
PyFreeBilling, Wholesale billing and softswitch application based on Freeswitch Documentation

Release 1.3

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Wholesale billing and softswitch application based on Freeswitch

pyfreebilling is an **open source wholesale billing platform** for **FreeSWITCH**.

1.1 Introduction

1.1.1 What is pyfreebilling

pyfreebilling is an **open source wholesale billing platform** for **FreeSWITCH**.

pyfreebilling is developed under python, LUA and PostgreSQL as the database layer.

1.1.2 General prerequisites

In order to run pyfreebilling, you need the following configured, secured and working Basic Operating System (Linux or BSD).

The project uses Kamailio, Freeswitch, PostgreSQL and Django.

1.2 Changelog

1.2.1 Version 1.5.0 (Not yet released)

New features

- New CDR import script (PERL packages are no longer needed)
- Recurring services
- Invoicing

Bug corrections

- N/A

1.2.2 Version 1.4.6

Bug correction

- Resolve a codec error when using Eyebeam as sip client.

1.2.3 Version 1.4.5

Modifications

- Correct javascript issues

1.2.4 Version 1.4.4

Modifications

- Apache template : disable sslv2 and sslv3 (POODLE - CVE-2014-0224)
- Sofia new option : tracelevel with default value “error” (if you need more debug, in cli : sofia tracelevel debug)

1.2.5 Version 1.4.3

New features

- Bd backup every day (in backups directory and FTP)
- Customer panel : new xport CDR panel

Bug corrections

- fix javascript issues with new firefox version (need delete static before update)
- fix alert message in customer panel when account is blocked due to low balance.
- LUA excaping error in DID
- Fix js bug in inlines (impact LCR and customer view)

1.2.6 Version 1.4.2

New features

- Customer panel traduction (French)
- Add G722 Codec

Bug corrections

- Admin : stats : div per 0 error
- Test if customer UA has available codec recognised by FS

1.2.7 Version 1.4.1

New features

- Admin stats enhancements

Security

- Validation of django 1.6.7 (dependencies update)

Bug corrections

- Postpaid : a negative credit limit value no longer blocks call process
- Admin : CDR export button is now visible in CDR panel
- Admin : Database size view now correct

1.2.8 Version 1.4

New features

- New customer portal
- HTTPS access only
- Reload Fs config via button in admin panel
- Currency management
- Database size monitoring - new panel (in admin menu)
- Sofia Gateway : add new choose lists for selecting codecs
- Add sip profile DTMF options (pass-rfc2833)
- Add new rtp_rewrite_timestamps sofia profile option
- Visitors and web interface use stats
- Admin CDR panel : show minutes / sell / cost / margin corresponding to selection
- New dashboard : revenue / cost / minutes / calls stats
- documentation update for installation of 1.4 freeswitch version
- web country blocker based on visitor's ip. Databases : freegeoip.net and/or maxmind
- detailed customers, providers and destinations stats

Modifications

- Django 1.6 migration
- All dependencies are up to date
- Optimisation of customer sip parameter and customer sip UA codecs selection

Bug corrections

- Add new codec options in Customer sip accounts and sip profiles : G711u&G711a and G711a&G711u
- Destination number is checked before LUA
- Recurrent tasks working with new chronicle version

1.2.9 Version 1.3

New features

- DID module : import DID, DID billing, DID cdr report
- Customer sip account module : add many options to handle sip registration and NAT. New admin panel.
- Sofia profile module : add many options. New admin panel.
- Add the possibility to block/allow ratecard by CallerID prefix list.

Modifications

- “Tarif group” is now “ratecard”

Bug corrections

- some menu corrections
- other bug corrections

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Version 3, 29 June 2007

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```
<one line to give the program's name and a brief idea of what it does.>
Copyright (C) <year> <name of author>
```

```
This program is free software: you can redistribute it and/or modify
it under the terms of the GNU General Public License as published by
the Free Software Foundation, either version 3 of the License, or
(at your option) any later version.
```

```
This program is distributed in the hope that it will be useful,
but WITHOUT ANY WARRANTY; without even the implied warranty of
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
GNU General Public License for more details.
```

```
You should have received a copy of the GNU General Public License
along with this program. If not, see <http://www.gnu.org/licenses/>.
```

Also add information on how to contact you by electronic and paper mail.

If the program does terminal interaction, make it output a short notice like this when it starts in an interactive mode:

