
Business API Ecosystem Documentation

Release latest

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1	Index	3
1.1	Installation and Administration Guide	3
1.2	User Guide	31
1.3	Programmer Guide	104
1.4	Plugins Guide	111

This project is part of [FIWARE](#) and has been made in collaboration with the [TM Forum](#).

The Business API Ecosystem is a joint component made up of the FIWARE Business Framework and a set of APIs (and its reference implementations) provided by the TMForum. This component allows the monetization of different kind of assets (both digital and physical) during the whole service life cycle, from offering creation to its charging, accounting and revenue settlement and sharing. The Business API Ecosystem exposes its complete functionality through TMForum standard APIs; concretely, it includes the catalog management, ordering management, inventory management, usage management, billing, customer, and party APIs.

The Business API Ecosystem is not a single software repository, but it is composed of different projects which work coordinately to provide the complete functionality.

Concretely, the Business API Ecosystem is made of the following components:

- *Reference implementations of TM Forum APIs*: Reference implementation of the catalog management, ordering management, inventory management, usage management, billing, customer, and party APIs.
- *Business Ecosystem Charging Backend*: Is the component in charge of processing the different pricing models, the accounting information, and the revenue sharing reports. With this information, the Business Ecosystem Charging Backend is able to calculate amounts to be charged, charge customers, and pay sellers.
- *Business Ecosystem RSS*: Is in charge of distributing the revenues originated by the usage of a given service among the involved stakeholders. In particular, it focuses on distributing part of the revenue generated by a service between the Business API Ecosystem instance provider and the Service Provider(s) responsible for the service. With the term “service” we refer to both final applications and backend application services (typically exposed through an API). Note that, in the case of composite services, more than one service provider may have to receive a share of the revenues.
- *Business Ecosystem Logic Proxy*: Acts as the endpoint for accessing the Business API Ecosystem. On the one hand, it orchestrates the APIs validating user requests, including authentication, authorization, and the content of the request from a business logic point of view. On the other hand, it serves a web portal that can be used to interact with the system.

Installation and Administration Guide The guide for maintainers that explains how to install it.

User Guide The guide for users that explains how to use it.

Programmer Guide The guide for programmers that explains how to develop plugins

Plugins Guide The guide for admins that cover the available plugins

1.1 Installation and Administration Guide

1.1.1 Introduction

This installation and administration guide covers the Business API Ecosystem version 6.4.0, corresponding to FIWARE release 6. Any feedback on this document is highly welcomed, including bugs, typos or things you think should be included but aren't. Please send them to the "Contact Person" email that appears in the [Catalogue page for this GEi](#). Or create an issue at [GitHub Issues](#)

The current version of the software has been tested under Ubuntu 14.04, Ubuntu 15.10, Ubuntu 16.04, Debian 7, Debian 8, and CentOS 7. THESE ARE THEREFORE CONSIDERED AS THE SUPPORTED OPERATING SYSTEMS.

1.1.2 Installation

Requirements

As described in the GErI overview, the Business API Ecosystem is not a single software, but a set of projects that work together for proving business capabilities. In this regard, this section contains the basic dependencies of the different components that made up the Business API Ecosystem.

Note: These dependencies are not mean to be installed manually in this step, as they will be installed throughout the documentation

TM Forum APIs and RSS requirements

- Java 8
- Glassfish 4.1
- MySQL 5.5

Charging Backend requirements

- Python 2.7
- MongoDB
- wkhtmltopdf

Logic Proxy requirements

- NodeJS 4.5.0+ (Including NPM)

Installing basic dependencies

Basic dependencies such as Java 8, Glassfish, MySQL, Python, etc. Can be installed using the package management tools provided by your operating system. However, in order to easy the installation process some scripts have been provided.

Note: The installation script may override some of the packages already installed in the system. so if you have software with common dependencies you may want to manually resolve them.

Installing basic dependencies using the script

In order to automate the installation of the basic dependencies, the script *setup_env.sh* has been provided. This script, located in the root directory, installs all the needed packages for Ubuntu, Debian, and CentOS systems.

Additionally, this script creates a directory */opt/biz-ecosystem* where Glassfish 4.1 and Node 6.9.1 are downloaded, creates a */etc/default/rss* directory used later for properties files, and sets up the PATH environment in your *.bashrc* file.

