Slovenská technická univerzita v Bratislave

Fakulta informatiky a informačných technológií

Ilkovičova 2, 842 16 Bratislava 4

Analytický report

Service Hero

**Dávid Majerčák**

Študijný program: Informatika

Ročník: 2

Predmet: Databázové systémy a algoritmy

Vedúci projektu: Ing. Tomáš Kramár

Ak. rok: 2016/2017

# Úvod

Cieľom projektu je vytvorenie aplikácie pre rezervovanie si verejne ponúkaných služieb. Vzhľadom k účelu projekt získal meno **Service Hero**.

Projekt je vyvíjaný v programovacom jazyku Ruby s využitím frameworku Rails vo verzii 5.0.2. Tento framework sprostredkováva ORM (Object Relational Mapping), ktoré vývojárovi uľahčuje prácu s databázov a umožňuje vyššiu úroveň abstrakcie nad dátami.

# Generovanie Dát

## Použité nástroje

Na generovanie dát bol vyžitý súbor **seed.rb**, ktorý je súčasťou každého projektu vytvoreného cez framework Rails. Tento slúži na prvotné naplnenie databázy údajmi, avšak nedokáže vytvárať hodnoty pre riadky v tabuľke. Tie si musí vývojár napísať sám. Presunutie údajov z tohto súboru do tabuľky je záležitosťou spustenia príkazu **rails db:seed**.

Písať však dáta pre tabuľky aby mali vhodnú testovaciu hodnotu je ručne takmer nemožné a v prípade ak by aj bolo je to časovo nevýhodné a neefektívne riešenie.

V tomto ohľade bolo výhodné použiť externú knižnicu **Faker**, nachádzajúcu sa na portáli Git Hub na adrese <https://github.com/stympy/faker>*.* Pomocou tejto knižnice sa dajú generovať vierohodné dáta, ktoré sú vhodné či už na otestovanie aplikácie ako celku alebo výkonnosti databázy a celkovú pripravenosť projektu do produkcie. Jeho inštalácia pozostáva z nainštalovania pomocou balíkovacieho manažéra **gem**, nasledujúcim príkazom gem install faker.

## Spôsob generovania dát

Pomocou vyššie spomenutých nástrojov sa generovanie stáva triviálnym avšak zdĺhavým procesom. Nižšie môžete vidieť generovanie dát do tabuľky *customers*.

100000.times do

  # GENERATE CUSTOMERS AND RELATIONSHIPS

  # Create addresses for the customer

  address\_customer1 = Address.create!(

      name: Faker::Name.name\_with\_middle,

      street: Faker::Address.street\_address,

      city: Faker::Address.city,

      ZIP: Faker::Address.zip\_code,

      state: Faker::Address.state,

      country: Faker::Address.country,

      phone: Faker::PhoneNumber.cell\_phone

  )

  addresses.append(address\_customer1)

  address\_customer2 = Address.create!(

      name: Faker::Name.name\_with\_middle,

      street: Faker::Address.street\_address,

      city: Faker::Address.city,

      ZIP: Faker::Address.zip\_code,

      state: Faker::Address.state,

      country: Faker::Address.country,

      phone: Faker::PhoneNumber.cell\_phone

  )

  addresses.append(address\_customer2)

  customer\_name = Faker::Name.name\_with\_middle

  customers.append(Customer.create!(

      billing\_address\_id: address\_customer1.id,

      shipping\_address\_id: address\_customer2.id,

      email: Faker::Internet.email(customer\_name),

      password\_digest: Faker::Internet.password,

      name: customer\_name,

      date\_joined: Faker::Date.between(10.year.ago, Date.today)

  ))

end

Tento kód vytvoril stotisíc riadkov v tabuľke *customers* ale zároveň aj dvestotisíc riadkov v tabuľke *addresses*. Tento spôsob bol použitý aj na generovanie všetkých ostatných dát, spolu s prepojením na cudzie kľúče.

Generátor údajov môžete nájsť v projekte na portáli Git Hub v priečinku **db** a v súbore **seed.rb**.