```
<program> Copyright (C) <year> <name of author>
This program comes with ABSOLUTELY NO WARRANTY; for details type `show w'.
This is free software, and you are welcome to redistribute it
under certain conditions; type `show c' for details.
```

The hypothetical commands `show w` and `show c` should show the appropriate parts of the General Public License. Of course, your program's commands might be different; for a GUI interface, you would use an *about box*.

You should also get your employer (if you work as a programmer) or school, if any, to sign a *copyright disclaimer* for the program, if necessary. For more information on this, and how to apply and follow the GNU GPL, see <http://www.gnu.org/licenses/>.

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1.4 Features

There are many features supported. Most of them are configurable via the web interface. A few of them are:

- Customer add/modify/delete
- IP termination
- SIP authentication
- Prepaid and/or postpaid
- Realtime billing
- Block calls on negative balance (prepaid) or balance under credit limit (postpaid)
- Block / allow negative margin calls
- Email alerts
- Daily balance email to customer
- Limit the maximum number of calls per customer and/or per gateway
- Multiple contexts
- Tons of media handling options
- Powerfull ratecard engine
- Provider add/modify/delete
- Powerful LCR engine
- Routing based on area code
- Routing decision based on quality, reliability, cost or load balancing (equal)
- Limit max channels by each provider gateway
- Extensive call and financial reporting screens (TBD)
- CDR export to CSV
- Design for scalability

... and much more :)

1.5 Installation

1.5.1 Table of contents

- Introduction
- Prerequisites
- Sip server installation
- SBC installation
- Postgresql configuration
- Web server install
- PyFreeBilling installation

- Next step

1.5.2 Introduction

This howto is written for Debian 8 server. You need 2 interfaces with 2 ip public addresses, one for customers side and the other one for provider side.

1.5.3 Prerequisites

First, you need to install these packages

```
apt-get install git-core build-essential autoconf automake libtool libtool-bin ↵  
↵libncurses5 libncurses5-dev gawk libjpeg-dev zlib1g-dev pkg-config libssl-dev libpq- ↵  
↵dev unixodbc-dev odbc-postgresql postgresql postgresql-client libpq-dev libxml2-dev ↵  
↵libxslt-dev ntp ntpdate libapache2-mod-wsgi apache2 gcc python-setuptools python- ↵  
↵pip libdbd-pg-perl libtext-csv-perl sqlite3 libsqlite3-dev libcurl4-openssl-dev ↵  
↵libpcre3-dev libspeex-dev libspeexdsp-dev libldns-dev libedit-dev libmemcached-dev ↵  
↵python-psycopg2 python-dev libgeoip-dev libffi-dev
```

1.5.4 Postgresql configuration

- create user and database :

```
su postgres
```

```
createuser -P pyfreebilling --interactive  
Enter password for new role:  
Enter it again:  
Shall the new role be a superuser? (y/n) n  
Shall the new role be allowed to create databases? (y/n) y  
Shall the new role be allowed to create more new roles? (y/n) y
```

```
createdb -O pyfreebilling -E UTF8 pyfreebilling  
exit
```

1.5.5 Sip server installation

- First, install dependencies, edit sources.list :

```
nano /etc/apt/sources.list
```

- Add this lines at the end of the files :

```
# Kamailio 4.4 Release  
deb http://deb.kamailio.org/kamailio44 jessie main  
deb-src http://deb.kamailio.org/kamailio44 jessie main
```

- Add the repo GPG key, update the packages list, and install packages :

```
wget -O- http://deb.kamailio.org/kamailiodebkey.gpg | sudo apt-key add -
apt-get update
apt-get install libpq5 libpq-dev
apt-get install kamailio kamailio-tls-modules kamailio-postgres-modules kamailio-
↳outbound-modules kamailio-extra-modules kamailio-xml-modules
```

- After finishing the installation, you have to edit /etc/default/kamailio file:

```
#
# Kamailio startup options
#

# Set to yes to enable kamailio, once configured properly.
RUN_KAMAILIO=yes

# User to run as
USER=kamailio

# Group to run as
GROUP=kamailio

# Amount of shared and private memory to allocate
# for the running Kamailio server (in Mb)
#SHM_MEMORY=64
#PKG_MEMORY=8

# Config file
CFGFILE=/etc/kamailio/kamailio.cfg

# Enable the server to leave a core file when it crashes.
# Set this to 'yes' to enable Kamailio to leave a core file when it crashes
# or 'no' to disable this feature. This option is case sensitive and only
# accepts 'yes' and 'no' and only in lowercase letters.
# On some systems it is necessary to specify a directory for the core files
# to get a dump. Look into the kamailio init file for an example configuration.
DUMP_CORE=yes
```

- Configuration files are located in /etc/kamailio/ folder.

The /etc/kamailio/kamctlrc is the configuration file for kamctl and kamdbctl tools. You need to edit it and set the SIP_DOMAIN to your SIP service domain (or IP address if you don't have a DNS hostname associated with your SIP service).

Set also the DBENGINE to be PGSQL and adjust other setting as you want. Very important are the passwords to connect to PostgreSQL server, respectively DBRWPW and DBROPW. By default, their values are kamailiorw and kamailioro. You should change them before executing kamdbctl create (step detailed the section Create Database).

```
sed '/^[# ]*SIP_DOMAIN/cSIP_DOMAIN=sip.<DOMAIN>.net" -i /etc/kamailio/kamctlrc
sed '/^[# ]*DBENGINE/cDBENGINE=PGSQL' -i /etc/kamailio/kamctlrc
sed '/^[# ]*DBHOST/cDBHOST=localhost' -i /etc/kamailio/kamctlrc
sed '/^[# ]*DBNAME/cDBNAME=pyfreebilling' -i /etc/kamailio/kamctlrc
sed '/^[# ]*DBRWUSER/cDBRWUSER=kamailio' -i /etc/kamailio/kamctlrc
sed '/^[# ]*DBRWPW/cDBRWPW="kamailio"' -i /etc/kamailio/kamctlrc
sed '/^[# ]*DBROUSER/cDBROUSER=kamailioro' -i /etc/kamailio/kamctlrc
sed '/^[# ]*DBROPW/cDBROPW=kamailioro' -i /etc/kamailio/kamctlrc
sed '/^[# ]*DBROOTUSER/cDBROOTUSER="pyfreebilling" ' -i /etc/kamailio/kamctlrc
```

The database name created in PostgreSQL is kamailio. Two access users to PostgreSQL server were created:

- kamailio - (with password set by DBRWPW in kamctlrc) - user which has full access rights to kamailio database
- kamailioro - (with password set by DBROPW in kamctlrc) - user which has read-only access rights to kamailio database
- Start / stop kamailio :

If the default startup system is systemd, then kamailio can be managed via systemctl:

```
systemctl start kamailio
systemctl stop kamailio
```

First you may also need to edit /etc/default/kamailio and adjust the setting for kamailio startup script, in particular the one that enables kamailio to start.

- Check if it is ok :

```
lsof -i :5060
```

- Add crontab :

```
*/10 * * * * /usr/sbin/kamcmd dialplan.reload>> /var/log/cron.log 2>&1
*/10 * * * * /usr/sbin/kamcmd dispatcher.reload>> /var/log/cron.log 2>&1
*/10 * * * * /usr/sbin/kamcmd permissions.addressReload>> /var/log/cron.log 2>&1
```

1.5.6 SBC installation

- AUTOMATIC INSTALL (from package) :

```
wget -O - https://files.freeswitch.org/repo/deb/debian/freeswitch_archive_g0.pub |  
→ apt-key add -  
  
echo "deb http://files.freeswitch.org/repo/deb/freeswitch-1.6/ jessie main" > /  
→ etc/apt/sources.list.d/freeswitch.list  
  
# you may want to populate /etc/freeswitch at this point.  
# if /etc/freeswitch does not exist, the standard vanilla configuration is  
→ deployed  
apt-get update && apt-get install -y freeswitch-meta-bare freeswitch-mod-commands  
→ freeswitch-meta-codecs freeswitch-mod-console freeswitch-mod-logfile freeswitch-  
→ conf-vanilla freeswitch-mod-lua freeswitch-mod-cdr-csv freeswitch-mod-event-socket  
→ freeswitch-mod-sofia freeswitch-mod-sofia-dbg freeswitch-mod-loopback freeswitch-  
→ mod-db freeswitch-mod-dptools freeswitch-mod-hash freeswitch-mod-esl freeswitch-mod-  
→ dialplan-xml freeswitch-dbg freeswitch-mod-directory freeswitch-mod-nibblebill  
apt-get install -f odbc-postgresql unixodbc-bin unixodbc-dev libdbd-pg-perl  
→ libtext-csv-perl
```

- If you do not want to use snmp, comment the corresponding line in modules.conf.xml.

1.5.7 ODBC configuration

- set odbc parameters; you need to create and edit /etc/odbc.ini file. Do not forget to specify your postgres password !

