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How to Install and Configure MongoDB on CentOS 7

MongoDB is a NoSQL database that provides high performance, high availability, and automatic scaling. NoSQL database means that, unlike MySQL or PostgreSQL, it does not support SQL (Structured Query Language) to retrieve or manipulate the stored data. MongoDB does not store data in tables, instead, it stores data in a "document" structure similar to JSON (in MongoDB called BSON). MongoDB was first introduced in 2009, six years ago. Currently developed by the company MongoDB MongoDB Inc.

In this tutorial, I will guide you to install and configure MongoDB 3.2 (stable) on a CentOS 7 server. We will add and configure the administrator user for MongoDB and configure the authentication for MongoDB services.

On this page

- [Prerequisites](#)
- [Step 1 - Add the MongoDB Repository in CentOS](#)
- [Step 2 - Installing MongoDB](#)
- [Step 3 - Fix a MongoDB Error](#)
- [Step 4 - Create a MongoDB Administrator User](#)
- [Step 5 - Enable User Authentication in MongoDB](#)
- [Links](#)

Prerequisites

- CentOS 7
- Root privileges

What we will do in this tutorial :

- Add the MongoDB repository.
- Installing MongoDB.
- Fix some MongoDB errors.
- Create an administrator user.
- Enable MongoDB authentication and Testing.

Step 1 - Add the MongoDB Repository in CentOS

Connect to your CentOS 7 server with the ssh root account:

```
ssh root@192.168.1.100
```

We need to go to the 'yum.repos.d' directory in order to add the new CentOS repository. Go to that directory and create new repository file 'mongodb-org-3.2.repo' with vim:

```
cd /etc/yum.repos.d/  
vim mongodb-org-3.2.repo
```

Paste MongoDB repository configuration that is shown below:

```
[mongodb-org-3.2]
name=MongoDB Repository
baseurl=https://repo.mongodb.org/yum/redhat/$releasever/mongodb-org/3.2/x86_64/
gpgcheck=1
enabled=1
gpgkey=https://www.mongodb.org/static/pgp/server-3.2.asc
```

Save the file and exit the editor.

Step 2 - Installing MongoDB

We've added MongoDB repository, now check the repository list on the server to make sure that the MongoDB repository is available in the list.

Run the command below as root to do so:

```
yum repolist
```

You should see results below. The MongoDB repository is on the list.

```
[root@natsume ~]# cd /etc/yum.repos.d/
[root@natsume yum.repos.d]# vim mongodb-org-3.2.repo
[root@natsume yum.repos.d]# yum repolist
Loaded plugins: fastestmirror
base
extras
mongodb-org-3.2
updates
(1/5): extras/7/x86_64/primary_db
(2/5): mongodb-org-3.2/7/primary_db
(3/5): base/7/x86_64/group_gz
(4/5): base/7/x86_64/primary_db
(5/5): updates/7/x86_64/primary_db
Determining fastest mirrors
 * base: kartolo.sby.datautama.net.id
 * extras: kartolo.sby.datautama.net.id
 * updates: kartolo.sby.datautama.net.id
repo id                                repo name
base/7/x86_64                          CentOS-7 - Base
extras/7/x86_64                        CentOS-7 - Extras
mongodb-org-3.2/7                      MongoDB Repository
updates/7/x86_64                       CentOS-7 - Updates
repolist: 12,015
[root@natsume yum.repos.d]#
```

Next, install MongoDB with the yum command.

```
yum -y install mongodb-org
```

When the installation is finished, start MongoDB with this systemctl command:

```
systemctl start mongod
```

Check that MongoDB is running by checking that the port '27017' is open.

```
netstat -plntu
```

And make sure the mongodb service is active.

```
systemctl status mongod
```

```
[root@natsume ~]# systemctl start mongod
[root@natsume ~]# netstat -plntu
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State       PID/Program name
tcp        0      0 0.0.0.0:22             0.0.0.0:*               LISTEN      991/sshd
tcp        0      0 127.0.0.1:25           0.0.0.0:*               LISTEN      2571/master
tcp        0      0 127.0.0.1:27017        0.0.0.0:*               LISTEN      4279/mongod
tcp6       0      0 :::22                  :::*                     LISTEN      991/sshd
tcp6       0      0 :::25                  :::*                     LISTEN      2571/master
udp        0      0 0.0.0.0:29230          0.0.0.0:*               699/dhclient
udp        0      0 127.0.0.1:323          0.0.0.0:*               619/chronyd
udp        0      0 0.0.0.0:68             0.0.0.0:*               699/dhclient
udp6       0      0 :::50636               :::*                     699/dhclient
udp6       0      0 :::323                 :::*                     619/chronyd

[root@natsume ~]# systemctl status mongod
● mongod.service - SYSV: Mongo is a scalable, document-oriented database.
   Loaded: loaded (/etc/rc.d/init.d/mongod)
   Active: active (running) since Wed 2016-10-26 22:14:10 UTC; 10s ago
     Docs: man:systemd-sysv-generator(8)
  Process: 4268 ExecStart=/etc/rc.d/init.d/mongod start (code=exited, status=0/SUCCESS)
    CGroup: /system.slice/mongod.service
            └─4279 /usr/bin/mongod -f /etc/mongod.conf

Oct 26 22:14:10 natsume systemd[1]: Starting SYSV: Mongo is a scalable, document-oriented database...
Oct 26 22:14:10 natsume runuser[4275]: pam_unix(runuser:session): session opened for user mongod by (uid=0)
Oct 26 22:14:10 natsume mongod[4268]: Starting mongod: [ OK ]
Oct 26 22:14:10 natsume systemd[1]: Started SYSV: Mongo is a scalable, document-oriented database..
[root@natsume ~]#
```

Step 3 - Fix a MongoDB Error

MongoDB is installed. Now we can access the mongodb shell by using the command below:

```
mongo
```

You will probably see this error about ulimit configuration on the server.