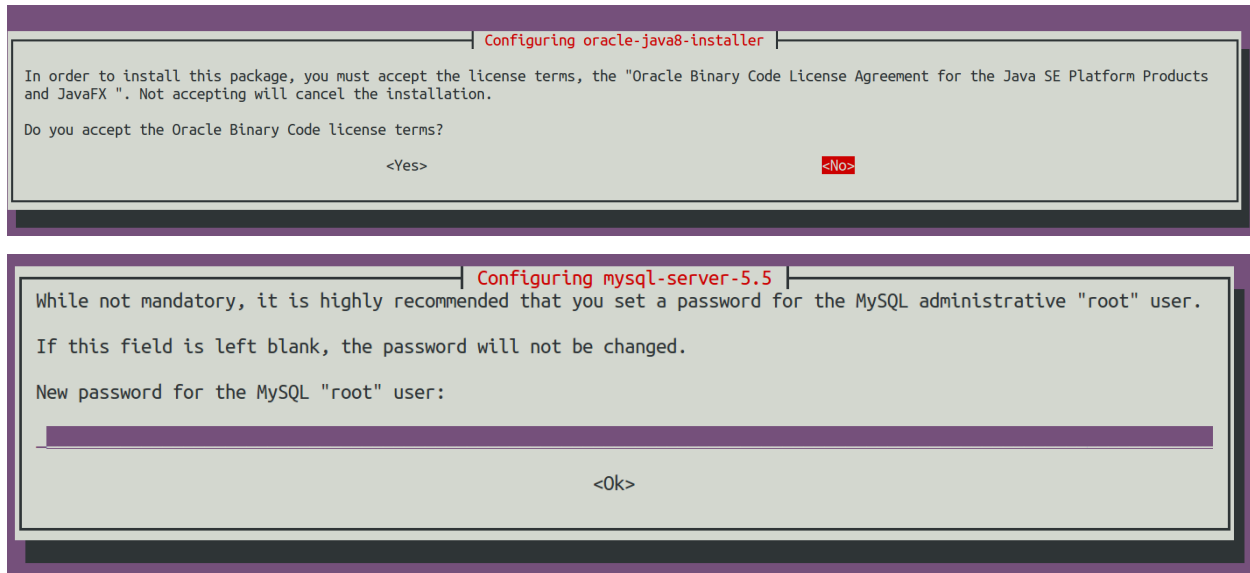
Note: The installation script changes the owner of all its created directories to your current user

To execute the script, run the following command from the root directory of the project

```
$ ./setup_env.sh
```

Note: Do not execute the script using sudo, for those tasks which require root privileges the script will prompt you to provide your sudo password

During the execution of the script you will be prompted some times in order to accept Oracle Java 8 terms and conditions and to provide MySQL root password.



Installing basic dependencies manually

Following, you can find how to install the basic dependencies without using the script. Be aware that some commands require to be executed as root.

APIs dependencies

Java 8 Debian/Ubuntu

To install Java 8 in a Debian or Ubuntu system, it is needed to include the *webupd8team* repository. In an Ubuntu system this can be done directly with the following command:

```
$ sudo add-apt-repository ppa:webupd8team/java
```

In the case you have a Debian system the following commands have to be executed

```
$ sudo echo "deb http://ppa.launchpad.net/webupd8team/java/ubuntu trusty main" | tee /
→etc/apt/sources.list.d/webupd8team-java.list
$ sudo echo "deb-src http://ppa.launchpad.net/webupd8team/java/ubuntu trusty main" |
→tee -a /etc/apt/sources.list.d/webupd8team-java.list
$ sudo apt-key adv --keyserver hkp://keyserver.ubuntu.com:80 --recv-keys EEA14886
```

Then Java 8 can be installed using the following commands:

```
$ sudo apt-get update
$ sudo apt-get install -y oracle-java8-installer
$ sudo apt-get install -y oracle-java8-set-default
```

Java 8 CentOS 7

For a CentOS 7 system, the installation of Java 8 requires downloading the package from the official site

```
$ wget --no-cookies --no-check-certificate --header "Cookie: gpw_e24=http%3A%2F%2Fwww.
→oracle.com%2F; oraclelicense=accept-securebackup-cookie" "http://download.oracle.
→com/otn-pub/java/jdk/8u102-b14/jdk-8u102-linux-x64.tar.gz"
$ tar xzf jdk-8u102-linux-x64.tar.gz
```

Then Java can be installed using *alternatives*

```
$ sudo alternatives --install /usr/bin/java java /opt/biz-ecosystem/jdk1.8.0_102/bin/
→java 2
$ sudo alternatives --config java

$ sudo alternatives --install /usr/bin/jar jar /opt/biz-ecosystem/jdk1.8.0_102/bin/
→jar 2
$ sudo alternatives --install /usr/bin/javac javac /opt/biz-ecosystem/jdk1.8.0_102/
→bin/javac 2
$ sudo alternatives --set jar /opt/biz-ecosystem/jdk1.8.0_102/bin/jar
$ sudo alternatives --set javac /opt/biz-ecosystem/jdk1.8.0_102/bin/javac
```