```
[freeswitch]  
Driver = PostgreSQL  
Description = Connection to POSTGRESQL
```

```
Servername = 127.0.0.1
Port = 5432
Protocol = 6.4
FetchBufferSize = 99
Username = pyfreebilling
Password =
Database = pyfreebilling
ReadOnly = no
Debug = 0
CommLog = 0
```

- edit /etc/odbcinst.ini (delete all entries and add these ones)

```
[PostgreSQL]
Description      = PostgreSQL ODBC driver (Unicode version)
Driver           = /usr/lib/x86_64-linux-gnu/odbc/psqlodbcw.so
Setup           = /usr/lib/x86_64-linux-gnu/odbc/libodbcpsqlS.so
Debug           = 0
CommLog         = 0
UsageCount      = 0
Threading       = 0
MaxLongVarcharSize = 65536
```

1.5.8 Web server install

- securing apache

```
sudo a2enmod ssl
sudo make-ssl-cert /usr/share/ssl-cert/ssleay.cnf /etc/ssl/private/localhost.pem (or
↳ use others methods or certificats)
```

- install python virtualenv

```
pip install virtualenv
cd /usr/local
virtualenv venv --no-site-packages
chown -R myuser:mysuser venv (replace myuser by your current user, perhaps root -
↳ better other one)
```

- activate it :

```
source venv/bin/activate
cd venv
```

- install CPAN :

- install all dependent packages for CPAN

```
apt-get install build-essential
```

- invoke the cpan command as a normal user :

```
$cpan
But once you hit on enter for "cpan" to execute, you be asked of
some few questions. To make it simple for yourself, answer "no"
for the first question so that the latter ones will be done for
```



```
you automatically.
```

```
-> ANSWER YES
```

- **Once the above is done, you will be present with the cpan prompt.** now enter the commands below

```
cpan prompt> make install  
cpan prompt> install Bundle::CPAN
```

- **Now all is set and you can install any perl module you want.** examples of what installed below

```
cpan prompt> install Carp  
cpan prompt> install Filter::Simple  
cpan prompt> install Config::Vars  
cpan prompt> exit
```

1.5.9 Pyfreebilling installation

- download pyfreebilling sources :

```
cd /usr/local/venv  
git clone https://github.com/mwolff44/pyfreebilling.git -b v2.1  
chown -R www-data:www-data pyfreebilling  
cd pyfreebilling
```

- create a new file in pyfreebilling directory called local.py (**delete the existing one**)

```
nano /usr/local/venv/pyfreebilling/config/settings/local.py
```

- edit this new file, and put yours specific values

```
# -*- coding: utf-8 -*-  
from .base import *  
  
# ##### DEBUG CONFIGURATION  
DEBUG = False  
# ##### END DEBUG CONFIGURATION  
  
# ##### MANAGER CONFIGURATION  
ADMINS = (  
    # ('Your Name', 'your_email@example.com'),  
)  
  
MANAGERS = ADMINS  
# ##### END MANAGER CONFIGURATION  
  
# ##### DATABASE CONFIGURATION  
DATABASES = {  
    'default': {  
        'ENGINE': 'django.db.backends.postgresql_psycopg2',  
        'NAME': 'pyfreebilling',  
        'USER': 'pyfreebilling',  
        'PASSWORD': 'password',  
        'HOST': '127.0.0.1',
```

```
        'PORT': '',                                # Set to empty string for default.
    }
}
# ##### END DATABASE CONFIGURATION

# ##### HOST CONFIGURATION
# Add your IP and domain
ALLOWED_HOSTS = ['*']
# ##### END HOST CONFIGURATION

# ##### SECRET CONFIGURATION
# Note: very important - put your key for security - any string
SECRET_KEY = 'securitykeymustbechanged'
# ##### END SECRET CONFIGURATION

# ##### COUNTRY SPECIFIC
TIME_ZONE = 'Europe/Paris'
# LANGUAGE_CODE = 'it' # uncomment do change webinterface language
# ##### END COUNTRY SPECIFIC

# ##### SPECIFIC SETTINGS

OPENEXCHANGERATES_APP_ID = "Your API Key"