# Tabuľky

## Početnosť riadkov v tabuľkách

Množstvo vygenerovaných údaj do tabuliek bolo vo väčšine náhodné v rozmedzí vopred určených hodnôt aby čo najdôvernejšie odzrkadľovali realitu v produkcii. Prehľad početností môžete vidieť nižšie (viď.: Tabuľka početností 1).

|  |  |
| --- | --- |
| Meno tabuľky | Počet riadkov |
| addresses | 306312 |
| administrators | 1 |
| business\_business\_owners | 8409 |
| business\_owners | 8410 |
| business\_service\_orders | 2217580 |
| business\_services | 40069 |
| businesses | 5850 |
| customers | 100000 |
| documents | 1193521 |
| employees | 38894 |
| orders | 369856 |
| services | 40069 |

Tabuľka početností

## Numerické atribúty tabuliek

Táto kapitola obsahuje všetky tabuľky, ktoré obsahujú numerické atribúty a opisuje ich najdôležitejšie vlastnosti. Medzi najdôležitejšie patrí minimum, maximum a priemer týchto číselných hodnôt. Pre lepšiu presnosť a detaily o dátach sú uvedené aj informácie ako horný a dolný kvartil a medián hodnôt.

### business\_business\_owners

|  |  |  |
| --- | --- | --- |
| business\_id | Hodnota | Query |
| Minimum | 1 | SELECT min(business\_business\_owners.business\_id) FROM business\_business\_owners |
| Maximum | 5850 | SELECT max(business\_business\_owners.business\_id) FROM business\_business\_owners |
| Priemer | 2424.19 | SELECT avg(business\_business\_owners.business\_id) FROM business\_business\_owners |
| Dolný kvartil | 665 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY business\_business\_owners.business\_id) FROM business\_business\_owners |
| Horný kvartil | 4123 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY business\_business\_owners.business\_id) FROM business\_business\_owners |
| Medián | 2021 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY business\_business\_owners.business\_id) FROM business\_business\_owners |

|  |  |  |
| --- | --- | --- |
| business\_owner\_id | Hodnota | Query |
| Minimum | 1 | SELECT min(business\_business\_owners.business\_owner\_id) FROM business\_business\_owners |
| Maximum | 8410 | SELECT max(business\_business\_owners.business\_owner\_id) FROM business\_business\_owners |
| Priemer | 4205.62 | SELECT avg(business\_business\_owners.business\_owner\_id) FROM business\_business\_owners |
| Dolný kvartil | 2103 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY business\_business\_owners.business\_owner\_id) FROM business\_business\_owners |
| Horný kvartil | 6308 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY business\_business\_owners.business\_owner\_id) FROM business\_business\_owners |
| Medián | 4206 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY business\_business\_owners.business\_owner\_id) FROM business\_business\_owners |

### business\_owners

|  |  |  |
| --- | --- | --- |
| billing\_address\_id | Hodnota | Query |
| Minimum | 200003 | SELECT min(business\_owners.billing\_address\_id) FROM business\_owners |
| Maximum | 304051 | SELECT max(business\_owners.billing\_address\_id) FROM business\_owners |
| Priemer | 223147.11 | SELECT avg(business\_owners.billing\_address\_id) FROM business\_owners |
| Dolný kvartil | 214790.5 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY business\_owners.billing\_address\_id) FROM business\_owners |
| Horný kvartil | 229443 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY business\_owners.billing\_address\_id) FROM business\_owners |
| Medián | 221034 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY business\_owners.billing\_address\_id) FROM business\_owners |

|  |  |  |
| --- | --- | --- |
| shipping\_address\_id | Hodnota | Query |
| Minimum | 200004 | SELECT min(business\_owners.shipping\_address\_id) FROM business\_owners |
| Maximum | 304052 | SELECT max(business\_owners.shipping\_address\_id) FROM business\_owners |
| Priemer | 223148.12 | SELECT avg(business\_owners.shipping\_address\_id) FROM business\_owners |
| Dolný kvartil | 214791.5 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY business\_owners.shipping\_address\_id) FROM business\_owners |
| Horný kvartil | 229444 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY business\_owners.shipping\_address\_id) FROM business\_owners |
| Medián | 221035 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY business\_owners.shipping\_address\_id) FROM business\_owners |