MySQL and Maven Debian/Ubuntu Once Java has been installed, the next step is installing MySQL and Maven

```
$ sudo apt-get install -y mysql-server mysql-client
$ sudo apt-get install -y maven
```

MySQL and Maven CentOS 7

For installing MySQL in CentOS, it is required to include the related repository before installing it

```
$ wget http://repo.mysql.com/mysql-community-release-el7-5.noarch.rpm
$ sudo rpm -ivh mysql-community-release-el7-5.noarch.rpm
$ sudo yum update

$ sudo yum install -y mysql-community-server
```

Then, for installing Maven

```
$ sudo wget http://repos.fedorapeople.org/repos/dchen/apache-maven/epel-apache-maven.
→repo -O /etc/yum.repos.d/epel-apache-maven.repo
$ sudo sed -i s/\\$releasever/6/g /etc/yum.repos.d/epel-apache-maven.repo
$ sudo yum install -y apache-maven
```

Glassfish The next step is downloading and extracting Glassfish

```
$ wget http://download.java.net/glassfish/4.1/release/glassfish-4.1.zip
$ unzip glassfish-4.1.zip
```

Finally, it is required to download the MySQL connector for Glassfish and include it within the Glassfish *lib* directory

```
$ wget http://dev.mysql.com/get/Downloads/Connector-J/mysql-connector-java-5.1.39.tar.
→gz

$ gunzip mysql-connector-java-5.1.39.tar.gz
$ tar -xvf mysql-connector-java-5.1.39.tar

$ cp mysql-connector-java-5.1.39/mysql-connector-java-5.1.39-bin.jar glassfish4/
→glassfish/lib
```

Charging Backend dependencies

Python 2.7 Debian/Ubuntu

To install Python 2.7 and Pip in a Debian/Ubuntu distribution, execute the following command

```
$ sudo apt-get install -y python python-pip
```

Python 2.7 CentOS

Python 2.7 is included by default in CentOS 7. To install Pip it is required to include EPEL repository. All this stuff can be done executing the following commands

```
$ sudo rpm -iUvh http://dl.fedoraproject.org/pub/epel/7/x86_64/e/epel-release-7-5.
↪noarch.rpm
$ sudo yum -y update
$ sudo yum install -y python-pip
```

MongoDB Debian/Ubuntu

To install MongoDB in a Debian/Ubuntu distribution, execute the following command

```
$ sudo apt-get install -y mongodb
```

MongoDB CentOS 7

To install MongoDB in CentOS it is needed to include its repository first. MongoDB can be installed executing the following commands

```
$ sudo echo "[mongodb]
name=MongoDB Repository
baseurl=http://downloads-distro.mongodb.org/repo/redhat/os/x86_64/
gpgcheck=0
enabled=1" > /etc/yum.repos.d/mongodb.repo

$ sudo yum install -y mongodb-org
```

Wkhtmltopdf Debian/Ubuntu

In Debian and Ubuntu Wkhtmltopdf is included in a package, so it can be directly installed with the following command

```
$ sudo apt-get install -y wkhtmltopdf
```

Wkhtmltopdf CentOS 7

In CentOS the Wkhtmltopdf RPM package has to be downloaded for installing it

```
$ wget http://download.gna.org/wkhtmltopdf/0.12/0.12.1/wkhtmltox-0.12.1_linux-centos7-
↪amd64.rpm
$ sudo rpm -ivh wkhtmltox-0.12.1_linux-centos7-amd64.rpm
```

Logic Proxy Dependencies

For installing Node and NPM it is needed to download the binaries from the official site and uncompress them

```
$ wget https://nodejs.org/dist/v6.9.1/node-v6.9.1-linux-x64.tar.xz
$ tar -xvf node-v6.9.1-linux-x64.tar.xz
```

Installing the Business API Ecosystem

As stated previously, the Business API Ecosystem is composed of different systems that need to be installed separately. In order to ease this process, it has been created an script **install.py** which can be used to automate the installation.

Installing the Business API Ecosystem using the script

The script *install.py* is located at the root of the Business API Ecosystem project. This script provides functionality to automate the installation of the software. Concretely, it downloads all the APIs and components, compiles and deploys the APIs, and installs python and node libraries.

