

BEMOSS and Its Enhanced Applications

Brian Lauer
Advisor: Dr. Suruz Miah

Department of Electrical and Computer Engineering
Bradley University
1501 W. Bradley Avenue
Peoria, IL, 61625, USA

Friday, June 21, 2019

Outline

- 1 Install Ubuntu 16.04
 - On Disk
 - Virtual Machine
- 2 Install BEMOSS Launcher Wizard
- 3 Launch BEMOSS Launcher Wizard
- 4 Install BEMOSS System
- 5 Post-Installation
 - Configure PostgreSQL database
- 6 Problems
- 7 Progress
- 8 Plan

Install Ubuntu 16.04

On Disk

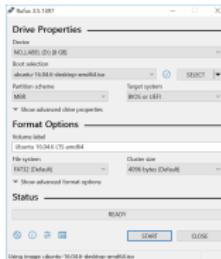


Figure: Rufus USB Formatting Utility

Link

<http://releases.ubuntu.com/16.04/>

Create Bootable Flash Medium

- Rufus (Windows)
- SanDisk Cruzer Media (MacOS)
- Startup Disk Creator (Linux)

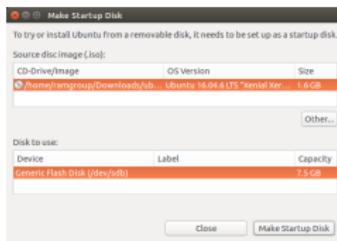
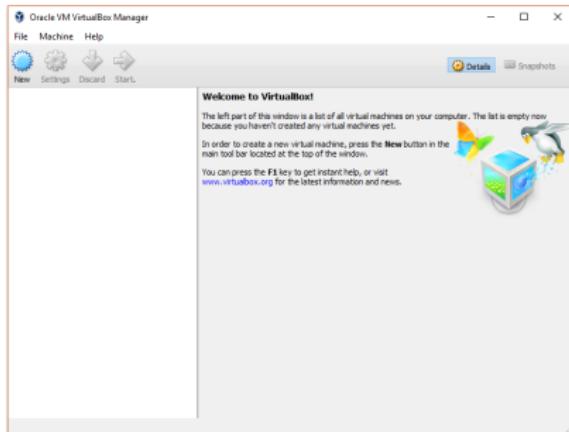


Figure: Startup Disk Creator

Install Ubuntu 16.04

Virtual Machine



Links

- ① <https://www.virtualbox.org/wiki/Downloads>
- ② <https://github.com/bemoss/BEMOSS3.5/wiki/Ubuntu-Installation>

Figure: Oracle VM VirtualBox Manager, courtesy of https://github.com/bemoss/wiki_images/

Install BEMOSS Launcher Wizard

```
ramgroup@ramgroup-Latitude-E6510:~$ sudo apt-get update  
Hit:1 http://us.archive.ubuntu.com/ubuntu xenial InRelease  
Hit:2 http://us.archive.ubuntu.com/ubuntu xenial-updates InRelease  
Hit:3 http://us.archive.ubuntu.com/ubuntu xenial-backports InRelease  
Hit:4 http://security.ubuntu.com/ubuntu xenial-security InRelease  
Reading package lists... Done  
Reading package lists... Done  
ramgroup@ramgroup-Latitude-E6510:~$
```

Figure: Updating the system

Steps

- ① Open a terminal
- ② Update the system
- ③ Install git
- ④ Clone BEMOSS repo

```
ramgroup@ramgroup-Latitude-E6510:~$ sudo apt-get install git  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
git is already the newest version (1:2.7.4-0ubuntu1.6).  
0 upgraded, 0 newly installed, 0 to remove and 172 not upgraded.  
21 not fully installed or removed.  
After this operation, 0 B of additional disk space will be used.
```

