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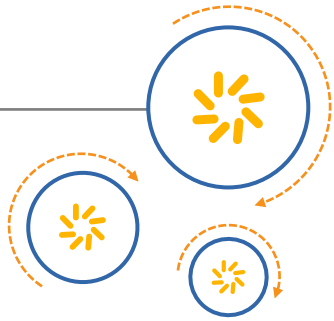

Device Registration Subsystem 3.0.0

API Installation Guide

DRS-Installation-Guide-API-3.0.0

November 02, 2020

Revision history

Revision	Date	Description
A	March 2019	Release 2.0.0
B	November 2020	Release 3.0.0

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1. Introduction

1.1 Purpose & Scope

This document provides:

- Installation instructions for the Device Registration Subsystem
- Instructions for running test commands to verify DRS API installation

1.2 Definitions, Acronyms & Abbreviations

Table 1 - Definitions, Acronyms & Abbreviations

Term	Explanation
DIRBS	Device Identification, Registration & Blocking System
DRS	Device Registration Subsystem
OS	Operating System
PostgreSQL	PostgreSQL open source object-relational database system
Nginx	An open source, lightweight, high-performance web server or proxy server
uWSGI	uWSGI is used for serving Python web applications
Rabbit MQ server	RabbitMQ is an open source server and is built on the Open Telecom Platform framework for clustering and failover
Celery	Celery is an open source asynchronous task queue or job queue which is based on distributed message passing. While it supports scheduling, its focus is on operations in real time.

1.3 References

N.A

1.4 Getting Started

The instructions provided in this document assume that the required equipment (hardware, software) has been installed and configured with Ubuntu 16.04. Refer to the Ubuntu Installation Guide for additional installation help.

The installer should be familiar with Linux command line.

2. Installation

NOTE The reader acknowledges and agrees that he is entirely and solely responsible for the selection and use of all third-party software modules downloaded and installed by this installation method, including securing all appropriate and proper rights of use to any of such third-party software modules and to comply fully with any terms of use that may apply to or accompany any such third-party software modules.

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2.1 System Requirements

2.1.1 Software Requirements

- Python 3.8
- PostgreSQL 12.4
- Nginx 1.14.X
- uWSGI 2.0
- Rabbitmq 3.8.9
- Celery 4.2.x

2.1.2 Hardware Requirements

Minimum hardware requirements

- At least 1 GB of RAM
- At least 8 GB of disk space

2.1.3 Operating System

This subsystem will be installed and configured with Ubuntu 16.04. Refer to the Ubuntu Installation Guide for additional installation help.

- Ubuntu 16.04
- non-root user

You should have a regular, non-root user account on your server with sudo privileges (in this installation guide the user is referred to as ‘drs-user’)

2.1.4 Database Support

NOTE: Creating a new database from scratch assumes that you are already running a PostgreSQL instance.

A complete guide for PostgreSQL installation and configuration can be found on PostgreSQL website

2.2 Extracting Software Release

The DRS software release can be downloaded via one of the following two methods. To extract the contents of the distribution, run either:

Method 1: Download and unzip from GitHub

```
unzip Device-Registration-Subsystem-master.zip
```

Method 2: Clone the repository from GitHub

```
git clone https://github.com/CACF/Device-Registration-Subsystem.git
```

Copy the content to the user home directory e.g. /home/drs-user (you may have different home directory according to user)

2.3 Manual Installation

- Ensure the APT package index is updated
  ```
  sudo apt-get update --fix-missing
  ```
- Install basic required packages
  ```
  sudo apt-get install nginx git python3 virtualenv libpython3-dev
  python3-pip python3-dev rabbitmq-server postgresql
  ```
- Go to path /home/drs-user/Device-Registration-Subsystem
  ```
  cd /home/drs-user/Device-Registration-Subsystem
  ```
- Create virtual environment and activate it
  ```
  virtualenv –p python3 venv
  source venv/bin/activate
  ```
- Install all libraries from requirements.txt in virtual
  ```
  pip3 install -r requirements.txt
  ```
- Nginx does not support python application so we need to install uWSGI to run python application through Nginx, below is the command to install uWSGI
  ```
  pip3 install uwsgi
  ```
- Deactivate the virtual environment:
  ```
  deactivate
  ```