### business\_service\_orders

|  |  |  |
| --- | --- | --- |
| business\_service\_id | Hodnota | Query |
| Minimum | 1 | SELECT min(business\_service\_orders.business\_service\_id) FROM business\_service\_orders |
| Maximum | 40068 | SELECT max(business\_service\_orders.business\_service\_id) FROM business\_service\_orders |
| Priemer | 16530.60 | SELECT avg(business\_service\_orders.business\_service\_id) FROM business\_service\_orders |
| Dolný kvartil | 8261 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY business\_service\_orders.business\_service\_id) FROM business\_service\_orders |
| Horný kvartil | 21332 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY business\_service\_orders.business\_service\_id) FROM business\_service\_orders |
| Medián | 18521 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY business\_service\_orders.business\_service\_id) FROM business\_service\_orders |

|  |  |  |
| --- | --- | --- |
| order\_id | Hodnota | Query |
| Minimum | 1 | SELECT min(business\_service\_orders.order\_id) FROM business\_service\_orders |
| Maximum | 369856 | SELECT max(business\_service\_orders.order\_id) FROM business\_service\_orders |
| Priemer | 184807.62 | SELECT avg(business\_service\_orders.order\_id) FROM business\_service\_orders |
| Dolný kvartil | 92248 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY business\_service\_orders.order\_id) FROM business\_service\_orders |
| Horný kvartil | 277247.25 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY business\_service\_orders.order\_id) FROM business\_service\_orders |
| Medián | 184909 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY business\_service\_orders.order\_id) FROM business\_service\_orders |

### business\_services

|  |  |  |
| --- | --- | --- |
| business\_id | Hodnota | Query |
| Minimum | 1 | SELECT min(business\_services.business\_id) FROM business\_services |
| Maximum | 5850 | SELECT max(business\_services.business\_id) FROM business\_services |
| Priemer | 5697.99 | SELECT avg(business\_services.business\_id) FROM business\_services |
| Dolný kvartil | 5845 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY business\_services.business\_id) FROM business\_services |
| Horný kvartil | 5849 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY business\_services.business\_id) FROM business\_services |
| Medián | 5848 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY business\_services.business\_id) FROM business\_services |

|  |  |  |
| --- | --- | --- |
| service\_id | Hodnota | Query |
| Minimum | 1 | SELECT min(business\_services.service\_id) FROM business\_services |
| Maximum | 40069 | SELECT max(business\_services.service\_id) FROM business\_services |
| Priemer | 20035.00 | SELECT avg(business\_services.service\_id) FROM business\_services |
| Dolný kvartil | 10018 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY business\_services.service\_id) FROM business\_services |
| Horný kvartil | 30052 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY business\_services.service\_id) FROM business\_services |
| Medián | 20035 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY business\_services.service\_id) FROM business\_services |

|  |  |  |
| --- | --- | --- |
| price | Hodnota | Query |
| Minimum | 0.01 | SELECT min(business\_services.price) FROM business\_services |
| Maximum | 999.89 | SELECT max(business\_services.price) FROM business\_services |
| Priemer | 205.60 | SELECT avg(business\_services.price) FROM business\_services |
| Dolný kvartil | 7.43 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY business\_services.price) FROM business\_services |
| Horný kvartil | 328.13 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY business\_services.price) FROM business\_services |
| Medián | 55.73 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY business\_services.price) FROM business\_services |

