

fsig-students - ćwiczenia

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March 2020

1 Logowanie do serwera

Ćwiczenia odbywają się na serwerze: fsig-students.ocean.icm.edu.pl , który jest dostępny z sieci ICM. Aby zalogować się do serwera spoza sieci ICM należy wpierw zalogować się do serwera: login.icm.edu.pl (za pomocą studenckiego loginu) a następnie na serwer docelowy.
Do podłączenia wymagany jest klient SSH, np.:

- linux/unix: openssh-clients
- windows: putty, openssh

Przykład połączenia spoza sieci ICM:

```
login@alucard[12:45:55]:~$ ssh loginname@login.icm.edu.pl
loginname@login.icm.edu.pl's password:
Last login: Thu Mar 26 09:32:25 2020 from 1.2.3.4
#####
#                                     #
#      |   _ )       _               |           |   #
#      | _ \ _ '    | | __ \   __ | __ ' _ \   | | |   #
#      | ( | ( | | | | ( | | |   _ / ( | | | | | |   #
#      _|\___/\__ , | |_|_|_||_\___|_|_|_|_|\___\|_|) ._/ |_ #
#              |___/                               _|   #
#                                                         #
#####
#          ICM nie wysyla do uzytkownikow maili z prosba o podanie hasla #
#          ani innych danych, ew. takie listy to falszywki             #
#####
Uruchamianie jakichkolwiek zadani obliczeniowych na wezle dostepowym bedzie skutkowac ich bezwarunkowym zabijaniem. Do prowadzenia obliczen prosze uzywac klastra obliczeniowego oraz systemu kolejkowego.
#####
-----
[loginname@hpc ~]$ ssh loginname@fsig-students.ocean.icm.edu.pl
The authenticity of host 'fsig-students.ocean.icm.edu.pl (213.135.60.239)' can't be established.
ECDSA key fingerprint is SHA256:8ytIzJOQ12fADZH0sQ3VgXfz7UqjHM4St4/Sn+oQMUMU.
ECDSA key fingerprint is MD5:95:26:8d:da:ad:7e:10:e3:87:4d:6b:aa:f2:cf:cc:ba.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'fsig-students.ocean.icm.edu.pl,213.135.60.239' (ECDSA) to the list of known hosts.
Welcome to Ubuntu 18.04.2 LTS (GNU/Linux 4.15.0-46-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management:   https://landscape.canonical.com
 * Support:      https://ubuntu.com/advantage


 * Canonical Livepatch is available for installation.
 - Reduce system reboots and improve kernel security. Activate at:
https://ubuntu.com/livepatch
```

Last login: Thu Mar 26 09:32:48 2020 from 213.135.60.135
loginname@fsig-students[12:46:48]:~\$

Możliwe jest połączenie bezpośrednie z serwerem z pominięciem serwera login.icm.edu.pl, jeżeli znajduje się w sieci ICM lub korzysta się z ICM'owego VPN.

2 MongoDB

2.1 Czym jest mongoDB

MongoDB jest nierelacyjna baza danych. W mongo operujemy na dokumentach. MongoDB przechowuje dane w formacie BSON - format JSON w postaci binarnej.

Table 1: Porównanie terminologii RDBMS z MongoDB.

RDBMS	MongoDB
Database	Database
Table	Collection
Row	Document
Column	field
table join	Embedded Documents
Primary key	Primary key

2.2 Logowanie do mongoDB

MongoDB podobnie jak większość baz danych umożliwia połączenie się z lini poleceń za pomocą komendy: `mongo`. W przypadku `fsig-students.ocean.icm.edu.pl` wymagana jest autoryzacja. Dane do autoryzacji:

- Użytkownik: `student`
- Hasło: `student`
- Host: `10.20.66.7`
- Baza: `fsig-raw`

Aby podłączyć się do bazy z lini poleceń należy wykonać następujące polecenie:

```
login@fsig-students[16:07:09]:~$ mongo --host 10.20.66.7 --username student --password student fsig-raw
MongoDB shell version v3.4.9
connecting to: mongodb://10.20.66.7:27017/fsig-raw
MongoDB server version: 3.4.9
```

2.3 Podstawowe komendy

2.3.1 Wyświetlenie istniejących baz danych

(trzeba mieć odpowiednie uprawnienia do wykonania tej komendy)

```
> show dbs;
admin                0.000GB
fsig-emergency       52.130GB
fsig-raw             3951.892GB
local                0.000GB
```