**** WARNING: soft rlimits too low. rlimits set to 4096 processes, 64000 files. Number of processes should be at least 32000...**

```
[root@natsume ~]# mongo
MongoDB shell version: 3.2.10
connecting to: test
Welcome to the MongoDB shell.
For interactive help, type "help".
For more comprehensive documentation, see
  http://docs.mongodb.org/
Questions? Try the support group
  http://groups.google.com/group/mongodb-user
Server has startup warnings:
2016-10-26T22:14:10.640+0000 I CONTROL [initandlisten]
2016-10-26T22:14:10.640+0000 I CONTROL [initandlisten] ** WARNING: soft rlimits too low. rlimits set to 4096 processes, 64000 files. Number of processes should be at least 32000
: 0.5 times number of files.
>
```

Ulimits or User limits define how much of a system-wide resource a user may use.

In order to resolve this problem, we need to increase the ulimit configuration of the user mongod.

On CentOS 7 server, the MongoDB database is running under the user 'mongod'. Go to the 'security' directory and edit the 'limits.conf' configuration file.

```
cd /etc/security/
vim limits.conf
```

I will increase the limits of the mongod user to '64000' - number of processes or nproc and the number of open files or nofile to 64000.

Paste new configuration below to the end of the file:

```
mongod soft nproc 64000
mongod hard nproc 64000
mongod soft nofile 64000
mongod hard nofile 64000
```

Save the limits.conf file.

Run the `sysctl` command below to apply the changed limits to the system:

```
sysctl -p
```

Then restart the MongoDB service and try again to access the mongo shell, the error is gone now.

```
systemctl restart mongod  
mongo
```

```
[root@natsume ~]# systemctl restart mongod  
[root@natsume ~]# mongo  
MongoDB shell version: 3.2.10  
connecting to: test  
> |
```

Step 4 - Create a MongoDB Administrator User

In this step, we will create a new user "admin" for MongoDB with the role 'UserAdminAnyDatabase' from the mongo shell.

Open the mongodb shell:

```
mongo
```

I will create new user administrator named 'admin' with password 'admin123'. Please use a secure password on your server. Then we will configure the role of the user to be 'UserAdminAnyDatabase'.

Switch to the database 'admin'.

```
use admin
```

Type in the MongoDB query below to create the new administrator user:

```
db.createUser(  
  {  
    user: "admin",  
    pwd: "admin123",  
    roles: [ { role: "userAdminAnyDatabase", db: "admin" } ]  
  }  
)
```

Next, ensure that the user has been created with the MongoDB query below.

```
show users
```

```
[root@natsume ~]# mongo
MongoDB shell version: 3.2.10
connecting to: test
> use admin
switched to db admin
> db.createUser(
... {
...   user: "admin",
...   pwd: "admin123",
...   roles: [ { role: "userAdminAnyDatabase", db: "admin" } ]
... }
... )
Successfully added user: {
  "user" : "admin",
  "roles" : [
    {
      "role" : "userAdminAnyDatabase",
      "db" : "admin"
    }
  ]
}
> show users
{
  "_id" : "admin.admin",
  "user" : "admin",
  "db" : "admin",
  "roles" : [
    {
      "role" : "userAdminAnyDatabase",
      "db" : "admin"
    }
  ]
}
>
bye
[root@natsume ~]#
```

The MongoDB administrator user has been created.

Step 5 - Enable User Authentication in MongoDB

In this step, we will enable authentication for users to prevent that another user without sufficient privileges is able to see the data on the database.

On our CentOS 7 server, MongoDB is running under systemd with an init script in the '/etc/init.d/' directory. We will edit that script to force the mongod service to run with the '--auth' option.

Go to the '/etc/init.d/' directory and edit the "mongod" file:

```
cd /etc/init.d/
vim mongod
```

On line 15 you will find the "OPTION" variable, there we will add the "mongod" option.

```
OPTIONS="--auth -f $CONFIGFILE"
```

Save the file.

Reload the systemd service and restart MongoDB.

```
systemctl daemon-reload
systemctl restart mongod
```

Next, we have to test the configuration by logging into the mongo shell and switch to the admin database, then try to see the admin users.

```
mongo
use admin
show users
```

You will see an error about the unauthorized execution of the command in the database admin. Now we need to use the command 'db.auth()' for the authentication.

```
db.auth('admin', 'admin123')
```

Now you can see the users with their roles and the privileges.

```
[root@natsume ~]# mongo
MongoDB shell version: 3.2.10
connecting to: test
> use admin
switched to db admin
> show users
2016-10-29T22:39:27.954+0000 E QUERY [thread1] Error: not authorized on admin to execute command { usersInfo: 1.0 } :
_getErrorWithCode@src/mongo/shell/utils.js:25:13
DB.prototype.getUser@src/mongo/shell/db.js:1523:1
shellHelper.show@src/mongo/shell/utils.js:744:9
shellHelper@src/mongo/shell/utils.js:651:15
@(shellhelp2):1:1

> db.auth('admin', 'admin123')
1
> show users
{
  "_id" : "admin.admin",
  "user" : "admin",
  "db" : "admin",
  "roles" : [
    {
      "role" : "userAdminAnyDatabase",
      "db" : "admin"
    }
  ]
}
```

MongoDB 3.2 has been installed and configured on a CentOS 7 Server.

Links

- <https://docs.mongodb.com/manual/>

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