### businesses

|  |  |  |
| --- | --- | --- |
| billing\_address\_id | Hodnota | Query |
| Minimum | 200001 | SELECT min(businesses.billing\_address\_id) FROM businesses |
| Maximum | 303973 | SELECT max(businesses.billing\_address\_id) FROM businesses |
| Priemer | 223793.35 | SELECT avg(businesses.billing\_address\_id) FROM businesses |
| Dolný kvartil | 218803 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY businesses.billing\_address\_id) FROM businesses |
| Horný kvartil | 230501 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY businesses.billing\_address\_id) FROM businesses |
| Medián | 224652 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY businesses.billing\_address\_id) FROM businesses |

|  |  |  |
| --- | --- | --- |
| shipping\_address\_id | Hodnota | Query |
| Minimum | 200002 | SELECT min(businesses.shipping\_address\_id) FROM businesses |
| Maximum | 303974 | SELECT max(businesses.shipping\_address\_id) FROM businesses |
| Priemer | 223794.35 | SELECT avg(businesses.shipping\_address\_id) FROM businesses |
| Dolný kvartil | 218804 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY businesses.shipping\_address\_id) FROM businesses |
| Horný kvartil | 230502 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY businesses.shipping\_address\_id) FROM businesses |
| Medián | 224653 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY businesses.shipping\_address\_id) FROM businesses |

|  |  |  |
| --- | --- | --- |
| administrator\_id | Hodnota | Query |
| Minimum | 1 | SELECT min(businesses.administrator\_id) FROM businesses |
| Maximum | 1 | SELECT max(businesses.administrator\_id) FROM businesses |
| Priemer | 1 | SELECT avg(businesses.administrator\_id) FROM businesses |
| Dolný kvartil | 1 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY businesses.administrator\_id) FROM businesses |
| Horný kvartil | 1 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY businesses.administrator\_id) FROM businesses |
| Medián | 1 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY businesses.administrator\_id) FROM businesses |

### customers

|  |  |  |
| --- | --- | --- |
| billing\_address\_id | Hodnota | Query |
| Minimum | 1 | SELECT min(customers.billing\_address\_id) FROM customers |
| Maximum | 199999 | SELECT max(customers.billing\_address\_id) FROM customers |
| Priemer | 100000 | SELECT avg(customers.billing\_address\_id) FROM customers |
| Dolný kvartil | 50000.5 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY customers.billing\_address\_id) FROM customers |
| Horný kvartil | 149999.5 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY customers.billing\_address\_id) FROM customers |
| Medián | 100000 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY customers.billing\_address\_id) FROM customers |

|  |  |  |
| --- | --- | --- |
| shipping\_address\_id | Hodnota | Query |
| Minimum | 2 | SELECT min(customers.shipping\_address\_id) FROM customers |
| Maximum | 200000 | SELECT max(customers.shipping\_address\_id) FROM customers |
| Priemer | 100001 | SELECT avg(customers.shipping\_address\_id) FROM customers |
| Dolný kvartil | 50001.5 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY customers.shipping\_address\_id) FROM customers |
| Horný kvartil | 150000.5 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY customers.shipping\_address\_id) FROM customers |
| Medián | 100001 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY customers.shipping\_address\_id) FROM customers |

### documents

|  |  |  |
| --- | --- | --- |
| documentable\_id | Hodnota | Query |
| Minimum | 1 | SELECT min(documents.documentable\_id) FROM documents |
| Maximum | 110961 | SELECT max(documents.documentable\_id) FROM documents |
| Priemer | 15515.09 | SELECT avg(documents.documentable\_id) FROM documents |
| Dolný kvartil | 49 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY documents.documentable\_id) FROM documents |
| Horný kvartil | 13089 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY documents.documentable\_id) FROM documents |
| Medián | 670 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY documents.documentable\_id) FROM documents |