2.3.2 Użycie bazy danych

```
> use fsig-raw;
switched to db fsig-raw
```

2.3.3 Wyświetlenie kolekcji w bazie danych

```
> show collections;
rawFaSignals
```

2.3.4 Wyświetlenie indexów dla kolekcji

```
> db.rawFaSignals.getIndexes()
[
  {
    "v" : 2,
    "unique" : true,
    "key" : {
      "key" : 1
    },
    "name" : "key_1",
    "ns" : "fsig-raw.rawFaSignals"
  },
  .
  .
  .
  {
    "v" : 2,
    "key" : {
      "value.alt" : 1
    },
    "name" : "value.alt_1",
    "ns" : "fsig-raw.rawFaSignals",
    "background" : true
  }
]
```

2.3.5 Wyświetlenie jednego dokumentu

```
> db.rawFaSignals.findOne()
{
  "_id" : ObjectId("5a497a04870c008695942e4d"),
  "key" : "1514764800#SJY590#72592fc3bcb6e36761fb4982e3bda1dc#v2",
  "value" : {
    "pitr" : "1514764800",
    "type" : "position",
    "ident" : "SJY590",
    "alt" : "5300",
    "clock" : "1514764792",
    "facility_hash" : "910f66749f1ce9655b9f41ce7850e239974cd798",
    "facility_name" : "FlightAware ADS-B",
    "id" : "SJY590-1514584800-schedule-0001",
    "gs" : "213",
    "heading" : "30",
    "hexid" : "8A0670",
    "lat" : "-5.33489",
    "lon" : "119.40396",
    "updateType" : "A",
```

```
"altChange" : "D",
"air_ground" : "A"
}
}
```

2.3.6 Wyświetlenie wielu dokumentów (z ograniczeniem do 2 pierwszych)

```
> db.rawFaSignals.find().limit(2);
{ "_id" : ObjectId("5a497a04870c008695942e4d"), "key" : "1514764800#SJY590#72592
  fc3bcb6e36761fb4982e3bda1dc#v2", "value" : { "pitr" : "1514764800", "type" : "position", "ident" : "
  SJY590", "alt" : "5300", "clock" : "1514764792", "facility_hash" : "910
  f66749f1ce9655b9f41ce7850e239974cd798", "facility_name" : "FlightAware ADS-B", "id" : "SJY590
  -1514584800-schedule-0001", "gs" : "213", "heading" : "30", "hexid" : "8A0670", "lat" : "-5.33489", "
  lon" : "119.40396", "updateType" : "A", "altChange" : "D", "air_ground" : "A" } }
{ "_id" : ObjectId("5a497a04870c008695942e48"), "key" : "1514764800#CSH9141#13502
  bb3289128da9b3ce044cfca818c#v2", "value" : { "pitr" : "1514764800", "type" : "position", "ident" : "
  CSH9141", "alt" : "26125", "clock" : "1514764791", "facility_hash" : "376
  de0ee67533952227347fa52bebdcaf1f7dece", "facility_name" : "FlightAware ADS-B", "id" : "CSH9141
  -1514588100-schedule-0000", "gs" : "371", "heading" : "0", "hexid" : "78057B", "lat" : "36.89665", "
  lon" : "120.76399", "reg" : "B5260", "squawk" : "6347", "updateType" : "A", "altChange" : "D", "
  air_ground" : "A" } }
```

2.3.7 Wyświetlenie dokumentów z wyszukiwaniem wzorca

```
> db.rawFaSignals.find({"value.ident":"SJY590"}).limit(2)
{ "_id" : ObjectId("5a497a04870c008695942e4d"), "key" : "1514764800#SJY590#72592
  fc3bcb6e36761fb4982e3bda1dc#v2", "value" : { "pitr" : "1514764800", "type" : "position", "ident" : "
  SJY590", "alt" : "5300", "clock" : "1514764792", "facility_hash" : "910
  f66749f1ce9655b9f41ce7850e239974cd798", "facility_name" : "FlightAware ADS-B", "id" : "SJY590
  -1514584800-schedule-0001", "gs" : "213", "heading" : "30", "hexid" : "8A0670", "lat" : "-5.33489", "
  lon" : "119.40396", "updateType" : "A", "altChange" : "D", "air_ground" : "A" } }
{ "_id" : ObjectId("5a497a15870c0086959472de"), "key" : "1514764815#SJY590#376
  bae18b0f99551f7ca8314794778cb#v2", "value" : { "pitr" : "1514764815", "type" : "position", "ident" : "
  SJY590", "alt" : "5100", "clock" : "1514764808", "facility_hash" : "910
  f66749f1ce9655b9f41ce7850e239974cd798", "facility_name" : "FlightAware ADS-B", "id" : "SJY590
  -1514584800-schedule-0001", "gs" : "204", "heading" : "30", "hexid" : "8A0670", "lat" : "-5.32164", "
  lon" : "119.41161", "squawk" : "2430", "updateType" : "A", "altChange" : "D", "air_ground" : "A" } }
```

