectdb=# \timing on
Timing is on.
projectdb=# SELECT * FROM playerCharacters_jsonb
projectdb=# WHERE (data->'level')::int > 100;
Time: 11.985 ms
projectdb=#
```

## 2. Postacie z więcej niż 200 grzybami

```
Administrator Windows PowerShell

[...]
```

```
projectdb=# SELECT * FROM playerCharacters_jsonb
projectdb=# WHERE (data->>'ownMushrooms')::int > 200;
Time: 25.336 ms
projectdb=#
projectdb=#
```

## 3. Lista członków danej gildii

```
projectdb=# SELECT * FROM guildMemberships_jsonb
projectdb=# WHERE data->>'guildId' = 'b473f6a8-a138-47c0-a9df-dc26f9c44159';
data
-----
{"role": "leader", "guildId": "b473f6a8-a138-47c0-a9df-dc26f9c44159", "characterId": "eff79c32-31ce-448e-8298-d9d48294e00e"},
{"role": "officer", "guildId": "b473f6a8-a138-47c0-a9df-dc26f9c44159", "characterId": "6e4e45ee-e416-4aa2-ac88-bcbb9c948a9"},
{"role": "officer", "guildId": "b473f6a8-a138-47c0-a9df-dc26f9c44159", "characterId": "2db647f8-15cf-4d45-a593-7c61747a587e"}
(3 rows)

>
Time: 0.880 ms
projectdb=#
```

#### 4. Najczęściej wykonywane query.

```
Administrator: Windows PowerShell

rc01user

Times Taken
56bd3a44-3438-4936-8540-526acfb8b5db 12
7d5d38c-48ff-422f-dc86-8c18e6de2e 12
3a6ef502-b693-49d5-a85b-412c6a0b927 10
e98b94ce-4697-4655-8d78-d315ce5c2b9 10
78f65322-138e-4632-b4f8-9e0f3d28e64 10
9eef448b-b38a-41d4-b66e-7f6c3655d8a2 10
f413f3b0-8cc3-4780-b0d3-46f981f3eb0 10
7b139405-4917-4484-b246-f8f8187925c1 10
e4855529-49e1-4b3f-927c-705315314b07 10
e194469f-68ab-4840-8c19-87c7f858c1da 10
4b29a8cc-689d-4860-bd37-fc33041221f4 10
f4e0d0c2-4678-4183-a05c-5b33f4eef66 10
6563986-7894-4132-9800-b81a6342d54e 9
8c83d84d-b684-49e8-8e39-7ad7d69624e 9
21b8824c-445e-41d5-b38c-7d79a6e5da35 9
6acbe6d6-fac7-4397-91c1-fb258ff57896 9
6c1124f6-b0bd-4688-9f76-4683d19af202 9
fcb4376f-6c0e-4a25-a08c-d5217f6f9eaf 9
83c24d38-9706-46ae-a9d5-4d4b4e5d01f8 9
8e151f85-7f4b-4791-b0af-84386cac95b7 9
83a80533-b41c-49cb-b0f3-7c06c4a8906 9
82263ecf-489c-46b7-b4a8-f1c4ce7b818c 8
9f5cf36d-99c7-4516-b78d-6ccc1301e9c9 8
e06275d1-b351-4772-b0e1-e83975385581 8
517eda1a-4378-45c7-8183-a1339ef2df59 8
8064867b-b842-4167-a85c-b0d4a0334ac 8
f9c7224c-bd3b-44c5-baaf-917b39c5c5f9 8
e4878c87-bb0f-499f-953a-f9d944d7b26 8
8075889e-b0c-4754-b8c-1b047c4f3a14 8
cc21115d-c9b0-4897-affb-a1e0e03cf33d 8
2ab22637-b466-48d9-81e4-5ebb898cd70 8
3096a327-1843-47d1-83cd-2d85727e0a83 8
165343af-437e-49f3-b08c-3a1216d7f4e7 8
995f7ac2-bdfb-4783-b7ba-df2f6e8fa85 8
459e13d6-b0a6-48e8-d046-4d21a81ae9eb 7
f6a8931c-f54b-4855-b597-c3a0e9f1ce9 7
54e0a474-bcf2-4889-8e52-b5e98885c495 7
e8b80861-0f21-4852-b398-dac119f1885 7
aaff181b-b041-4d58-b74c-3a3f4eff0fac 7
7b2cd438-1ead-4bee-8f4c-d9a4378d3cf8 7
22cd06a0-8d22-44d0-8887-f2eae37c8c72 7
8c2c9ff6-b19b-4d16-a85c-fc1a81e4338 7
804a6e1b-e677-48be-a158-a108d78c8948 7
89608835-50c4-4257-9099-6d79601c08ca 7
c594d2d1-70e7-4333-b3d7-ba9ff16ee4ae 7
2ef7b26b-3a8b-48a0-a854-4b2a78ead53a 7
50b9de1b-ec0c-488d-d65d-9098a5af4a31 7
d52eae07-f7fb-4e79-d7c2-d1863f7e9c36 7
809e2591-a28a-438c-ba14-81578621dce0 7
71413eaf-d01d-4d6d-b0a9-8133c040b98c 7
71f670b3-a110-45c3-a263-87b0a021232d 7
55774762-8e56-4dbf-9d13-1ab441ee8c0f 7
48e48e79-c795-487a-b31d-94389484961c 7
82d44934-f72c-4485-bd97-7b8bead8c19 7
852c9d1c-aee8-4566-bff4-be1121680fb1 7
08924492-78c6-4ccb-802d-cb05f69d0d0f 7
b7328a55-7cde-4846-a3dc-513e4591cd01 7
744cc78d-cccc-4217-94d7-e48548f1e232 7
a578c445-5c1d-4ae7-b7cf-ec01754d4a85 7
5323027c-097b-48d2-a99c-cdb10391ae83 7
04f39951-808d-4d8e-9b69-a5ec3782fbf9 6
c677764c-f3f3-464c-abf1-508f7d1c7a19 6
f9a1a819-bd01-43d3-8c37-bd333ee039af 6
7c989baf-0f9a-4aa2-966e-57bde0e52693 6
3996f52f-d876-4e7f-9477-c73db69c17fe 6
96d4a4e-083c-4478-9c7b-8a3a6f6d9f5f 6
091d176d-94be-4ef7-bff9-59e0b5b4ee13 6
711f83c-b4d1-4911-beff-a12836eac57 6
48639a8b-f7a3-446c-83d7-cdb0e5011c3d 6
7edd022c-a08f-43f1-9def-0d3f6cc77220 6
a0517b37-85c3-49cd-b2e4-b6be247ef8ba 6
c9a4876d-228f-411e-9e1c-2205f6ee21ef 6
48af3363-ab0d-48b0-a0ac-98c13747d1a7 6
823c8532-8dcf-4419-914c-5b5b7cb68882 6
e1a07563-837e-45a5-b731-4e90f8839e02 6
40a3af36-b716-44f0-a0d3-471b7be07911 6
58747e43-0984-4ccc-adce-95248a1d1053 6
36472a12-3bcs-47e4-bd8c-5c3b75d2467e 6
~
projectdb=# SELECT data->'questId', COUNT(*) AS times_taken
projectdb=# FROM questsInProgress_jsonb
5 projectdb=# GROUP BY data->'questId'
projectdb=# ORDER BY times_taken DESC;
Time: 3.106 ms
projectdb=#
```

#### 5. Liczba postaci danej klasy (np. "druid")

```
projectdb=# SELECT COUNT(*) FROM playerCharacters_jsonb
projectdb=# WHERE data->'characterClass' = 'druid';
count
-----
243
(1 row)
```



## 6. Lista gildii w regionie "pl".