### employees

|  |  |  |
| --- | --- | --- |
| business\_id | Hodnota | Query |
| Minimum | 1 | SELECT min(employees.business\_id) FROM employees |
| Maximum | 5850 | SELECT max(employees.business\_id) FROM employees |
| Priemer | 5202.23 | SELECT avg(employees.business\_id) FROM employees |
| Dolný kvartil | 5844 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY employees.business\_id) FROM employees |
| Horný kvartil | 5849 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY employees.business\_id) FROM employees |
| Medián | 5847 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY employees.business\_id) FROM employees |

|  |  |  |
| --- | --- | --- |
| billing\_address\_id | Hodnota | Query |
| Minimum | 200157 | SELECT min(employees.billing\_address\_id) FROM employees |
| Maximum | 306311 | SELECT max(employees.billing\_address\_id) FROM employees |
| Priemer | 264063.11 | SELECT avg(employees.billing\_address\_id) FROM employees |
| Dolný kvartil | 247419.5 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY employees.billing\_address\_id) FROM employees |
| Horný kvartil | 286784.5 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY employees.billing\_address\_id) FROM employees |
| Medián | 267182 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY employees.billing\_address\_id) FROM employees |

|  |  |  |
| --- | --- | --- |
| shipping\_address\_id | Hodnota | Query |
| Minimum | 200158 | SELECT min(employees.shipping\_address\_id) FROM employees |
| Maximum | 306312 | SELECT max(employees.shipping\_address\_id) FROM employees |
| Priemer | 264064.11 | SELECT avg(employees.shipping\_address\_id) FROM employees |
| Dolný kvartil | 247420.5 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY employees.shipping\_address\_id) FROM employees |
| Horný kvartil | 286785.5 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY employees.shipping\_address\_id) FROM employees |
| Medián | 267183 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY employees.shipping\_address\_id) FROM employees |

### orders

|  |  |  |
| --- | --- | --- |
| customer\_id | Hodnota | Query |
| Minimum | 1 | SELECT min(orders.customer\_id) FROM orders |
| Maximum | 99999 | SELECT max(orders.customer\_id) FROM orders |
| Priemer | 50000.47 | SELECT avg(orders.customer\_id) FROM orders |
| Dolný kvartil | 24962 | SELECT percentile\_cont(0.25) WITHIN GROUP (ORDER BY orders.customer\_id) FROM orders |
| Horný kvartil | 75011 | SELECT percentile\_cont(0.75) WITHIN GROUP (ORDER BY orders.customer\_id) FROM orders |
| Medián | 50059 | SELECT percentile\_cont(0.5) WITHIN GROUP (ORDER BY orders.customer\_id) FROM orders |

## Nominálne atribúty tabuliek

Táto kapitola obsahuje informácie o nominálnych atribútoch v tabuľkách v databáze aplikácie určenej pre vývoj. Boli vybraté iba tabuľky v ktorých sa nachádza viac ako milión riadkov, pretože každá tabuľka obsahuje takýchto atribútov veľmi veľké množstvo a pre vývoj a testovanie nám stačí mať informácie o tej, ktorá bude mať najvyššie požiadavky na pamäť a výkon.