#-- Nb days of CDR to show
PFB_NB_ADMIN_CDR = 30
PFB_NB_CUST_CDR = 30

# ##### END SPECIFIC SETTINGS

# ##### EMAIL CONFIGURATION
# EMAIL SETUP
TEMPLATED_EMAIL_BACKEND = 'templated_email.backends.vanilla_django.TemplateBackend'
TEMPLATED_EMAIL_TEMPLATE_DIR = 'templated_email/'
TEMPLATED_EMAIL_FILE_EXTENSION = 'email'

EMAIL_BACKEND = 'django.core.mail.backends.smtp.EmailBackend'
EMAIL_HOST = ''
EMAIL_PORT = 587
EMAIL_HOST_USER = ''
EMAIL_HOST_PASSWORD = ''
#EMAIL_USE_TLS = True
EMAIL_USE_SSL = True
EMAIL_SIGNATURE = ''
# ##### END EMAIL CONFIGURATION
```

- and now, enter the following commands without sudo (IMPORTANT). At the step “syncdb”, you will have a prompt asking you to enter a username and a password. They are very important, as they are the admin one !

```
pip install -r requirements/prod.txt
python manage.py migrate
python manage.py createsuperuser
- (IMPORTANT : enter your username and password) --

python manage.py loaddata 0001_initial_SipProfile.json
python manage.py loaddata 0001_initial_ReccurentTasks.json
python manage.py loaddata 0001_initial_Version.json
python manage.py collectstatic (answer 'yes')
```

- copy some config files :

```
mkdir /usr/share/freeswitch/scripts
cd /usr/local/venv/pyfreebilling/install/resources/fs/config
cp -av conf/autoload_configs/* /etc/freeswitch/autoload_configs/
cp -av conf/dialplan/* /etc/freeswitch/dialplan/
cp -av scripts/* /usr/share/freeswitch/scripts/
```

- configure Freeswitch :

```
rm -f /etc/freeswitch/directory/default/*
chown freeswitch:www-data -R /etc/freeswitch/
mkdir /tmp/cdr-csv/
chmod 777 -R /tmp/cdr-csv
touch /tmp/cdr-csv/Master.csv
chmod 600 /tmp/cdr-csv/Master.csv
chown freeswitch:freeswitch /tmp/cdr-csv/Master.csv
chown -R freeswitch:daemon /tmp/cdr-csv/
```

You need to adapt `acl_conf.xml` to accept sip requests from kamailio.

- configure Kamailio :

```
cp /usr/local/venv/pyfreebilling/install/resources/kam/config/* /etc/kamailio/
```

Adapt the data in `kamctlrc` and `kamailio-local.cfg` (do not touch `kamailio.cfg`)

- set apache config :

```
cp /usr/local/venv/pyfreebilling/setup/apache/001-pyfreebilling /etc/apache2/sites-
↳enabled/000-default.conf
a2ensite 000-default
/etc/init.d/apache2 restart
```

- set crontab :

```
* /1 * * * * perl /usr/share/freeswitch/scripts/import-csv.pl>> /var/log/cron.log 2>&1
* * * * * /usr/local/venv/bin/chroniker -e /usr/local/venv/bin/activate_this.py -p /
↳usr/local/venv/pyfreebilling -s config.settings.local
```

- modify db password and somme settings in :

```
/usr/local/venv/pyfreebilling/config/settings/local.py
/usr/share/freeswitch/scripts/import-csv.pl
```

- restart FreeSwitch :

```
systemctl restart freeswitch
```

1.5.10 Pyfreebilling login

Got to the url <https://my-ip/extranet> and enter your username and password.

The customer portal url is : <https://my-ip>

I recommend to setup a firewall restricting access to web pages and your voip ports !

1.6 Migration

1.6.1 Table of contents

- Introduction
- Prerequisites
- From 1.4.5 to 1.4.6

1.6.2 Introduction

You will find migration guide from stable version to another one. Please follow carefully each step.

1.6.3 Prerequisites

Before following the migration guide, you must be located in :

`cd /usr/local/venv/pyfreebilling` directory.

Also, you virtual venv must be activated :

`source /usr/local/venv/bin/activate`

1.6.4 From 1.4.5 to 1.4.6

Just enter these commands :

`git pull`

And restart FreeSwitch.

1.7 Developer documentation

1.7.1 pyfreebill

ToDo

CHAPTER 2

Support

For free support, please use bitbucket issue tools.

CHAPTER 3

Contact Information

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