```
projectdb=# SELECT * FROM guilds_jsonb
projectdb=# WHERE data->'world'>'>'region' = 'pl';

          data
-----
{"name": "Shadowborn Vanguard", "glory": 7508, "world": {"nr": 2, "region": "pl"}, "guildId": "b473feaa-af38-47c8-a9df-dc26f9c4a159", "trainerLevel": 131, "treasuryLevel": 23}
{"name": "Blazing Demons Vanguard", "glory": 649, "world": {"nr": 2, "region": "pl"}, "guildId": "d3832097-b193-47a6-a0c7-3d11ecac4413", "trainerLevel": 521, "treasuryLevel": 877}
{"name": "Feral Demons Order", "glory": 4778, "world": {"nr": 1, "region": "pl"}, "guildId": "a5f02902-bbfe-46d0-ab1b-1b8c687798a1", "trainerLevel": 934, "treasuryLevel": 32}
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7. Lista przedmiotów typu "weapon" o poziomie > 100

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8. Postacie z HP większym niż 300 000

[illegible]



# PostgreSQLa przy jednoczesnej konwersji JSON na tabele.

## 1. Postacie powyżej 100 poziomu.

characterid	accountid	name	region	nr	level	exp	characterclass	race	owngold	ownmushrooms	glory	strength	agility	intelligence	constitution	luck	hp
24dc994e-6f8b-418e-af4d-bec22a89e23b	e744462-1992-4e58-f813-131347c946c8	GhostLord8411	eu	2	107	51203	druid	demon	3118	485	3188	3197	1284	208	2193	1737	148726
02b7307b-28c2-4f4c-b0a0-c5d488fa7575	12b1c184-77f1-6806-b183-339566a4730c	TieLord922	eu	2	111	57071	scout	elf	1800	531	3051	2468	1546	1056	2173	504	1075648
6808b0c6-bf6b-411b-af91-f9a036c4e977	ba2080d2-199d-45e9-8b7c-af1a9e745c3c	ShadowMaster1690	cz	2	204	96678	demonHunter	dwarf	8444	1965	437	4889	805	5269	4358	4358	1189636
58574572-713b-428c-9455-d9d0b01a2c6c	5f4af9ed-03b1-6d15-8112-50e0af497907	FlameQueen312	fr	1	236	126080	scout	orc	12165	751	12310	25	4851	5589	4753	5828	1254925
0d8f667c-1d5c-4f94-b529-755b8a5a1eaf	1bde739f-e886-4d16-8869-afaf02b29f82	FlameQueen485	hu	1	462	268935	assassin	gnome	38725	458	43143	13174	287	8457	18113	1279155	55
5e3d31e6-c37c-4d5c-8b02-fd2bafef9e07	1bde739f-e886-4d16-8869-afaf02b29f82	FlameReaper	cz	1	233	164751	battleMage	demon	4596	848	8085	2953	491	5326	4865	26193	1624932
071355a8-e68b-4c7e-b5d8-1759b1394719	13a33a4e-b0c5-4419-a818-f4279afef053	FlameReaper613	am	1	252	128763	druid	human	8817	1315	20803	3054	4518	1818	7316	5037	1486793
5094a408-0864-4c5f-af84-51181a38025e	f36cfae2-779f-4d5c-94d7-e0b30f6ef2ad	FlameReaper76	cz	2	244	122761	battleMage	goblin	28932	884	15219	6881	1123	6616	5923	2193	1584610
76974444-e599-4327-8c1c-4a08124f4f3b	f36cfae2-779f-4d5c-94d7-e0b30f6ef2ad	FlameReaper	am	2	489	132234	mage	human	15442	1535	15808	4712	6738	8414	2432	1108	1186163
14e07132-3a6d-4d74-435e-7c390b080805	f36cfae2-779f-4d5c-94d7-e0b30f6ef2ad	FlameReaper36	eu	1	124	99232	bard	orc	974	1000	8979	1679	222	254	1993	1572	614244
18f7399c-b03c-421b-811b-e0212474224a	f36cfae2-779f-4d5c-94d7-e0b30f6ef2ad	FlameReaper53	de	2	463	295216	berserker	human	7424	479	347	3807	6255	11477	4771	6241	2354396
93593113-9c38-4d1b-8a6e-9b726755428b	64d1817b-c889-432c-9584-fa6b931a444	FlameReaper56	int	1	355	97841	scout	darkelf	7384	183	1811	1494	4122	712	3136	4287	1475484
36c77822-7f6b-411f-946b-4376a0f9f904	a037a77f-568b-4d5f-941c-3797d7078116	StorQueen051	de	2	255	246405	scout	goblin	18008	1355	7911	6538	782	985	4266	2354	943582
64e0e0e7-ba1b-481a-9c38-108713380134	9e23374c-c8b1-6805-b01e-08a6537c380b	FlameSeeker	int	2	193	158174	scout	goblin	5878	988	11803	5318	3532	1471	3579	2756	553581
76e0baa2-1187-4d8e-a55e-799a00a6e541	1103a3cf-08aa-40e4-048e-895d2680955	FlameSeeker044	fr	1	336	131108	scout	goblin	5956	3274	6888	1468	2584	4807	9885	1822	1880838
2711e657-e2f7-4d1e-9c5c-1e6d13d8f480	6426c035-4358-40a6-4c3e-02a9f3d21f38	FlameSlayer	de	2	235	234977	berserker	darkelf	15797	381	543	1639	2952	3668	1262	3234	248434
05422357-a857-4d6b-9123-af1070b8a7b6c	0a8f317a-1156-477e-855e-78825f0884a8	FlameSlayer268	int	2	448	85292	bard	elf	15963	3864	3781	2837	2546	5519	4270	2126	580311
51a4921f-149f-4d42-8912-55c31a677783	0a8f317a-1156-477e-855e-78825f0884a8	FlameSlayer	pl	1	383	174183	battleMage	human	24429	432	22712	3698	6336	6259	11332	5476	2161888
8085608c-c336-4d4c-820e-374f9d555557	c3948087-7c51-4f42-88a8-48ec33d732b0	FlameSlice411	pl	1	243	108692	scout	demon	28648	1468	18635	3834	788	3469	3878	1356	2271785
93c108a8-e08c-481b-9157-18978212b0f6	261ec318-95c2-455c-b08e-448d024f9348	FlameMaker728	de	2	375	98818	warrior	darkelf	34713	2589	3156	2788	4824	888	1815	1695	1695880
44d1a094-5d9a-43af-939e-476d5e1c1c11	18f7c9af-30e6-4b0c-31af-4eaf7989c311	FlameSlaker	am	1	264	119455	warrior	demon	13953	1587	11988	7541	4017	5389	6746	129	1477081
83c2a3d5-05e5-4d6c-aad7-717478b08ff7	c18a7af7-93db-4a79-80fa-f3c2c9e5c8b0	FlameThief481	cz	2	478	212783	warrior	gnome	36885	2726	23864	7183	13438	2748	13996	5154	1847693
21c1a8a6-eaf9-4a89-8314-487c338a0113	21a191ac-c08c-421a-951e-ef10e38a0213	FlameThief4658	int	1	353	241178	warrior	dwarf	29957	51	28458	3162	9252	8688	5576	4508	1521852
32c3cf8a-4f48-487f-8f64-66e3c1a5a544	21862753-e713-af1f-0723-012530488239	DragonRider8949	int	1	285	164324	battleMage	goblin	16723	533	821	5537	4117	1974	2638	4835	1888863