### business\_service\_order

**QUERY:** SELECT business\_service\_orders.label, count(\*) FROM business\_service\_orders GROUP BY 1

|  |  |
| --- | --- |
| label | Početnosť |
| recusandae | 8937 |
| nemo | 8737 |
| cumque | 8945 |
| amet | 8820 |
| voluptatem | 35481 |
| commodi | 8933 |
| alias | 8787 |
| temporibus | 8889 |
| nesciunt | 9064 |
| placeat | 8707 |
| ex | 9014 |
| possimus | 8829 |
| voluptatum | 9041 |
| reprehenderit | 8917 |
| ipsam | 8925 |
| molestias | 8897 |
| sequi | 9102 |
| modi | 8911 |
| maxime | 8746 |
| maiores | 9057 |
| inventore | 9094 |
| laudantium | 8877 |
| ipsa | 8934 |
| veniam | 9025 |
| nisi | 8808 |
| itaque | 8913 |
| magnam | 8894 |
| iusto | 8968 |
| odio | 8953 |
| tempore | 8987 |
| exercitationem | 8894 |
| impedit | 8878 |
| illo | 9024 |
| incidunt | 8927 |
| perspiciatis | 8950 |
| repudiandae | 8894 |
| dolores | 17903 |
| esse | 8939 |
| in | 17593 |
| ea | 17911 |
| ad | 8842 |
| porro | 8850 |
| consectetur | 8632 |
| quaerat | 9049 |
| optio | 8833 |
| quis | 17811 |
| corporis | 8840 |
| aliquam | 9016 |
| blanditiis | 9004 |
| praesentium | 8825 |
| eos | 17888 |
| cum | 8778 |
| dolore | 8953 |
| qui | 53445 |
| delectus | 8865 |
| voluptas | 26572 |
| culpa | 8722 |
| nostrum | 8872 |
| dignissimos | 8938 |
| expedita | 9209 |
| sint | 17995 |
| quas | 8747 |
| rerum | 26858 |
| iure | 8938 |
| quasi | 8968 |
| eum | 17896 |
| vitae | 8859 |
| non | 26682 |
| repellendus | 8948 |
| dolor | 17865 |
| excepturi | 8714 |
| deserunt | 8812 |
| facere | 8846 |
| quod | 8860 |
| quae | 9016 |
| nulla | 8890 |
| et | 98599 |
| dolorum | 8758 |
| iste | 8945 |
| quibusdam | 8679 |
| officiis | 8837 |
| quisquam | 8807 |
| omnis | 26924 |
| consequatur | 26909 |
| minus | 8903 |
| fugit | 9032 |
| repellat | 8742 |
| fuga | 8958 |
| consequuntur | 8907 |
| beatae | 8760 |
| enim | 17716 |
| corrupti | 9042 |
| quidem | 9002 |
| quia | 35658 |
| asperiores | 8861 |
| autem | 17867 |
| sed | 26932 |
| voluptate | 8890 |
| pariatur | 8722 |
| sit | 26859 |
| necessitatibus | 8880 |
| atque | 8866 |
| tenetur | 8812 |
| animi | 9046 |
| velit | 17793 |
| occaecati | 8899 |
| eaque | 8823 |
| aut | 53769 |
| aperiam | 8918 |
| tempora | 8882 |
| numquam | 8723 |
| nihil | 17940 |
| provident | 8913 |
| labore | 8925 |
| doloribus | 8853 |
| assumenda | 8845 |
| officia | 8683 |
| illum | 8914 |
| rem | 8899 |
| libero | 8720 |
| nam | 8856 |
| facilis | 8964 |
| quam | 8956 |
| eligendi | 8809 |
| distinctio | 8820 |
| magni | 8826 |
| ducimus | 8976 |
| a | 8940 |
| dicta | 8942 |
| hic | 8924 |
| soluta | 9012 |
| at | 8871 |
| deleniti | 9004 |
| saepe | 8996 |
| ipsum | 9034 |
| odit | 8868 |
| ullam | 9017 |
| veritatis | 8870 |
| ab | 8804 |
| suscipit | 8700 |
| natus | 8841 |
| sunt | 17893 |
| dolorem | 17810 |
| aspernatur | 8912 |
| reiciendis | 8850 |
| debitis | 8915 |
| voluptatibus | 8910 |
| accusantium | 8998 |
| cupiditate | 8827 |
| unde | 8762 |
| sapiente | 8847 |
| harum | 8834 |
| adipisci | 8780 |
| laborum | 8992 |
| similique | 8865 |
| mollitia | 8792 |
| doloremque | 9034 |
| est | 44063 |
| totam | 9018 |
| eveniet | 8984 |
| aliquid | 8783 |
| earum | 8989 |
| error | 8872 |
| laboriosam | 8960 |
| vel | 17787 |
| perferendis | 9017 |
| molestiae | 17925 |
| vero | 8857 |
| accusamus | 8859 |
| quos | 8917 |
| fugiat | 8970 |
| nobis | 9014 |
| quo | 17979 |
| ratione | 8821 |
| eius | 8830 |
| ut | 53607 |
| voluptates | 8861 |
| id | 17631 |
| explicabo | 8685 |
| minima | 8913 |
| neque | 8951 |
| architecto | 8881 |