Figure: Installing git

```
ramgroup@ramgroup-Latitude-E6510:~/temp$ git clone -b master https://github.com/bemoss/BEMOSS3.5.git  
Cloning into 'BEMOSS3.5'...  
remote: Enumerating objects: 2689, done.  
remote: Total 2689 (delta 0), reused 0 (delta 0), pack-reused 2689  
Receiving objects: 100% (2689/2689), 5.89 MB | 954.00 KB/s, done.  
Resolving deltas: 100% (1013/1013), done.  
Checking connectivity... done.  
ramgroup@ramgroup-Latitude-E6510:~/temp$
```

Launch BEMOSS Launcher Wizard

```
ramgroup@ramgroup-Latitude-E6510:~/BEMOSS3.5/GUI  
ramgroup@ramgroup-Latitude-E6510:~/BEMOSS3.5/GUI$ ./startBEMOSS_GUI.sh  
/home/ramgroup/BEMOSS3.5/GUI/startBEMOSS_GUI.sh  
/home/ramgroup/BEMOSS3.5/GUI  
Install ok installed  
Package Installed  
  
Installing Package...  
[sudo] password for ramgroup: ■
```

Figure: Running startBEMOSS_GUI.sh using a relative path

Steps

- ① Run startBEMOSS_GUI.sh in /#bemoss_folder/ BEMOSS3.5/GUI
- ② Enter system password



Figure: BEMOSS Launcher Wizard

Install BEMOSS System

```
Terminal
Applying bemooss_applications.0001_initial... OK
Applying device.0001_initial... OK
Applying deviceinfo.0001_initial... OK
Applying device.0002_initial... OK
Applying discovery.0001_initial... OK
Applying discovery.0002_initial... OK
Applying schedule.0001_initial... OK
Applying sessions.0001_initial... OK
/home/rangroup/.virtualenvs/BEMOSS3.5/Web_Server
OS settings imported
No cassandra_settings file. Using current IP
no cassandra_settings file. Using the default cassandra cassandra user/pass
Cannot establish connection
Connection cannot be established
('Unable to connect to hosts': ('192.168.1.111:9042', 'error[11]: "Tried
connection to ('192.168.1.111': 9042)'. Last error: Connection refused"'))
System check identified some issues:

WARNINGS:
7: (urls.W003) Your URL pattern '^$' uses include with a regex ending with a '$'.
  Remove the dollar from the regex to avoid problems with URLs.
  To learn more, see https://docs.djangoproject.com/en/1.11/topics/http/urls/
    (fuzzy) [error]: 'username': 'admin' has no effect on ManyToManyField.
    Username (Leave blank to use 'rangroup'): admin
  [all address]
```

Figure: Prompt for Django Superuser

Steps

- ① Click "Run BEMOSS"
- ② Define Django Superuser
- ③ Define parameters for Cassandra database

```
rangroup@rangroup-Latitude-DE510:~/temp/BEMOSS3.5/GUI
PlatformInitiator >> done 6: database bemooss connection is closed
(rm: cannot remove '/home/rangroup/temp/BEMOSS3.5/log/voltstream.log': No such file
or directory
(rm: cannot remove '/home/rangroup/temp/BEMOSS3.5/log/cassandra.log': No such file
or directory)
PlatformInitiator >> done 7: clear volttron log file, kill volttron process, kill
all BEMOSS processes
(rm: cannot remove '/home/rangroup/temp/BEMOSS3.5/log/voltstream.log'
creating a new cassandra_settings file
Enter a unique name for cassandra cluster-name:
using default name: bemoosscassandra
Enter database username:
Enter database password:
Using default username: bemooss
Using default password: bemooss
Using default host: bemooss
=====
* Congratulations! BEMOSS Installation is complete!
* For before running BEMOSS for the first time, please refer the following link
* For post installation configuration:
  https://github.com/bemoss/BEMOSS3.5/wiki/Post-Installation-Instruction
=====

rangroup@rangroup-Latitude-DE510:~/temp/BEMOSS3.5/GUI$
```

Figure: Cassandra database login info

Post-Installation

Configure PostgreSQL database



Steps

- 1 Click "Advanced Setting"

Figure: Advanced Settings window

Post-Installation

Configure PostgreSQL database

```
57 # - Connection Settings -
58
59 listen_addresses = '*'          # what IP address(es) to listen on;
60                                # comma-separated list of addresses;
```