13d4f94c-7285-4d8e-af7f-6aaf05b724d4	54a4f03a-c67f-4d0b-a07f-28b76729a4d4	FlameWalker	cz	2	235	229263	scout	gnome	12846	295	24689	5788	1374	2668	4588	4268	986818
23e2c118-6d8e-4d9f-8d9c-38d8a4815a08	88c4980c-e0ec-408a-9718-1d180868884e	FlameWalker676	cz	1	345	23484	berserker	human	8275	296	7811	561	2867	2383	2784	3768	398888
04843821-c3af-4d6c-8c63-9330b071582b	078d880b-d133-4a62-024e-3d7c7f772c49	FlameWalker726	int	1	508	115419	berserker	gnome	49175	758	30749	2452	7987	1481	7334	4761	2547979
bc8f9a62-11fc-4d27-980f-08713870a8b9	27a9593d-493d-480b-b03f-1f46e2ac5181	FlameWalker868	cz	1	319	3267	bard	darkelf	38875	1891	6179	773	3385	7933	7887	188	1033441
44dc1289-4139-4317-5b81-83209f7b7d4d	95a3ca7e-b88c-47ee-833c-f8d617493114	FlameWarren	fr	1	374	113736	battleMage	gnome	182	254	24266	5888	18889	9184	247	311	933797
3ee926a2-13c5-4c75-933e-02615c1c78b6	4323a213-16c4-4a4b-80a0-0782645e6717	FlameWalker205	pl	1	277	47008	battleMage	gnome	17584	878	28166	4868	2251	7354	3125	3954	1282336
18c6e39f-1c42-459f-9737-af8239931f8f	6359f937-5edc-4f12-4c3b-bd9f9f994478	FlameLupher	am	1	492	128227	scout	darkelf	97	3883	48136	3571	12893	1348	5438	8865	4763915
82a8221f-1c1c-4d25-9370-f28162c01d6f	1a83234c-16c4-4a4b-80a0-0782645e6717	FlameWalker558	pl	1	452	43728	battleMage	orc	44629	383	29794	4323	4828	3288	5205	3872	1827708
c2e71a6f-4d9f-4d3c-9e44-6530e38e280b	1a83234c-16c4-4a4b-80a0-0782645e6717	FrostBeast613	int	2	362	228218	scout	human	18712	3329	8947	4771	3742	5787	377	188122	171737
0a801871-58a8-470c-9121-28d8e0e280c6	746c218c-5c14-4106-1388-0329235807a4	FrostBreaker13	pl	2	236	188429	mage	orc	6886	1568	21473	975	2779	519	978	787	552973
624597a8-e08c-481b-9157-18978212b0f6	746c218c-5c14-4106-1388-0329235807a4	FrostBreaker917	int	2	294	30164	warrior	orc	22288	2248	3166	178	411	3357	6875	3567	2793352
03c555a9-2956-4155-3c38-e26a1609a0c0	5515d53f-4b0d-4508-5a3a-1a53c5c5a7f4	FrostBreaker729	fr	1	498	6415	mage	orc	7455	1172	47329	13886	5533	6139	5945	1384	4616578
8c8a0144-11ef-4d27-980f-08713870a8b9	5a91891a-d6da-461d-4a0c-391841c5c271	FrostBreaker996	am	1	121	45917	mage	orc	2517	323	3178	2495	2388	1368	1654	181	1161388
f8e4b9d4-1b9a-4dce-a047-b06c9195272d	88488985-2146-4c58-ae5a-3c58412a84c6	FrostFang	hu	2	181	102888	mage	dwarf	5824	119	15748	7126	2088	811	4884	3946	218925
04a1169f-7ef7-4d33-9b70-f28162c01d6f	5a91891a-d6da-461d-4a0c-391841c5c271	FrostFang996	am	1	482	437156	battleMage	elf	36239	2238	28674	18849	13774	21862	18654	26149	3360824
93593113-9c38-4d1b-8a6e-9b726755428b	57021a95-c765-4c33-8132-7291c3a9aaad	FrostFang075	eu	2	362	134685	battleMage	demon	15837	1348	7487	2716	159	1486	3536	4845	675794
07c78859-450a-471c-901c-3a8115a2b03b	09d4880b-f5b1-4d76-ae8e-03178e6d7508	FrostHeart	fr	1	448	137619	scout	orc	31520	3597	15596	11871	9719	18911	5133	4254	1748878
18414548-608b-4d6c-931f-89f625c13713	26a0772b-30e6-4b0c-31af-4eaf7989c311	FrostHeart111	int	1	437	134814	mage	elf	11538	1244	43382	2578	6786	4015	11173	1894	1586897
6f8e0a6c-11cf-4d27-980f-08713870a8b9	1a78783b-6e87-4f63-88f2-5a8a079582c1	FrostKnight118	am	1	231	178317	berserker	dwarf	5821	924	17483	3388	5446	5225	2340	6818	1683311
013364a8-183f-4d82-980f-08713870a8b9	1a78783b-6e87-4f63-88f2-5a8a079582c1	FrostKnight118	cz	2	496	57033	berserker	elf	11763	4818	2558	4822	18786	6437	5485	9455	2517883
1777240b-6578-4d34-9774-2c8818854c18	1a78783b-6e87-4f63-88f2-5a8a079582c1	FrostKnight195	de	1	377	366569	berserker	darkelf	32828	1608	6879	5991	7845	11237	6889	7356	3887882
3a2c9b2b-9c3b-4d71-9a41-23c30e9f6f66	2284006a-423e-4c1c-390b-ba6109a445	FrostKnight608	de	2	451	125242	mage	orc	42687	3284	21598	6682	18888	20712	1149	2859	3386024
8358787a-9238-4d9f-4309-637254dad13f	1a78783b-6e87-4f63-88f2-5a8a079582c1	FrostKnight738	fr	1	254	242189	mage	elf	15182	964	7883	3446	5148	1719	2487	6113	963388
97a507f8-af47-4d3c-9a0c-02277f9f0f69	09d4880b-f5b1-4d76-ae8e-03178e6d7508	FrostLord	de	1	365	137619	mage	dwarf	1886	1862	7186	1862	1725	2726	3897	6883	47888
708070c7-c1c5-477b-980f-08713870a8b9	13a0a05c-9215-469c-0a3c-76d73131c1ef	FrostMage	de	1	315	115247	warrior	dwarf	4638	1715	9549	6372	1359	2268	818	5793	1591548
b7f6b115-17b8-4745-b08b-081a1e1a2873	d21eaf8f-158a-43ad-831f-f80800704357	FrostMage575	hu	2	348	388956	mage	goblin	19451	3238	24665	4473	3667	2118	6859	18918	2758789
76c83132-3a1e-41e6-823e-28113a180724	a85f6b1c-474b-4b32-9a5c-c57846111f96	FrostMage618	cz	2	443	286173	scout	goblin	33839	3714	11184	1461	11888	2402	7488	3994	4121877
af96a91e-174e-4808-8227-2ac858f4c0fe	4ef4893e-bc14-4506-adb6-7c6f19b5a5e4	FrostMage551	int	1	184	2181	bard	human	12928	534	4899	3931	139	2254	4355	1843	1143484
90d8a0af-7028-41a4-8a19-400f7fe70405	4ef4893e-bc14-4506-adb6-7c6f19b5a5e4	FrostMage978	de	2	472	232933	berserker	dwarf	7878	3558	39233	388	9255	15487	2143	187	1482181
68d72889-223c-4d8e-8a9c-4118131125a2	f3c76138-4f3f-4afa-884d-94a2d71188a2	FrostMaster	de	1	455	298811	assassin	human	23855	3774	22233	18841	9839	1318	9813	2588	1168485
161c8a7c-735c-437f-800f-025b90198a85	f3e0d51f-859c-436b-a8b7-578ac79aa41c	FrostMaster175	hu	1	441	417368	battleMage	darkelf	27149	1267	5148	7877	3316	9823	4788	6883</	