This script depends on Python3 to work. If you have used the *setup_env.sh* script, Python 3 is already installed. Otherwise, you can install Python 3 using the following commands:

Debian/Ubuntu

```
$ sudo apt-get install -y python3
$ sudo apt-get install -y python3-pip
```

CentOS 7

```
$ sudo yum -y install scl-utils
$ sudo rpm -Uvh https://www.softwarecollections.org/en/scls/rhscl/python33/epel-7-x86_
→64/download/rhscl-python33-epel-7-x86_64.noarch.rpm
$ sudo yum -y install python33
```

Additionally, *install.py* specs the binaries of Glassfish and Node to be included in the PATH, and need to be accessible by the user using the script. This can be done with the following commands (Note that the commands are supposing both or them are installed at */opt/biz-ecosystem*)

```
$ export PATH=$PATH:/opt/biz-ecosystem/glassfish4/glassfish/bin
$ export PATH=$PATH:/opt/biz-ecosystem/node-6.9.1-linux-x64/bin

$ sudo chown -R <your_user>:<your_user> /opt/biz-ecosystem
```

If you have used *setup_env.sh**, the Glassfish installation directory already belongs to your user. In addition, the export PATH command has been included in your bashrc, so to have Node and Glassfish in the PATH execute the following command:

```
$ source ~/.bashrc
```

Moreover, *install.py* requires Glassfish, MySQL and MongoDB to be up and running.

Debian/Ubuntu

```
$ asadmin start-domain
$ sudo service mysql restart
$ sudo service mongodb restart
```

CentOS 7

```
$ asadmin start-domain
$ sudo systemctl start mysqld
$ sudo systemctl start mongod
```

Finally, during the deployment of the RSS API, the script saves the properties file in the default RSS properties directory. If you have used *setup_env.sh* this directory already exists. Otherwise, you have to manually create the

directory `/etc/default/rss`, being required to have root privileges to create it. Moreover, this directory must be accessible by the user executing the script. To do that

```
$ sudo mkdir /etc/default/rss
$ sudo chown <your_user>:<your_user> /etc/default/rss
```

The script `install.py` creates the different databases as well as the connection pools and resources. In this regard, after the execution of the script all the APIs will be already configured. You can specify the database settings by modifying the script and updating `DBUSER`, `DBPWD`, `DBHOST`, and `DBPORT`, which by default contains the following configuration.

```
DBUSER = "root"
DBPWD = "toor"
DBHOST = "localhost"
DBPORT = 3306
```

To make a complete installation of the Business API Ecosystem, execute the following command

```
$ ./install.py all
```

In addition to the `all` option, `install.py` also provides several options that allows to execute parts of the installation process, so you can have more control over it. Concretely, the script provides the following options:

- **clone**: Downloads from GitHub the different components of the Business API Ecosystem
- **maven**: Compiles the downloaded APIs using Maven
- **tables**: Creates the required databases in MySQL
- **persistence**: Builds persistence.xml files of the different APIs
- **pools**: Creates database pools in Glassfish
- **resources**: Creates database resources in Glassfish
- **redeploy**: Deploys APIs and RSS war files in Glassfish
- **proxy**: Installs proxy Node libs
- **charging**: Installs charging Python libs

Installing the Business API Ecosystem Manually

Installing TM Forum APIs

The different reference implementations of the TM Forum APIs used in the Business API Ecosystem are available in GitHub:

- [Catalog Management API](#)
- [Product Ordering Management API](#)
- [Product Inventory Management API](#)
- [Party Management API](#)
- [Customer Management API](#)
- [Billing Management API](#)
- [Usage Management API](#)

The installation for all of them is similar. The first step is cloning the repository and moving to the correct release

```
$ git clone https://github.com/FIWARE-TMForum/DSPRODUCTCATALOG2.git
$ cd DSPRODUCTCATALOG2
$ git checkout v6.4.0
```

Once the software has been downloaded, it is needed to create the connection to the database. To do that, the first step is editing the `src/main/resources/META-INF/persistence.xml` to have something similar to the following:

```
<?xml version="1.0" encoding="UTF-8"?>
<persistence version="2.1" xmlns="http://xmlns.jcp.org/xml/ns/persistence" xmlns:xsi=
↪ "http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://xmlns.jcp.
↪ org/xml/ns/persistence http://xmlns.jcp.org/xml/ns/persistence/persistence_2_1.xsd">
  <persistence-unit name="DSProductCatalogPU" transaction-type="JTA">
    <jta-data-source>jdbc/pcatv2</jta-data-source>
    <exclude-unlisted-classes>false</exclude-unlisted-classes>
    <properties>
      <property name="javax.persistence.schema-generation.database.action"
↪ value="drop-and-create"/>
    </properties>
  </persistence-unit>
</persistence>
```

Note that you should provide in the tag `jta-data-source` the name you want for your database connection resource, taking into account that it must be unique for each API.