2.3.8 Wyświetlenie dokumentów z wyszukiwaniem wzorca i użyciem \$and

```
> db.rawFaSignals.find( {$and: [{"value.ident":"SJY590"}, {"value.alt": "5100"}]})
{ "_id" : ObjectId("5a497a15870c0086959472de"), "key" : "1514764815#SJY590#376
  bae18b0f99551f7ca8314794778cb#v2", "value" : { "pitr" : "1514764815", "type" : "position", "ident" : "
  SJY590", "alt" : "5100", "clock" : "1514764808", "facility_hash" : "910
  f66749f1ce9655b9f41ce7850e239974cd798", "facility_name" : "FlightAware ADS-B", "id" : "SJY590
  -1514584800-schedule-0001", "gs" : "204", "heading" : "30", "hexid" : "8A0670", "lat" : "-5.32164", "
  lon" : "119.41161", "squawk" : "2430", "updateType" : "A", "altChange" : "D", "air_ground" : "A" } }
{ "_id" : ObjectId("5a4c1d3e870c008695b90f0b"), "key" : "1514937657#SJY590#4
  ae0b1aec168e7cc7632cd50fc69d9eb#v2", "value" : { "pitr" : "1514937657", "type" : "position", "ident" : "
  SJY590", "alt" : "5100", "clock" : "1514937649", "facility_hash" : "910
  f66749f1ce9655b9f41ce7850e239974cd798", "facility_name" : "FlightAware ADS-B", "id" : "SJY590
  -1514757600-schedule-0003", "gs" : "266", "heading" : "70", "hexid" : "8A05B6", "lat" : "-5.31139", "
  lon" : "119.31753", "reg" : "PKCMQ", "squawk" : "2412", "updateType" : "A", "altChange" : "D", "
  air_ground" : "A" } }
```

2.3.9 Wyświetlenie dokumentów z wyszukiwaniem wzorca i użyciem \$or

```
> db.rawFaSignals.find( {$or: [{"value.pitr":{"$gt":"1514832510"}}, {"value.alt":{"$lt":"5400"}}]})
{ "_id" : ObjectId("5a497a04870c008695942e4d"), "key" : "1514764800#SJY590#72592
  fc3bcb6e36761fb4982e3bda1dc#v2", "value" : { "pitr" : "1514764800", "type" : "position", "ident" : "
  SJY590", "alt" : "5300", "clock" : "1514764792", "facility_hash" : "910
  f66749f1ce9655b9f41ce7850e239974cd798", "facility_name" : "FlightAware ADS-B", "id" : "SJY590
  -1514584800-schedule-0001", "gs" : "213", "heading" : "30", "hexid" : "8A0670", "lat" : "-5.33489", "
  lon" : "119.40396", "updateType" : "A", "altChange" : "D", "air_ground" : "A" } }
{ "_id" : ObjectId("5a497a04870c008695942e48"), "key" : "1514764800#CSH9141#13502
  bb3289128da9b3ce044cfca818c#v2", "value" : { "pitr" : "1514764800", "type" : "position", "ident" : "
  CSH9141", "alt" : "26125", "clock" : "1514764791", "facility_hash" : "376
  de0ee67533952227347fa52bebdcaf1f7dece", "facility_name" : "FlightAware ADS-B", "id" : "CSH9141
  -1514588100-schedule-0000", "gs" : "371", "heading" : "0", "hexid" : "78057B", "lat" : "36.89665", "
  lon" : "120.76399", "reg" : "B5260", "squawk" : "6347", "updateType" : "A", "altChange" : "D", "
  air_ground" : "A" } }
{ "_id" : ObjectId("5a497a05870c0086959430dc"), "key" : "1514764801#SKW3467#53
  b91d8b75f3b7947fbc25fdae2d60d2#v2", "value" : { "pitr" : "1514764801", "type" : "position", "ident" :
  "SKW3467", "aircrafttype" : "E170", "alt" : "34000", "clock" : "1514764793", "facility_hash" : "5
  d844a88f200ed09ff146f342b0ef155903ab125", "facility_name" : "FlightAware ADS-B", "id" : "SKW3467
  -1514584320-schedule-0000", "gs" : "369", "heading" : "253", "hexid" : "A1388C", "lat" : "43.46140",
  "lon" : "-108.51170", "reg" : "N178SY", "squawk" : "3631", "updateType" : "A", "altChange" : " ", "
  air_ground" : "A" } }
```

2.4 Przydatne linki

- <https://docs.mongodb.com/manual/>
- <https://docs.mongodb.com/compass/current/>
- https://www.w3schools.com/python/python_mongodb_getstarted.asp