## 2. Postacie z więcej niż 200 grzybami.

characterid	accountid	name	region	lv	level	exp	characterclass	race	gold	ownMushrooms	glory	strength	agility	intelligence	constitution	luck	hp
14653946-680b-483a-8584-3049849320	40764442-384d-460b-bf55-333343c0f441	Shuttleford13	eu	2	157	53180	druid	elf	3110	685	3110	1284	1284	1284	1284	3110	340778
8073730-2662-4f6b-9eb0-cd6c498a9370	8b3c1f44-79f3-4880-8183-395966a70xc	Icelor04922	hu	2	111	57971	scout	elf	1800	931	1251	2468	1546	1656	1173	594	1807649
00000b-0950-4153-ae1f-f9a20a6ca977	0a2060d2-159d-482d-987c-411a2e245c3c	Shamster1090	cz	2	286	96578	demohunter	dwarf	9422	1505	8187	2600	825	5260	825	2605	1189536
985757-731a-4028-8163-311030a0a3c6	19a49f6c-13a7-41c3-8139-3a0a049a9747	FlameQueen125	fr	1	236	124880	scout	orc	11560	741	18118	75	4851	5580	4851	5820	1800300
0d80707-165b-4f54-5529-7305a94a1eaf	10ae739d-e88d-4d1d-8d09-af7a0209f897	FlameQueen485	hu	1	162	260953	assassin	gnome	30715	858	43143	13174	287	1457	1473	11115	1272152
9a3d1ee-837c-4e5d-802f-4d210a19a877	10ae739d-e88d-4d1d-8d09-af7a0209f897	FlameQueen485	hu	1	233	164751	battlemage	elf	4596	948	4985	2953	480	5238	6845	2833	1624332
0d71940d-f488-4e7e-4548-5238a378a729	1a639a9e-80dc-4a18-4a78-24675ade0f53	FlameReaper113	am	1	252	128743	druid	human	8817	1325	12885	5914	4518	1816	2398	5637	1480783
594a480b-d8e4-4c5f-4a4c-4118a38a28d6	1f8cfae2-728f-445d-9a47-4b2336f4c1cd	FlameReaper76	cz	1	244	121263	battlemage	goblin	20032	804	15529	6681	1133	6236	593	2193	1504816
bf0f1041-8058-4719-9a7f-33c4208a938b	1f8cfae2-728f-445d-9a47-4b2336f4c1cd	FlameReaper914	am	2	29	28637	bard	elf	2148	281	932	1581	289	37	254	263	278074
7e9f3484-9599-4027-8c12-40e20274f1f8	1f8cfae2-728f-445d-9a47-4b2336f4c1cd	FlameReaper914	am	2	489	322224	mage	human	12462	1573	33268	4712	4788	8144	2412	2198	1801159
14a07c32-346d-4a74-2456-7c39c0800005	1f8cfae2-728f-445d-9a47-4b2336f4c1cd	FlameReaper795	eu	1	124	99252	bard	orc	974	1080	8979	1670	222	254	1899	1572	614624
15e7380c-84bc-425a-901f-4e213747c246	1f8cfae2-728f-445d-9a47-4b2336f4c1cd	FlameReaper933	de	2	463	395818	berserker	human	7434	479	547	2085	6255	11477	4791	6241	2353536
7607702-149b-413f-194d-4a637a30a956	4a0f747f-5805-4c0e-8a4c-738a70f1c13b	StorQueen2051	de	2	235	246481	scout	goblin	18000	1155	7811	6638	782	905	4286	2134	943893
4a8a0e7-9e18-401c-3c36-5087110996a4	592537c4-c083-4085-9e1d-4b65374380b8	FlameSever	int	2	193	158174	scout	goblin	5870	988	11865	5318	3532	1473	3579	2750	553581
14e6ba31-3187-408e-807e-7f0a00a50163	1c1334c4-018a-4b0e-8a0e-8a00180a0f95	FlameQueen484	fr	1	336	113380	scout	goblin	999	3274	4840	1468	2184	4807	3845	787	1800300
05412557-4057-480b-9121-418708a07b06	8a08317a-1156-477e-853e-78825f680a4b	FlameQueen264	int	2	448	85292	bard	elf	15963	3864	3791	2837	7456	5519	4278	2126	583811
55c184e4-4356-4045-825a-34af95955575	1c394087-7011-4462-9849-48bc3307b28b	FlameSliver411	pl	1	243	108069	scout	elf	28048	1468	1835	3834	788	3469	3788	1362	2271789
531184d-804c-401c-b167-1aaf2622e0fe	4c3e383e-95cd-455c-8a0e-488d0d709148	FlameSliver726	de	2	375	36051	warrior	elf	34713	2589	5516	2780	4624	888	5317	1815	2685882
4c414094-597a-439e-859f-f705053c5311	1d8f34f3-3a86-40c3-b1af-4aaf4780c57b	FlameSliver400	de	1	264	119453	warrior	elf	19763	1587	13184	7541	4817	3388	6746	179	1477700
8312a3d-8545-4d6c-aaf9-713478a080ff	4c38a7f7-9308-4a79-88f4-731c4e65c0b0	FlameTief161	cz	2	478	121283	warrior	gnome	38886	2726	25866	7185	13438	1248	13966	5154	3497693
32c1f9e-4f48-4804-8074-4a6c4c49b464	218f0c73-e715-4f14-b77b-415336a88229	DragonQueen8948	int	1	280	164524	battlemage	goblin	18723	533	421	5337	4117	1974	2630	4455	1888863
05466667-7c43-4633-b01f-372121393	2a19a1ac-c08c-422e-953a-bf196580c23	FlameTief1985	de	2	38	13868	mage	dwarf	3172	223	749	262	539	1806	682	1881	347695
126f784-4181-408b-bc7b-20e7320c7248	1a639a9e-80dc-4a18-4a78-24675ade0f53	FlameSliver405	cz	2	238	228383	scout	gnome	12444	295	14469	5788	1374	2668	6580	4812	198412
202c15c-0686-4a0a-a0fc-3b0a482c5e0b	88c4930f-e9c7-406e-971a-1b10a060044e	FlameSliver676	cz	1	145	29444	berserker	human	8275	296	7011	561	2867	2383	7384	3768	390808
804818d1-434f-4a8d-aed3-91388b7c382d	1f6e850d-d133-44a2-b24e-3d77cf726c09	FlameSliver726	int	1	588	115467	berserker	human	40775	798	10749	2452	7987	7481	7304	4761	1547979
4549f1c2-1c1c-401c-998f-9a71307a99f9	17e70c0a-e61d-401e-8b13-1f0a32b1181	FlameSliver400	fr	1	339	3167	bard	dwarf	36075	1881	6179	773	3385	7933	7807	188	2053441
944c289-4139-4517-0881-e8329f9f76d4	9ebc277f-b88c-47ee-b391-f6a224031114	FlameSardes	fr	1	374	311738	battlemage	gnome	182	254	28266	5868	18189	1914	247	4331	931797