**QUERY:** SELECT extract(year from business\_service\_orders.date\_created), count(\*) FROM business\_service\_orders GROUP BY 1 ORDER BY 2 DESC

|  |  |
| --- | --- |
| Rok | Početnosť |
| 2014 | 687835 |
| 2013 | 426779 |
| 2012 | 299760 |
| 2015 | 291907 |
| 2011 | 211842 |
| 2010 | 146615 |
| 2009 | 93595 |
| 2008 | 48527 |
| 2007 | 10720 |

**QUERY:** SELECT extract(month from business\_service\_orders.date\_created), count(\*) FROM business\_service\_orders GROUP BY 1 ORDER BY 2 DESC

|  |  |
| --- | --- |
| Mesiac | Početnosť |
| 3 | 251121 |
| 1 | 219591 |
| 2 | 214280 |
| 12 | 206105 |
| 11 | 189314 |
| 10 | 186195 |
| 9 | 172269 |
| 8 | 170052 |
| 7 | 163742 |
| 6 | 153119 |
| 5 | 151617 |
| 4 | 140175 |

### documents

**QUERY:** SELECT documents.documentable\_type, count(\*) FROM documents GROUP BY 1 ORDER BY 1

|  |  |
| --- | --- |
| Názov entity | Početnosť |
| Administrator | 170718 |
| Business | 171264 |
| BusinessOwner | 171289 |
| BusinessService | 169902 |
| BusinessServiceOrder | 169836 |
| Customer | 170758 |
| Employee | 169754 |