Figure: postgresql.conf lines 57-60

```
92 host      all      all      127.0.0.1/32      md5
93 host      all      all      192.168.1.111/32      md5
```

Figure: pg_hba.conf lines 92-93

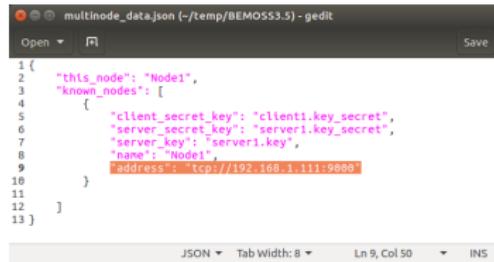
Steps (Cont.)

- ② Change line 59 of postgresql.conf to
listen_addresses = '*'

③ Copy line 92 of pg_hba.conf
and paste on line 93

④ Change IP address on line 93 to
system's IP address

Post-Installation



```
1 {
2     "this_node": "Node1",
3     "known_nodes": [
4         {
5             "client_secret_key": "client1.key.secret",
6             "server_secret_key": "server1.key.secret",
7             "server_key": "server1.key",
8             "name": "Node1",
9             "address": "tcp://192.168.1.111:9000"
10        }
11    ]
12 }
13 }
```

Figure: multinode_data.json open in gedit

Steps (Cont.)

- ⑤ Modify multinode_data.json in /#bemoss_folder/BEMOSS3.5 with system's IP address
- ⑥ Modify parent_ip.txt in /#bemoss_folder/BEMOSS3.5 with system's IP address



```
1 192.168.1.111
```

Figure: parent_ip.txt open in gedit
B. Lauer (Bradley University)

Problems

```
ramgroup@ramgroup-Latitude-E6510:~/BEMOSS3.5/GUI$ PlatformInitiator >> Done 7: clear volttron log file, kill volttron process, kill all BEMOSS processes
OS settings imported
Not found:/home/ramgroup/BEMOSS3.5/cassandra/conf/cassandra.yaml
Traceback (most recent call last):
  File "/bemoss_llb/databases/cassandraAPI/Initialize.py", line 186, in <module>
    init()
  File "/bemoss_llb/databases/cassandraAPI/Initialize.py", line 99, in init
    cassanFile = open(settings.PROJECT_DIR+ "/cassandra/conf/cassandra.yaml", 'r')
)
IOError: [Errno 2] No such file or directory: '/home/ramgroup/BEMOSS3.5/cassandra/conf/cassandra.yaml'
sudo /bemoss_llb/utils/increase_open_file_limit.sh: command not found
rm: cannot remove '/bemoss_llb/utils/increase_open_file_limit.sh': No such file or directory
*****
*
* Congratulations! BEMOSS Installation is complete!
* Before running BEMOSS for the first time, please refer the following link
* for post installation configuration:
* https://github.com/bemoss/BEMOSS3.5/wiki/Post-Installation-Instruction
*
*****
```

Figure: Error raised by BEMOSS during installation

Description

- Cassandra directory non-existent
- Broken link on line 48 of `bemoss_install_v3.5.sh` in `#bemoss_folder/` BEMOSS3.5/GUI

Problems



A screenshot of a terminal window titled "bemooss_install_v3.5.sh (-/BEMOSS3.5/GUI) - gedit". The window shows a shell script with several lines of code. The script includes commands for installing Java, Cassandra, and the Cassandra driver. It also contains a note about the CASS_DRIVER_NO_CYTHON variable and instructions to go to the BEMOSS web UI and run the syncdb command.

```
45 sudo apt-get install openjdk-8-jre libjna-java --assume-yes
46 # Install Cassandra
47 cd $projectpath
48 # replaced link
49 wget https://archive.apache.org/dist/cassandra/3.0.9/apache-
cassandra-3.0.9-bin.tar.gz
50 tar -xzf apache-cassandra-3.0.9-bin.tar.gz
51 sudo rm apache-cassandra-3.0.9-bin.tar.gz
52 sudo rm -rf cassandra/
53 sudo mv apache-cassandra-3.0.9 cassandra
54 # Install Cassandra Driver
55 # (For better performance of Cassandra, the install-option can be
# removed but might cause installation failure in some boards.)
56 CASS_DRIVER_NO_CYTHON=1 pip install cassandra-driver
57 # Go to the bemooss web ui and run the syncdb command for the
sh  Tab Width: 8  Ln 48, Col 16  INS
```