9ee2382-134c-471d-401c-81613a3c28b0	4321a311-5c7e-4a4b-ba47-7f0d3a5d0717	FlameSardes400	fr	1	277	42188	battlemage	gnome	17854	818	24106	4808	2211	7134	3125	3804	1282376
7213140d-4738-4d82-9d1c-22afae59386a	4c59f337-588c-4f12-4c30-b059f9984676	FlameSardes400	fr	2	88	56483	battlemage	elf	7841	511	1844	1835	641	1999	1445	1882	775417
18c4e209-43a2-4f7e-973f-4a82933c149f	4c59f337-588c-4f12-4c30-b059f9984676	FlameSliver400	fr	1	492	122227	scout	dwarf	97	3883	44336	3971	13383	1348	5618	869	4763918
11f4f192-3486-43fe-453a-5526a4d8c0c9	218f0c73-e715-4f14-b77b-415336a88229	Icelor04908	cz	1	26	1521	battlemage	dwarf	1578	245	18	154	625	494	768	312	26212
0781080e-980f-400f-9221-8c17c761472d	1a881324-bc42-4921-8814-892c78e07874	FlameSliver423	cz	1	78	45188	scout	human	1448	518	1888	1242	1188	1868	88	879	111441
624a227c-4341-4e25-1837-18c0c02c016f	1a881324-bc42-4921-8814-892c78e07874	FlameSliver558	pl	1	452	313727	battlemage	orc	54829	382	29794	4252	4819	5268	5295	3872	1027780
0a7b64a-8f5a-4088-8147-20c9e75734a0	1a881324-bc42-4921-8814-892c78e07874	FrostTeast	cz	1	68	3886	scout	dwarf	5897	518	1553	1774	1541	1128	1677	1899	183258
42a718f1-4a9f-4c15-813a-81613a3c28b0	1a881324-bc42-4921-8814-892c78e07874	FrostTeast113	pl	1	262	284234	scout	human	18712	3159	8784	4712	3742	5707	371	1812	717137
6218e45c-423a-4138-405e-393d0cdcaaf1	1a881324-bc42-4921-8814-892c78e07874	FrostBreaker	int	2	84	73838	demohunter	dwarf	6784	831	1845	967	2127	1926	174	886	190233
ae0f18f1-58ae-401c-921d-2a8e0c0a0000	1a881324-bc42-4921-8814-892c78e07874	FrostBreaker113	pl	1	236	188428	mage	human	6848	1969	21471	6789	5779	5118	978	787	932873
0245974d-998e-408e-928b-28b3a1492b28	746c218c-5c24-418d-8388-43929383a8da	FrostBreaker437	int	2	294	38164	warrior	orc	22288	2248	1316	178	411	3357	6675	3567	2793352
06c13389-298b-4153-bc3e-42eac0a0a000	15050807-408b-863d-29c76c3a9f94	FrostBreaker729	fr	1	488	4415	mage	orc	8655	1272	47909	13866	5513	9159	9945	1184	4418978
01000154-9149-4a57-807b-61a0d0c0a000	1a0710e0-9a6b-456d-a080-9316145c4871	FrostBreaker900	am	1	121	45937	mage	orc	2537	323	3378	2585	2388	1158	1661	1164288	
9589f8f5-813c-4362-930e-90444029751f	54488893-51ac-4ec1-a214-322a20d8a977	DarWalker1883	int	1	68	37775	scout	dwarf	5396	438	4778	381	1389	1823	1885	1828	314156
1a8c55c2-e558-477e-9a7f-3a4449a9a5ef	598c18a-dada-488e-8b47-8c2b0a08f8fc	FrostFang188	fr	1	88	21738	battlemage	elf	228	258	418	1353	695	1239	2858	277	256368
86414008-7f4d-4633-b70e-622f7f80f90b	1980a18a-dada-488e-8b47-8c2b0a08f8fc	FrostFang899	eu	1	481	437158	battlemage	elf	38219	1228	15874	18889	13774	13162	18804	18148	2827918
94594127-18c4-4629-4a8b-eaaf8d1c4a50	57827a50-e705-4a3c-8131-701a30a0a000	FrostFang75	eu	1	162	134685	battlemage	elf	12837	1348	7487	2725	159	2465	3536	4545	675794
bf7e859-48a8-4211-982c-c8a132a6a181	1f3bd184-6d6f-4e4e-8876-1c388d4a4630	FrostHeart	fr	1	449	138277	scout	orc	33265	1397	15696	11871	9719	10911	5163	4814	3748878
1a414548-608d-408d-919f-9f905d2a2123	1a08719f-5805-4f9f-bc0c-4a210a41c23b	FrostHeart111	int	1	437	138484	mage	elf	12539	2244	43392	9179	6788	4815	12173	18084	1588997
97e98a8c-1fc7-4298-8a70f8131267	1a08719f-5805-4f9f-bc0c-4a210a41c23b	FrostHeart111	am	1	231	178517	berserker	dwarf	5821	924	17481	3368	5148	5228	6818	4618	1888311
9138a48d-183f-4082-9887-74610ba1c0c1	1a07383c-6e67-4a63-9872-5a0a79582c1c	FrostKnight218	cz	2	496	57383	berserker	elf	11783	4618	2558	4822	18198	6437	5485	9456	2917882
177718a-0378-4c54-9f75-5a3838a5c0c0	1a07383c-6e67-4a63-9872-5a0a79582c1c	FrostKnight395	de	1	377	364569	warrior	dwarf	32268	1688	6678	5983	7845	11237	6489	7356	3887882
3c5e7b20-9c3b-4e71-b041-23a3b89f8862	2a0d90d4-a35b-4c5c-9909-ba04289a4655	Knightside6980	am	2	451	155842	mage	orc	43687	3794	21598	6602	18808	10712	1148	18859	3388834
8398376c-9138-405e-4b7e-437a4a61315f	1a07383c-6e67-4a63-9872-5a0a79582c1c	FrostKnight730	fr	1	254	243189	mage	elf	15182	964	7983	3446	5148	1719	2487	6113	563380
875f7990-4e4f-4ac3-b0ca-4388d0e08040	0948490b-f361-4a7b-a08b-43578a087504	FrostLord	de	2	193	176118	mage	dwarf	1885	1882	1590	6372	1725	5726	399	4214	878085
7a0977f5-9255-4779-960b-725c0b009497	130b00e0-9215-409e-902f-9f71021c1eaf	FrostMage	de	1	212	115247	warrior	dwarf	4028	1732	5540	6372	1259	2268	818	5293	1392568
bf7e6115-970b-4245-906b-600a1a020973	1a23a90b-55ab-43ad-8214-f08a06074157	FrostMage975	hu	2	348	188956	mage	goblin	19451	1239	24465	4473	3667	2118	6869	4918	2754789
7f651217-3a1a-41ed-830c-b0111a3872c4	4a5f050c-e768-4831-04c5-1578a6811f56	FrostMage975	cz	2	443	286373	scout	goblin	35639	3714	11184	1463	11888	2462	7480	3994	4121287
9966c1e1-171e-408b-8227-3a030a56c0fe	4a4f4848-bc14-																