**QUERY:** SELECT documents.label, count(\*) FROM documents GROUP BY 1 ORDER BY 2 DESC

|  |  |
| --- | --- |
| Label | Početnosť |
| et | 52654 |
| aut | 28690 |
| qui | 28551 |
| ut | 28302 |
| est | 23943 |
| voluptatem | 19167 |
| quia | 19138 |
| non | 14560 |
| sit | 14345 |
| omnis | 14334 |
| rerum | 14310 |
| sed | 14309 |
| voluptas | 14287 |
| consequatur | 14259 |
| ea | 9770 |
| quis | 9730 |
| velit | 9724 |
| sint | 9647 |
| dolorem | 9614 |
| vel | 9596 |
| quo | 9578 |
| dolores | 9573 |
| sunt | 9572 |
| enim | 9554 |
| molestiae | 9533 |
| eos | 9533 |
| in | 9510 |
| nihil | 9466 |
| id | 9453 |
| eum | 9448 |
| autem | 9430 |
| dolor | 9348 |
| magni | 4978 |
| iusto | 4942 |
| repellat | 4941 |
| delectus | 4930 |
| similique | 4928 |
| accusamus | 4915 |
| maiores | 4909 |
| debitis | 4903 |
| eveniet | 4897 |
| natus | 4896 |
| a | 4893 |
| consequuntur | 4890 |
| blanditiis | 4890 |
| asperiores | 4890 |
| soluta | 4886 |
| saepe | 4883 |
| voluptatibus | 4883 |
| fuga | 4881 |
| accusantium | 4880 |
| explicabo | 4878 |
| nobis | 4878 |
| laboriosam | 4876 |
| aspernatur | 4874 |
| nemo | 4872 |
| reprehenderit | 4872 |
| suscipit | 4870 |
| nulla | 4870 |
| ratione | 4866 |
| cupiditate | 4865 |
| recusandae | 4864 |
| necessitatibus | 4864 |
| ab | 4863 |
| porro | 4862 |
| vitae | 4861 |
| nam | 4859 |
| sequi | 4858 |
| nostrum | 4856 |
| facilis | 4855 |
| quae | 4854 |
| assumenda | 4852 |
| deleniti | 4849 |
| tempora | 4846 |
| aliquid | 4844 |
| quibusdam | 4844 |
| minus | 4842 |
| optio | 4842 |
| odit | 4842 |
| occaecati | 4841 |
| fugiat | 4840 |
| illum | 4838 |
| architecto | 4838 |
| nesciunt | 4837 |
| ipsum | 4834 |
| excepturi | 4832 |
| tenetur | 4831 |
| unde | 4830 |
| distinctio | 4828 |
| quam | 4828 |
| rem | 4828 |
| aperiam | 4825 |
| inventore | 4824 |
| veritatis | 4823 |
| amet | 4823 |
| quidem | 4823 |
| at | 4822 |
| aliquam | 4821 |
| vero | 4820 |
| ipsam | 4818 |
| corporis | 4816 |
| corrupti | 4814 |
| labore | 4813 |
| nisi | 4813 |
| minima | 4811 |
| dolore | 4809 |
| ex | 4806 |
| facere | 4806 |
| eligendi | 4805 |
| repudiandae | 4805 |
| odio | 4803 |
| ducimus | 4802 |
| impedit | 4800 |
| deserunt | 4800 |
| ullam | 4800 |
| quisquam | 4799 |
| commodi | 4796 |
| itaque | 4796 |
| possimus | 4796 |
| dignissimos | 4795 |
| magnam | 4794 |
| doloremque | 4793 |
| numquam | 4792 |
| eius | 4791 |
| esse | 4789 |
| doloribus | 4786 |
| dolorum | 4785 |
| officia | 4784 |
| praesentium | 4783 |
| tempore | 4783 |
| maxime | 4782 |
| voluptates | 4781 |
| dicta | 4780 |
| quaerat | 4779 |
| atque | 4777 |
| ipsa | 4777 |
| provident | 4776 |
| illo | 4776 |
| quasi | 4774 |
| iste | 4771 |
| fugit | 4768 |
| expedita | 4766 |
| harum | 4765 |
| exercitationem | 4762 |
| perferendis | 4761 |
| eaque | 4756 |
| earum | 4755 |
| cumque | 4752 |
| alias | 4751 |
| neque | 4748 |
| consectetur | 4746 |
| voluptate | 4745 |
| modi | 4745 |
| beatae | 4743 |
| hic | 4743 |
| perspiciatis | 4738 |
| ad | 4736 |
| temporibus | 4735 |
| placeat | 4735 |
| sapiente | 4733 |
| quos | 4733 |
| reiciendis | 4731 |
| molestias | 4730 |
| adipisci | 4728 |
| voluptatum | 4722 |
| repellendus | 4719 |
| laudantium | 4716 |
| veniam | 4704 |
| pariatur | 4703 |
| animi | 4701 |
| totam | 4697 |
| iure | 4694 |
| quas | 4682 |
| mollitia | 4679 |
| incidunt | 4679 |
| officiis | 4674 |
| laborum | 4670 |
| culpa | 4668 |
| error | 4668 |
| quod | 4646 |
| cum | 4625 |
| libero | 4605 |
| First Document | 1 |

# Záver

Splnením zadania sa mi podarilo vytvoriť základnú kostru projektu podľa skôr definovaného modelu. Tento datábázový model som naplnil testovacími údajmi, ktoré budú veľkou oporou pri ďalšom vypracovávaní projektu a zároveň pomôžu aj definovať hranice scenárov vzhľadom na náročnosť operácií.

Rôznorodosť údajov bola overená štatistickými nástrojmi ponúkanými priamo databázovým systémom Postgres. Medzi tieto patril pri numerických hodnotách horný a dolný kvartil ale aj medián. Využité však boli aj triviálne metódy ako sú pri číselných hodnotách napríklad minimum, maximum a priemer.

Pri nominálnych hodnotách sa dalo overiť koľko rôznych hodnôt nadobúda určitý stĺpec a aká je početnosť jednotlivých hodnôt. Metóda bola nápomocná pri overovaní programu na generovanie dát.

Zistili sme, že vygenerované dáta sú v súlade s požiadavkami, to znamená, že sa neopakajú príliš často alebo vôbec, a zároveň sú dobrým podkladom pre budúci vývoj riešenia vzhľadom na ich početnosť.