2.4 Celery Service Configurations

Follow below mentioned steps for celery configuration

- Start the Workers as Daemons so that they are started automatically at server startup
- Create a new service definition file in /etc/systemd/system/celeryd.service. Change the “User” and “Group” properties according to your actual user and group name
- For our setup the user is drs-user

```
[Unit]
Description=Celery Service
After=network.target
[Service]
Type=forking
User=drs-user
Group=drs-user
EnvironmentFile=/etc/default/celeryd
WorkingDirectory=/home/drs-user/Device-Registration-Subsystem/
ExecStart=/bin/sh -c '${CELERY_BIN} multi start ${CELERYD_NODES} -B\
-A ${CELERY_APP} --pidfile=${CELERYD_PID_FILE} \
--logfile=${CELERYD_LOG_FILE} --loglevel=${CELERYD_LOG_LEVEL} ${CELERYD_OPTS}'
ExecStop=/bin/sh -c '${CELERY_BIN} multi stopwait ${CELERYD_NODES} \
--pidfile=${CELERYD_PID_FILE}'
ExecReload=/bin/sh -c '${CELERY_BIN} multi restart ${CELERYD_NODES} -B \
-A ${CELERY_APP} --pidfile=${CELERYD_PID_FILE} \
--logfile=${CELERYD_LOG_FILE} --loglevel=${CELERYD_LOG_LEVEL} ${CELERYD_OPTS}'
[Install]
WantedBy=multi-user.target
```

- Create a configuration file “celeryd” in /etc/default/ directory

```
#The name of the workers. This example will create two workers
CELERYD_NODES=”worker1 worker2”
# The name of the Celery App, should be the same as the python file
# where the Celery tasks are defined
CELERY_APP=”app.celery”
# log and PID directories
CELERYD_LOG_FILE=”/var/log/celery/%n%I.log”
CELERYD_PID_FILE=”/var/run/celery/%n.pid”
#log level
CELERYD_LOG_LEVEL=INFO
#Path to celery binary, that is in your virtual environment

CELERY_BIN=/home/drs-user/Device-Registration-Subsystem/venv/bin/celery
```

- Create log and pid directories

```
sudo mkdir /var/log/celery /var/run/celery/
sudo chown -R drs-user:drs-user /var/log/celery /var/run/celery
```

- Reload systemctl daemon. You should run this command each time you make any change in the service definition file.


```
sudo systemctl daemon-reload
```

- Enable the service to startup at boot
```
sudo systemctl enable celeryd
```

- Start the service
```
sudo systemctl start celeryd
```


3. Configuration

3.1 Nginx Configuration

Remove Nginx default configuration and create new configuration file for the DRS app

```
sudo rm /etc/nginx/sites-enabled/default
```

- Now create a new configuration file in the root path

```
nano /home/drs-user/Device-Registration-Subsystem/drs-nginx.conf
```

- Copy the below lines

```
server {
listen      80;
server_name localhost;
charset     utf-8;
client_max_body_size 75M;
location / {try_files $uri @dirbs-drs;}
location @dirbs-drs
{
include uwsgi_params;
uwsgi_pass unix: /home/drs-user/Device-Registration-Subsystem/uwsgi.sock;
  }
}
```

- Symlink the new created file to Nginx's configuration files directory and restart Nginx

```
sudo ln -s /home/drs-user/Device-Registration-Subsystem/drs-nginx.conf
/etc/nginx/conf.d/
```

- Verify nginx configuration

```
sudo nginx –t
```

- Restart Nginx Service

```
sudo service nginx restart
```

3.2 uWSGI Configuration

- Create a new configuration file in the root path and copy the below lines

```
nano /home/drs-user/Device-Registration-Subsystem/uwsgi.ini
```