### 3. Lista członków danej gildi

```
projectdb=# SELECT pc.*
projectdb=# FROM guildMemberships gm
projectdb=# JOIN playerCharacters pc ON gm.characterId = pc.characterId
projectdb=# WHERE gm.guildId = 'b473f6a8-a138-47c0-a9df-dc26f9c44159';
 characterId | accountId | name | region | nr | level | exp | characterClass | race | ownGold | ownMushrooms | glory | strength | agility | intelligence | constitution | luck | hp
-----+-----+-----+-----+---+-----+----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----
(0 rows)

Time: 3.990 ms
projectdb=#
```

### 4. Najczęściej wykonywane questy.

```
projectdb=# SELECT name, COUNT(*) AS times_done
projectdb=# FROM quests
projectdb=# GROUP BY name
projectdb=# ORDER BY times_done DESC
projectdb=# LIMIT 5;
 name | times_done
-----+-----
(0 rows)

Time: 0.652 ms
projectdb=#
```

### 5. Liczba postaci klasy "druid"

```
projectdb=# SELECT COUNT(*) AS total
projectdb=# FROM playerCharacters
projectdb=# WHERE characterClass = 'druid';
 total
-----
    102
(1 row)

Time: 1.828 ms
projectdb=#
```



## 6. Lista gildii w regionie "pl" (np. z world.region = "pl")

projectdb=# SELECT * FROM guilds						
projectdb=# WHERE region = 'pl';	guildid	name	region	nr	glory	trainerlevel
						treasurylevel
b473f6a8-a138-47c8-a9df-dc26f9c44159	Shadowborn Vanguard	pl	2	7508	131	23
d3832097-b193-47aa-ab07-3d11ecac4413	Blazing Demons Vanguard	pl	2	649	521	877
a5f82802-b0fe-46d8-ab11-1b8c87726811	Feral Demons Order	pl	1	4778	934	32
7ab8d2b3-3b03-46c7-aa3f-4c3b82b59f08	Storm Titans Hidden	pl	1	5537	757	66
96307a5a-9f24-4503-86df-2831e0a05c84	Ravens Crimson Alliance	pl	2	1277	184	879
baa481c7-6e77-4435-a937-dcdeb1b09e408	Celestial Feral Hunters	pl	2	3970	526	578
038f6ed1-fc38-45d8-b4a2-95ef5b507f23	Onyx Dragons	pl	1	627	217	617
02f653ed-3ba9-406e-92f4-1519a9fab4d0	Archons Fabled Golden	pl	1	4828	447	178
276ef103-5157-470a-ba0b-12b38429897d	Ancient Banshees Keepers	pl	2	3106	331	62
1aa814a5-7fa0-45d7-adbf-564af6c0c4ed	Emberborn Pact	pl	2	2891	521	916
cb7d3e2b-0805-4cb2-a037-ad1c816718c8	Ancient Hunters Dragons	pl	2	6233	917	725
44f45504-a08f-4a79-9cd9-7589c9f543ba	Serpents Feral Keepers	pl	1	197	804	216
f78f9699-d163-474b-801b-e038e836c1b4	Storm Sentinels Unbroken	pl	2	7821	835	991
fa77928b-9762-4061-842d-b58eca9d0712	Angels Coven Shadow	pl	1	3393	134	343
b6437769-bca6-4555-8a27-5b77c7fac5d0	Bloodstone Marauders	pl	1	4939	9	968
7f87609e-a111-472a-b37d-d0de3c19e603	Circle Demons Lost	pl	2	4661	550	732
2df18424-5708-46d3-a77a-271be72d09c1	Ravens Crusaders Bound	pl	1	7502	596	546
13a7f786-6030-4de8-bb6e-70d6a7b77f7e3	Sacred Shadow Wardens	pl	2	9921	386	977
2e572ae7-ed27-4431-be00-9f06d0849a39	Fury Eternal Obsidian	pl	1	2516	584	635
3fe195bb-8f6d-4ff5-a0de-6c07b4b5b7b6	Silent Wolves Hidden	pl	2	9371	320	316
18fc2aff-c86a-4b06-9efa-796878affbfb	Unbroken Silent Coven	pl	2	1649	14	278
b9b4e355-fa22-4a2a-90b1-8bd23ab19e2c	Silent Ancient Circle	pl	2	2658	747	408
ee88828e-1d49-469f-b215-dc57dedde6f0d	Prime Obsidian Vanguard	pl	1	9413	35	351
a3552bd7-ba95-4505-976e-76512f7c3f27	Radiant Angels Brotherhood	pl	2	4318	739	692
dc3c8b78-a32e-4353-a5f7-71a861ab193a	Eternal Guardians Silent	pl	1	2629	782	677
20f151ae-a68f-4705-9dc5-25d8ec23232b	Silent Ravens Eternal	pl	2	5084	399	567
72b159f9-8741-429c-a2ef-a0741bbf71720	Phantoms Mystic Prime	pl	2	6263	894	83
cd083f6a-0e73-4ef4-99e5-615b62072538	Keepers Prime Reapers	pl	1	3310	358	132
32e49687-f5fa-4947-b1b3-84f30f475bbb	Valiant Horizon	pl	2	9584	627	341
124b4f19-428a-4b22-800a-18e2a07f2f4e	Chosen Iron Angels	pl	1	8383	988	35
49e00d7b-34bc-40c3-86ca-c15a6c00a723	Ravens Hunters Eternal	pl	2	106	524	732
3e27e3de-a085-4b50-9ca0-08d108cdffee	Forgotten Knights Emerald	pl	2	4408	323	268
b347a95c-ca8b-41ea-9f29-6783366551d6	Titans Unbroken Wardens	pl	2	8525	807	599
adbd45af-5bfd-43dd-b09f-465c3c1f6d1b	Prime Fury Keepers	pl	2	31	828	408
305d7d4f-6497-49ea-8616-8b303d32bd1f	Ravens Iron Prime	pl	2	4734	458	296
93a67374-3027-4d4f-00d0-f02a09ff5735	Wanderers Chosen Iron	pl	1	6655	402	679
f0e7b055-5797-4291-b2f1-4022446091ef	Blazing Hidden Ravens	pl	2	6110	341	864
4a536fec-4e32-4d09-825f-b3a53ab1b930	Radiant Giants Guardians	pl	1	2491	995	986
b26a7e70-43c0-48ae-9ff2-ac59d8f39a55	Lions Keepers Silent	pl	1	8418	737	39
f80c5da-02fb-4b04-9535-109a940c4db	Prime Sentinels Archons	pl	1	2408	238	711
653a4331-2f08-4396-b047-13d3f761f9f	Knights Celestial Noble	pl	2	8346	147	518
573098f2-4d41-4c35-a67e-1bce98775933	Onyx Vanguard	pl	2	4784	553	343
707b6993-7e11-4f92-81e8-b5c581179cab	Wanderers Eternal Azure	pl	1	3355	662	126
3bdf886a-d23e-4e8c-81fe-74523dde9b0f	Wardens Forgotten Radiant	pl	2	9805	607	553
ad0a9b7a-4d05-4a2e-957e-178d2caa3f46	Crimson Wolves Infinite	pl	1	7193	393	680
c53d31eb-3070-4a1a-800b-bbc215010c90	Noble Shadow Fury	pl	2	2299	29	469
b7105359-934f-4c9a-a67f-ec9007cef35e	Lions Iron Infinite	pl	2	2960	896	422
a4971906-e854-41df-8c85-cb1a1900216d	Vanguard Sacred Titans	pl	2	7967	197	279
b71cef6c-c409-44c2-9f07-be8de6ab4dbf	Frost Guardians Lions	pl	2	8208	992	463
89580245-8aa8-4448-a4ad-f9a44e6f8ebe	Feral Ravens Brotherhood	pl	2	4775	231	831
bd2445d7-0ee40-420b-a3a7-66f435b0ec2	Feral Obsidian Fury	pl	1	5245	822	606
b1ae1d46-ee73-4676-b6f5-cdb4419851bc	Golden Unbroken Banshees	pl	2	3599	698	2
53d1dd6c-fad5-41cd-9e46-11485c0a4ac4	Prime Dragons Crusaders	pl	1	4295	93	190
96728405-c631-4ec9-bcdd-21567e33bd00	Lions Prime Mystic	pl	2	4432	647	76
78c6c099-7ce4-4d05-a04b-0bde6f0a6dcf	Angels Unbroken Sentinels	pl	2	9547	427	515
76819084-1acf-48d7-8392-f33ea94f8570	Wolves Shadow Circle	pl	1	9182	562	36
08d0555e-defa-4f89-bb4d-06e8f6fb30b	Twilight Sacred Keepers	pl	1	4882	243	714
f69df16a-80be-472e-a211-7910a69426de	Solaris Conclave	pl	1	2916	819	799
ddcbadca-b223-4e12-b10f-11838312ddbf	Valiant Storm	pl	2	3618	200	124
c860d3f-ec28-4a34-0c9b-717da02de9bb	Duskveil Sentinels	pl	2	9429	13	329
4def31c1-44bb-4356-a312-85570806eafd	Bloodthorn Vanguard	pl	2	8289	539	162
4e190d14-b182-4e95-b943-8cf34f9b3966	Eclipse Revenants	pl	2	5229	728	434
76459725-bbfe-416f-8ff6-c1e29f3850e4	Phoenix Dominion	pl	2	5215	38	777
8831b01d-5d28-4e05-bb08-1e4532dd0916	Onyx Tempest	pl	2	9695	654	797

