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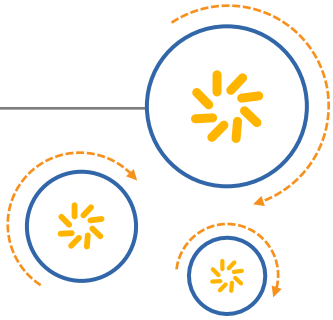

Device Pairing Subsystem 3.0.0

API Installation Guide

DPS-Installation-Guide-API-3.0.0

November 09, 2020

Revision history

Revision	Date	Description
A		Initial release
B	November 2020	Release 3.0.0

Contents

Tables

1. Introduction

1.1 Purpose & Scope

This document provides:

- Installation instructions for the Device Pairing Subsystem (DPS)
- Instructions for running test commands to verify DPS API installation

1.2 Definitions, Acronyms & Abbreviations

Table 1 - Definitions, Acronyms & Abbreviations

Term	Explanation
DIRBS	Device Identification, Registration & Blocking System
DPS	Device Pairing 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
API	Application Program Interface

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.X
- PostgreSQL 10
- Nginx 1.14.X
- uWSGI 2.0

2.1.2 Hardware Requirements

Minimum hardware requirements

- At least 1 GB of RAM
- At least 8G 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 ‘dps-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 DPS 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-Pairing-Subsystem.zip
```

Method 2: Clone the repository from GitHub

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

Copy the content to the user home directory e.g. /home/dps-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 postgresql
  ```
- Go to path /home/dps-user/Device-Pairing-Subsystem
  ```
  cd /home/dps-user/Device-Pairing-Subsystem
  ```
- Create virtual environment and activate it
  ```
  virtualenv –m python3 venv
  source venv/bin/activate
  ```
- Install all libraries from requirements.txt in virtual environment
  ```
  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
  ```


3. Configuration

3.1 Nginx Configuration

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

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

- Now create a new configuration file in the root path

```
nano /home/dps-user/Device-Pairing-Subsystem/dps-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-dps;}
location @dirbs-dps
{
include uwsgi_params;
uwsgi_pass unix:/home/dps-user/Device-Pairing-Subsystem/uwsgi.sock;
  }
}
```

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

```
sudo ln -s /home/dps-user/Device-Pairing-Subsystem/dps-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/dps-user/Device-Pairing-Subsystem/uwsgi.ini
```

- Add below lines in this configuration file:

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



```
#python module to import
app = run
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

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

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

#ownership of uwsgi service
uid = dps-user
gid = dps-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/dps-user/Device-Pairing-Subsystem/uwsgi.ini \
  /etc/uwsgi/vassals/uwsgi.ini
  ```
- Create a new directory for log files
  ```
  sudo mkdir -p /var/log/uwsgi
  ```
- Change ownership of the logs directory to dps-user
  ```
  chown -R dps-user:dps-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
  `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/dps-user/Device-Pairing-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 DPS Configuration and Initialization

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

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

To activate the virtual environment created earlier at `/home/dps-user/Device-Pairing-Subsystem` and start database initialization

```
cd /home/dps-user/Device-Pairing-Subsystem
source venv/bin/activate
```

- Create folder “Downloads” into the app directory.

  `mkdir/home/dps-user/Device-Pairing-Subsystem/Downloads`

- Install all libraries from requirements.txt in virtual environment

  `pip3 install -r requirements.txt`

- Create virtual environment using **virtualenv** and activate it:

```
virtualenv venv
source venv/bin/activate
```

Make sure that virtual-env is made using Python3 and all the required dependencies are installed.

- Run Database migrations using:

```
python manage.py db init
python manage.py db migrate
python manage.py db upgrade
python manage.py create_view
```

This will automatically create and migrate database schemas and requirements.

- Start DPS development server using:

```
python run.py
```

This will start a flask development environment for DPS.

- To run unit tests, run:

```
pytest -v -s
```

3.4.1 Other Helpful Commands

- To Upgrade already installed database:

```
python manage.py db upgrade
```

- To generate full pairing-list for DIRBS Core:

```
python scripts/pairlist_gen_complete.py
```

- To generate delta pairing-list for DIRBS Core:

```
python scripts/pairlist_gen_delta.py
```

- To delete un-confirmed pairs to clean-up main DB:

```
python scripts/unconfirmed_pair_deletion.py
```

- To run unit and regression tests:

```
pytest -v -s
```

- To enable different languages & activate their translations from English

```
pybabel extract -F babel.cfg -k _l -o messages.pot .
pybabel init -i messages.pot -d app/translations -l <language-code>
```

e.g to translate in Spanish

```
pybabel init -i messages.pot -d app/translations -l es
```

Finally, to compile the language

```
pybabel compile -d app/translations
```


- To update any translation after compilation

```
pybabel update -i messages.pot -d app/translations -l es
```

3.5 Configuration File Settings

DPS core configuration paramaters will be defined in configuration file “config.yml” and will be placed at root directory. The details of the parameters, their default values and usage are described below;

`pair_limit`: Defines how many secondary pairs you want DPS to allow. The default value is set to 4 and can be changed acoording to business needs.

pc_length: Controls the length of pair-code. Pair-Code acts like OTP (One-Time-Password) and will be given to subscriber upon registering the device with authority. The default value is set to 8.

`imeis_per_device`: As the name suggests, this parameter allows the total number of IMEIs that can be registered against single device. The default value is set to 5 but can be altered as per business needs.

Database connection Parameters

These DB parameters must be set before initialization of application according to your database settings

`Dbname`: The parameter must be set with database name. Default is the dummy database name.

`Dbusername`: Database username must be provided in this parameter. Default is the dummy username.

`Dbpassword`: Database password must be provided in this parameter. Default is the dummy password.

`Dbhost`: The IP address of database will be mentioned here. Default value is set to localhost.

Database tunning Parameters

These parameters are already set for optimized performance of DB but can be modified as per needs

`pool_size`: The parameter controls the number of sessions in pool for DB. Its default value is 100

`pool_timeout`: Default value of this parameter is 20

`pool_recycle`: Default value of this parameter is 10

`overflow_size`: overflow size is kept to 275

Operator related parameters

Just like DB, the values of these parameters must also be set as per opertors' requirements before running the app.

```
num_of_mnos: 5
MNO_Names: ["jazz", "telenor", "ufone", "zong", "warid"]
```

To add the sixth operator, one should simply add below line

```
MNO_6: 'Vodafone'
```

Just like DB parameters, following Kannel parameters must also be added

```
kannel_sms: 'http://192.168.100.70:13013/cgi-bin/sendsms'
kannel_username: 'tester'
kannel_password: 'foobar'
kannel_smsc: 'at'
kannel_shortcode: '7787'
```

To add multilanguage support

```
supported_languages:
  languages: ['es', 'id', 'en']
  default_language: 'en'
```

`kannel_sms`: This parameter contains the URL configured for Kannel server. Default value is the dummy server address.

`pairlist_path`: The parameter contains the path at which pair-lists will be saved. One of the products of DPS is pairing-list which is required by DIRBS-CORE to generate exception lists. You need to mention the directory, in this parameter, at which you want to save these pair-lists

`Download_Path`: The path for storing bulk MSISDN-files for operators. DPS will save these files in that directory which need manual housekeeping later on.

`Upload_Path`: The MSISDN-IMSI pairing files which are uploaded by operators will be placed on a directory mentioned in this parameter.

`sms_pair_limit_breached`: This is a sample parameter for one of the responses provided by DPS to Kannel. You can set as many parameters as possible for different kind of SMS(s). The value in the parameter will be provided to Kannel as string.

4. Testing

- To test Nginx server configuration, run below mentioned command:
  ```
  nginx –t
  ```

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