Figure: bemooss_install_v3.5.sh with URL changed

Possible Solution

Replace

<http://downloads.datastax.com/community/dsc-cassandra-3.0.8-bin.tar.gz> with

<https://archive.apache.org/dist/cassandra/3.0.9/apache-cassandra-3.0.9-bin.tar.gz>

Problems

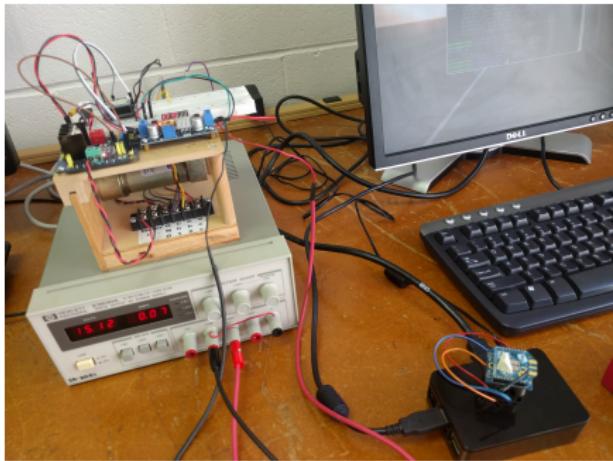
```
ramgroup@rangroup-Latitude-E6510:~/BEMOSS3.5
r/lib/python2.7/logging/_init_.py", line 861, in emit
2019-06-14 11:20:83,773 ({TSDagent-3.0 5453}) <stderr> ERROR:     msg = s
2019-06-14 11:20:83,773 ({TSDagent-3.0 5453}) <stderr> ERROR:     File "/u
2019-06-14 11:20:83,773 ({TSDagent-3.0 5453}) <stderr> ERROR:     line 734, in format
2019-06-14 11:20:83,773 ({TSDagent-3.0 5453}) <stderr> ERROR:     return
2019-06-14 11:20:83,773 ({TSDagent-3.0 5453}) <stderr> ERROR:         f
2019-06-14 11:20:83,773 ({TSDagent-3.0 5453}) <stderr> ERROR:             format(record)
2019-06-14 11:20:83,774 ({TSDagent-3.0 5453}) <stderr> ERROR:     File "/u
2019-06-14 11:20:83,774 ({TSDagent-3.0 5453}) <stderr> ERROR:     ne/rangroup/BEMOSS3.5/voltron/platform/agent/utils.py", line 242, in f
2019-06-14 11:20:83,774 ({TSDagent-3.0 5453}) <stderr> ERROR:         return
2019-06-14 11:20:83,774 ({TSDagent-3.0 5453}) <stderr> ERROR:             jsonapi.dumps(dct)
2019-06-14 11:20:83,774 ({TSDagent-3.0 5453}) <stderr> ERROR:     File "/u
2019-06-14 11:20:83,774 ({TSDagent-3.0 5453}) <stderr> ERROR:     ne/rangroup/BEMOSS3.5/env/local/lib/python2.7/site-packages/json/utils/j
2019-06-14 11:20:83,774 ({TSDagent-3.0 5453}) <stderr> ERROR:         sonapt.py", line 40, in dumps
2019-06-14 11:20:83,774 ({TSDagent-3.0 5453}) <stderr> ERROR:             s = js
2019-06-14 11:20:83,774 ({TSDagent-3.0 5453}) <stderr> ERROR:             on.dumps(obj, **kwargs)
2019-06-14 11:20:83,775 ({TSDagent-3.0 5453}) <stderr> ERROR:     File "/u
2019-06-14 11:20:83,775 ({TSDagent-3.0 5453}) <stderr> ERROR:     ne/rangroup/BEMOSS3.5/env/local/lib/python2.7/site-packages/simplejson/
2019-06-14 11:20:83,775 ({TSDagent-3.0 5453}) <stderr> ERROR:         _init_.py", line 399, in dumps
2019-06-14 11:20:83,775 ({TSDagent-3.0 5453}) <stderr> ERROR:             **kw).e
2019-06-14 11:20:83,775 ({TSDagent-3.0 5453}) <stderr> ERROR:             ncode(obj)
2019-06-14 11:20:83,775 ({TSDagent-3.0 5453}) <stderr> ERROR:     File "/u
2019-06-14 11:20:83,775 ({TSDagent-3.0 5453}) <stderr> ERROR:     ne/rangroup/BEMOSS3.5/env/local/lib/python2.7/site-packages/simplejson/