(64 rows)

Time: 4.544 ms  
projectdb=#

7. Lista przedmiotów typu "weapon" o poziomie > 100

projectdb=# SELECT * FROM genericitems	projectdb=# WHERE type = 'weapon' AND	level::int > 100;							
	itemid		name	level	type	classtypebelonging	rarity	gold	mushrooms
	ba08f734-6e6d-45bd-9f42-42827b6051e3		Claymore of the Star	189	weapon	melee	epic	11410	0
	5c9a5fbc-c506-44ee-bb61-ba90c52a8b2b		Savage the Ancients Blade	131	weapon	melee	common	13890	0
	39e3f503-7084-448f-a44c-7d54981d4336		Thunder Axe of the Eclipse	217	weapon	melee	common	22312	14
	3f75827d-a04e-4571-b3e0-004d29970ec7		Doomed Claymore	246	weapon	melee	epic	26958	13
	4b7d2f0b-b8e2-4725-bf17-c3381459e1e5		Enchanted Axe	156	weapon	melee	epic	16212	13
	0b07d7c8-f0a3-4462-aeab-f715067d6f3c		Shimmering Mace of the Lantern	191	weapon	melee	epic	20878	12
	3b0af87c-9973-4d0d-be89-6b16560e2859		Axe of the Titan	163	weapon	melee	common	16767	8
	1c5ca042-d823-4bce-80db-8523da4cbb31		Vampiric Scythe	220	weapon	melee	epic	24191	3
	231d9dc5-b5e8-46d2-8252-847921c5a0e6		Divine Katana	179	weapon	melee	common	17930	15
	54ca09d8-190c-4c15-895b-ed0bdaeb188b		Vampiric Claymore of the Lantern	189	weapon	melee	common	11322	10
	02a96cab-cb89-4c1f-8a5a-b57434545163		Shimmering the Abyss Cutlass	221	weapon	melee	epic	22716	13
	8ceea55c-999e-4055-a4ea-6dfcbb4915d8		Rapier of the Dragon	264	weapon	melee	epic	27863	0
	22018414-5e69-47f2-8cdc-as4f8dd10558		Brutal the Storm Spear	251	weapon	melee	common	25110	7
	f5306277-138b-4b53-9f24-394c10a437d6		Ancient the Fallen Axe	117	weapon	melee	epic	12695	0
	a356ee36-88dd-48d0-a5fd-3d574df7827c		Demonic Rapier of the Dawn	135	weapon	melee	epic	14383	0
	1c1e7f8a-451b-431d-2402-c8b8b81		Savage Mace	168	weapon	melee	epic	15170	7
	fcf04acfc-f490-4320-af66-6ba53fa9809e		Savage Blade of the Star	262	weapon	melee	common	20840	0
	bcb1b854-5bab-4b42-b736-f2cb4afeb4cf		Wicked the Dragon Spear	259	weapon	melee	common	27741	20
	0bf00ffa-c0a7-4dff-bccb-fae919f3cc38		Mace of the Storm	132	weapon	melee	common	14164	7
	d48a7613-4c27-4ded-852b-7883a75cb0cd		Dragon's the Inferno Blade	143	weapon	melee	epic	15555	8
	0cca562a-5506-4264-9de7-51ea7b6a24b4		Doomed Flail	295	weapon	melee	epic	31953	17
	af5626e6-949c-4e23-8f38-d28e8c2c7fca		Thunder the Ancients Mace	150	weapon	melee	epic	15649	15
	546cc4d2-31d2-4967-8bb6-eb814e7e3557		Savage Claymore of the Lantern	144	weapon	melee	legendary	15339	16
	a905ed47-02de-4f65-be3d-03e356884e52		Brutal Halberd of the Dragon	139	weapon	melee	epic	15247	7
	a37a8912-6bfe-400e-bdc1-c89f007685c4		Hammer of the Fallen	179	weapon	melee	epic	18994	15
	0e516a77-9000-41ec-bbc9-33a7919b90e0		Vampiric Mace of the Abyss	186	weapon	melee	epic	10706	14
	ab478d50-b1e9-4caf-8b4a-9819fb9f8cac		Vampiric the Dawn Axe	256	weapon	melee	epic	26069	18
	9e7cf4c5-9022-497a-8d3a-b9ad681e8c49		Ancient Hammer of the Eclipse	189	weapon	melee	epic	19899	5
	9f49092a-247f-450b-b837-d7ad109bd9fd		Dagger of the Storm	196	weapon	melee	legendary	20478	5
	0410c2d4-f257-4b3b-848d-dfab935b883c		Hammer of the Moon	182	weapon	melee	epic	18511	1
	659882ed-b0b4-45d1-b398-30e6a50cc6f3		Rapier of the Phoenix	225	weapon	melee	common	23407	4
	12b7a6b2-60bb-4eca-ac20-112299808749		Dagger of the Night	198	weapon	melee	legendary	20057	4
	b95025df-de63-49d9-ae4f-900d54180dc5		Vampiric Halberd of the Star	143	weapon	melee	epic	14604	14
	391d9565-41a3-40d7-86a2-42a216ff552a		Thunder Axe	298	weapon	melee	legendary	32756	6
	5429c932-25e0-4443-92ec-cea00373a706		Demonic Axe	269	weapon	melee	common	28290	20
	ab0c62bd-ac74-4d83-ae51-65133d7678ba		Thunder the Night Mace	173	weapon	melee	common	18655	5
	7941f76c-9c03-4785-8e2b-4002bedca673		Flaming Hammer	214	weapon	melee	common	22031	7
	3ebc44af-a62f-4548-a79b-85234bd794f55		Ancient Claymores of the Inferno	250	weapon	melee	epic	25685	18
	4b61b0a1-a55d-489e-bb98-394cfaac71		Hammer of the Night	151	weapon	melee	epic	16049	4
	4b61b0a1-a55d-489e-bb98-394cfaac71		Hammer of the Night	151	weapon	melee	common	20919	15
	4de0aadd-b5ae-493a-855f-e3b9a9978659		Thunder the Inferno Sword	218	weapon	melee	common	22583	12
	c0833787-e827-471a-a000-b0be4c4cf1d6		Frost the Phoenix Mace	251	weapon	melee	legendary	25826	11
	09845e15-08f3-4077-8619-1b073630b0ba		Shimmering Katana	134	weapon	melee	legendary	13556	19
	29769b0f-799d-430b-a03c-9527b8a1c59e		Savage Dagger of the Lantern	220	weapon	melee	epic	23273	3
	ccc39c4-71a1-411e-b2cd-3de544aa90ef		Doomed Scythe of the Ancients	258	weapon	melee	legendary	16179	7
	8f6dae92-4c18-4a3b-be5f-b8d213f819fc		Wicked Axe of the Dragon	137	weapon	melee	legendary	25068	8
	e37163b4-035e-409f-afc5-72bbbbcddc89		Frost the Lantern Katana	127	weapon	melee	common	13582	1
	9104d0f3-b638-477f-a837-ab90b3bf2e40		Halberd of the Abyss	178	weapon	melee	common	17860	14
	6c0ca295-a30c-4f66-a983-21b6a03ae43b		Radiant Dagger of the Dragon	148	weapon	melee	epic	14875	20
	0cb35fa7-534c-4789-b409-c401b5f2f44b		Ancient Blade of the Dragon	190	weapon	melee	epic	19302	7
	e8f6863a-2d82-43e4-a3c1-ba8640f35f77		Warhammer of the Phoenix	113	weapon	melee	legendary	11711	2
	1771c385-adaf-14eff-9f36-9088559de053		Bloodied Scythe	150	weapon	melee	legendary	15685	10
	72519c58-8942-40cd-ad93-117c9e04bd52		Holy Spear of the Moon	184	weapon	melee	common	10988	0
	c66c5684-7a51-443a-bfa0-36e7f9b010ee		Enchanted the Storm Dagger	188	weapon	melee	legendary	20654	3
	5e63fa7c-419a-468a-856e-30e28fd4d444		Divine Halberd of the Dragon	140	weapon	melee	common	15236	10
	6da7285-4976-433a-bc0b-d0b082abb2c8		Spear of the Dawn	193	weapon	melee	legendary	20934	16
	8f7bbe5f-f842-4d5d-9ab3-7af1f24d5a2a		Demonic Flail of the Void	179	weapon	melee	legendary	18329	3
	0088a207-0965-4559-b33f-3d238cc307c8		Flaming the Ancients Hammer	144	weapon	melee	epic	15084	12
	b5418bc2-3926-4b31-8d0c-8daf1f505ba1		Radiant Mace	222	weapon	melee	epic	23838	9
	c90328a2-d813-4682-96da-9c62ba8fde17		Sword of the Star	164	weapon	melee	legendary	17687	1
	61838f7c-3046-464a-8b4e-8117ec5a7136		Dagger of the Titan	145	weapon	melee	epic	14503	18
	3be434c-f159-4cca-b706-e3a22b0bc817		Dragon's the Dawn Sword	160	weapon	melee	legendary	16038	11
	4a14593-4031-4817-ea32-2780bc7e30		Wicked the Dragon	149	weapon	melee	common	16012	1
	9ba555b5-c80d-4a8d-aeef-7a186d61c740		Katana of the Eclipse	255	weapon	melee	common	27410	20
	cb25e923-0083-422f-b47f-908d07c746d0		Cursed Flail of the Storm	241	weapon	melee	common	25702	13
	053596c8-7850-49bc-0d28-918b95c9583f		Sword of the Ancients	254	weapon	melee	legendary	26556	6
	ef4dad67-bfed-4a77-8637-d7b457cf3b0		Claymore of the Phoenix	180	weapon	melee	common	11372	12
	7083d963-e884-4094-abc9-5e36a9800edf		Shadow the Fallen Mace	191	weapon	melee	legendary	20278	16
	3fc3ccce-ee3f-49c2-9f6f-cc3808285df6		Flaming Katana of the Storm	287	weapon	melee	epic	29908	1
	(69 rows)								
Time: 8.986 ms									
projectdb=#									