- Add below lines in this configuration file:

```
[uwsgi]
#application's base folder
base = /home/drs-user/Device-Registration-Subsystem/

#python module to import
module = app
chdir = %(base)
```



```
home = %(base)/venv
pythonpath = %(base)

master = true
processes = 10
cheaper = 2
cheaper-initial = 5
cheaper-step = 1
cheaper-algo = spare
cheaper-overload = 5

enable-threads = true
max-requests = 500
max-worker-lifetime = 120

ignore-sigpipe=true
ignore-write-errors=true
disable-write-exception=true

#socket file's location
socket = /home/drs-user/Device-Registration-Subsystem/%n.sock

#permissions for the socket file
chmod-socket = 666
chown-socket = drs-user:drs-user

#ownership of uwsgi service
uid = drs-user
gid = drs-user

#the variable that holds a flask application inside the module imported at line #6
callable = app

#location of log files
logto = /var/log/uwsgi/%n.log
```

- Create a directory vassals in /etc/uwsgi/
  `sudo mkdir -p /etc/uwsgi/vassals`
- Create Symlink in this directory to uwsgi ini config file
  `sudo ln -s /home/drs-user/Device-Registration-Subsystem/uwsgi.ini \`
  `/etc/uwsgi/vassals/uwsgi.ini`
- Create a new directory for log files
  `sudo mkdir -p /var/log/uwsgi`
- Change ownership of logs directory to drs-user
  `sudo chown -R` drs-user:drs-user `/var/log/uwsgi/`

3.3 uWSGI Service Configuration

Configure the uwsgi to run as a service on the server.

- Create an init script at location


```
sudo nano /etc/systemd/system/uwsgi.service
```

- Copy below lines in to the script file

```
[Unit]
Description=uWSGI Emperor service
After=syslog.target

[Service]
ExecStart=/home/drs-user/Device-Registration-Subsystem/venv/bin/uwsgi --emperor
/etc/uwsgi/vassals/
Restart=always
KillSignal=SIGQUIT
Type=notify
StandardError=syslog
NotifyAccess=all

[Install]
WantedBy=multi-user.target
```

- Reload system defaults to update the script in system services
  `sudo systemctl daemon-reload`

- Start uwsgi to start the application
  `sudo service uwsgi start`

- Go to the web-browser and enter the URL of the server to check that the service is running

3.4 DRS Configuration and Initialization

To configure file according to database server and credentials, edit config.yml in directory /home/drs-user/Device-Registration-Subsystem/

Change the hostname, port, username, password and database name as per requirements. Within the same directoy of DRS root, activate the virtual environment.

To activate the virtual environment created earlier at `/home/drs-user/Device-Registration-Subsystem` and start database initialization.

```
cd /home/drs-user/Device-Registration-Subsystem

source venv/bin/activate
```

Follow below steps for database initialization and migration:

- Clean extra and un-necessary directories
  `make clean`

- Clean python compiled files
  `make clean-pyc`

- Initialize database
  ```
  make install-db
  ```
- Upgrade database
  ```
  make upgrade-db
  ```
- Compile languages
  ```
  pybabel compile -d app/translations
  ```
- Configure to create distribution files
  ```
  make dist
  ```
- Generate full registration list for DIRBS Core
  ```
  make genlist-full
  ```
- Generate delta registration list for DIRBS Core
  ```
  make genlist-delta
  ```
- To run unit tests
  ```
  make test
  ```

- Restart uWSGI service
  ```
  sudo service uwsgi restart
  ```


4. Testing

- To check nginx configuration for errors
  ```
  sudo nginx –t
  ```

- To get detailed logs of uWSGI service. uWSGI can be run without service command in foreground
  ```
  uwsgi --ini /home/drs-user/Device-Registration-Subsystem/uwsgi.ini
  ```