2019-06-14 11:20:83,775 ({TSDagent-3.0 5453}) <stderr> ERROR:         encoder.py", line 296, in encode
2019-06-14 11:20:83,775 ({TSDagent-3.0 5453}) <stderr> ERROR:             chunks
2019-06-14 11:20:83,775 ({TSDagent-3.0 5453}) <stderr> ERROR:             = self._iterencode(o, _one_shot=True)
2019-06-14 11:20:83,775 ({TSDagent-3.0 5453}) <stderr> ERROR:     File "/u
2019-06-14 11:20:83,775 ({TSDagent-3.0 5453}) <stderr> ERROR:     ne/rangroup/BEMOSS3.5/env/local/lib/python2.7/site-packages/simplejson/
2019-06-14 11:20:83,775 ({TSDagent-3.0 5453}) <stderr> ERROR:         encoder.py", line 378, in iterencode
2019-06-14 11:20:83,775 ({TSDagent-3.0 5453}) <stderr> ERROR:             return
2019-06-14 11:20:83,775 ({TSDagent-3.0 5453}) <stderr> ERROR:             _iterencode(o, 0)
2019-06-14 11:20:83,778 ({TSDagent-3.0 5453}) <stderr> ERROR:     File "/u
2019-06-14 11:20:83,778 ({TSDagent-3.0 5453}) <stderr> ERROR:     ne/rangroup/BEMOSS3.5/env/local/lib/python2.7/site-packages/simplejson/
2019-06-14 11:20:83,778 ({TSDagent-3.0 5453}) <stderr> ERROR:         encoder.py", line 273, in default
2019-06-14 11:20:83,778 ({TSDagent-3.0 5453}) <stderr> ERROR:             o.__cl
2019-06-14 11:20:83,778 ({TSDagent-3.0 5453}) <stderr> ERROR:             ss._name__)
2019-06-14 11:20:83,779 ({TSDagent-3.0 5453}) <stderr> ERROR:             Object of type DefaultEndPoint is not JSON serializable
2019-06-14 11:20:83,779 ({TSDagent-3.0 5453}) <stderr> ERROR:             Logged from
2019-06-14 11:20:83,779 ({TSDagent-3.0 5453}) <stderr> ERROR:             file connection.py, line 1120
2019-06-14 11:20:84,872 (multinodeagent-0.1 5559) <stdout> INFO: Sendin
```

Figure: Error raised by BEMOSS during operation

Additional Problems

- Error reported by TSDagent (Time Series Database Agent) when server is running
- Additional changes may need to be made

Progress



DC Motor

- Used python scripts written by members of previous senior project to control DC motor

Plan

By June 24

- Build GUI with Python to control IoT devices

By June 28

- Create an icon within BEMOSS to control the DC motor
- Write conference paper
- Find a new device to implement within BEMOSS

Resources I

-  **BEMOSS Team**
BEMOSS Installation Guide
[https://github.com/bemoss/BEMOSS3.5/
wiki/BEMOSS-Installation-Guide](https://github.com/bemoss/BEMOSS3.5/wiki/BEMOSS-Installation-Guide)

-  **BEMOSS Team**
BEMOSS Wiki Images
https://github.com/bemoss/wiki_images/

Any Questions?