8. Postacie z HP większym niż 300 000.

[illegible]

```

projectdb=# \timing on
Timing is on.
projectdb=# SELECT * FROM playerCharacters
WHERE hp::int > 300000;
Time: 1.484 ms
projectdb=#

```

## Podsumowanie czasowe

### Tabela

	ZAP1	ZAP2	ZAP3	ZAP4	ZAP5	ZAP6	ZAP7	ZAP8
<b>NoSQL</b>	160ms	158ms	145ms	152ms	107ms	84ms	127ms	148ms
<b>JSONB</b>	11,985 ms	25,336 ms	0,88ms	3,10ms	1,57ms	1,44ms	1,44ms	25,554 ms
<b>JSON na tabelę</b>	5,28ms	2,186 ms	3,399 ms	0,652 ms (błąd)	1,828 ms	4,544 ms	8,986 ms	1,484 ms

## Wnioski

Na podstawie pomiarów czasów wykonania zapytań w trzech wariantach przechowywania danych – NoSQL (MongoDB), PostgreSQL z kolumnami JSONB oraz PostgreSQL z konwersją JSON na klasyczne tabele – można sformułować następujące obserwacje:

### MongoDB (NoSQL):

Ogólnie charakteryzuje się bardzo niskimi i stabilnymi czasami odpowiedzi (w zakresie 84–160 ms).

Doskonale radzi sobie z prostym i szybkim dostępem do danych, co potwierdza jego przydatność w zastosowaniach, gdzie ważna jest szybkość reakcji.

### PostgreSQL z kolumnami typu JSONB:

Czas odpowiedzi w przypadku niektórych zapytań (np. ZAP1, ZAP2, ZAP8) jest znacznie wyższy niż w pozostałych podejściach, osiągając nawet 25 sekund.

Najlepiej sprawdza się przy zapytaniach analizujących dane częściowo zagnieżdżone lub wymagających pracy na strukturze JSON, ale ogólnie prezentuje niestabilną wydajność.

### PostgreSQL z konwersją JSON na klasyczne tabele (relacyjne):

W większości przypadków oferuje najkrótszy czas odpowiedzi spośród trzech podejść.

Ujawniono pojedyncze przypadki problemów z błędem w zapytaniu (ZAP4), co może wynikać z nieprawidłowego odwzorowania danych w tabeli.

### **Porównanie ogólne:**

Najbardziej spójne i stabilne czasy zapewnia MongoDB – idealne do szybkich odczytów.

Największe problemy z wydajnością odnotowano w JSONB, gdzie niektóre zapytania są zdecydowanie zbyt wolne (np. ZAP2 – 25,336 ms, ZAP8 – 25,554 ms).

Najlepszy kompromis między wydajnością a elastycznością struktury danych zapewnia wariant z konwersją do tabel – przy poprawnym zaprojektowaniu schematu danych relacyjnych.

### **Skrypty użyte w trakcie projektu:**

**jsonGen.py** – został stworzony w celu automatycznego generowania danych testowych w formacie JSON dla bazy danych gry RPG, zgodnie z zaprojektowanym modelem dokumentowym. Skrypt odpowiada za przygotowanie instancji dokumentów dla wszystkich 16 typów danych używanych w projekcie. Dane są zapisywane w odpowiednich folderach w katalogu ../jsonInstances/.

**import\_jsonl\_fixed.ps1** – został przygotowany w celu automatycznego zaimportowania danych w formacie .jsonl do odpowiednich tabel PostgreSQL, które zostały wcześniej utworzone z kolumną typu JSONB.

**import-csv-final.ps1** – został przygotowany do automatycznego importu danych CSV do wcześniej utworzonych tabel PostgreSQL w klasycznym, relacyjnym modelu danych – czyli zgodnie z punktem 4.3 projektu (konwersja JSON na kolumny tabeli).

**Plik create\_tables\_4\_3\_clean.sql** – zawiera definicje wszystkich tabel PostgreSQL, przygotowanych zgodnie z podejściem 4.3 projektu – czyli z konwersją danych JSON na strukturę relacyjną. Każda tabela została zaprojektowana tak, aby dokładnie odwzorować strukturę pól oryginalnych dokumentów JSON.

**Plik `create_jsonb_tables.sql`** - zawiera definicje wszystkich tabel PostgreSQL, które zostały zaprojektowane w celu przechowywania danych w formacie JSONB. Każda tabela odpowiada jednemu typowi dokumentu JSON wygenerowanemu w projekcie.