The next step is creating the database for you API.

```
$ mysql-u <user> -p<passwd> "CREATE DATABASE IF NOT EXISTS <database>"
```

Note: You have to provide your own credentials and the selected database name to the previous command.

Once that the database has been created, the next step is creating the connection pool in Glassfish. To do that, you can use the following command:

```
$ asadmin create-jdbc-connection-pool --restype java.sql.Driver --driverclassname com.
↪ mysql.jdbc.Driver --property user=<user>:password=<passwd>:URL=jdbc:mysql://<host>:
↪ <port>/<database> <poolname>
```

Note: You have to provide you own database credentials, the database host, the database port, the database name of the one created previously, and a name for your pool

The last step for creating the database connection is creating the connection resource. To do that, execute the following command:

```
$ asadmin create-jdbc-resource --connectionpoolid <poolname> <jndiname>
```

Note: You have to provide the name of the pool you have previously created and a name for your resource, which has to be the same as the included in the `jta-data-source` tag of the `persistence.xml` file of the API.

When the database connection has been created, the next step is compiling the API sources with Maven

```
$ mvn install
```

Finally, the last step is deploying the generated war file in Glassfish

```
$ asadmin deploy --contextroot <root> --name <root> target/<WAR.war>
```

Note: You have to provide the wanted context root for the API, a name for it, and the path to the war file

Installing the RSS

The RSS sources can be found in [GitHub](#)

The first step for installing the RSS component is downloading it and moving to the correct release

```
$ git clone https://github.com/FIWARE-TMForum/business-ecosystem-rss.git
$ cd business-ecosystem-rss
$ git checkout v6.4.0
```

Then, the next step is coping, *database.properties* and *oauth.properties* files to its default location at */etc/default/rss*

```
$ sudo mkdir /etc/default/rss
$ sudo chown <your_user>:<your_user> /etc/default/rss
$ cp properties/database.properties /etc/default/rss/database.properties
$ cp properties/oauth.properties /etc/default/rss/ouath.properties
```

Note: You have to include your user when changing *rss* directory owner

Once the properties files have been copied, they should be edited in order to provide the correct configuration params:

database.properties

```
database.url=jdbc:mysql://localhost:3306/RSS
database.username=root
database.password=root
database.driverClassName=com.mysql.jdbc.Driver
```

oauth.properties

```
config.grantedRole=Provider
config.sellerRole=Seller
config.aggregatorRole=aggregator
```

Note: The different params included in the configuration file are explained in detail in the Configuration section

Once the properties files have been edited, the next step is compiling the sources with Maven

```
$ mvn install
```

Finally, the last step is deploying the generated war file in Glassfish

```
$ asadmin deploy --contextroot DSRevenueSharing --name DSRevenueSharing fiware-rss/
↳target/DSRevenueSharing.war
```

Installing the Charging Backend

The Charging Backend sources can be found in [GitHub](#)

The first step for installing the charging backend component is downloading it and moving to the correct release

```
$ git clone https://github.com/FIWARE-TMForum/business-ecosystem-charging-backend.git
$ cd business-ecosystem-charging-backend
$ git checkout v6.4.0
```

Once the code has been downloaded, it is recommended to create a virtualenv for installing python dependencies (This is not mandatory).

```
$ virtualenv virtenv
$ source virtenv/bin/activate
```

To install python libs, execute the *python-dep-install.sh* script

```
$ ./python-dep-install.sh
```

Note: If you have not created and activated a virtualenv you will need to execute the script using `sudo`

Installing the Logic Proxy

The Logic Proxy sources can be found in 'GitHub <<https://github.com/FIWARE-TMForum/business-ecosystem-logic-proxy>>'__

The first step for installing the logic proxy component is downloading it and moving to the correct release

```
$ git clone https://github.com/FIWARE-TMForum/business-ecosystem-logic-proxy.git
$ cd business-ecosystem-logic-proxy
$ git checkout v6.4.0
```

Once the code has been downloaded, Node dependencies can be installed with the provided script as follows

```
$ ./install.sh
```

Upgrading from 5.4.1

For upgrading Business API Ecosystem version 5.4.1 installations to version 6.4.0 a new command has been incorporated within the *install.py* script. This command downloads new components software, updates it, and migrates the different databases, so it lets the software ready to be used.

Note: It is highly recommended to make a backup of the different databases before upgrading the software

The first step for upgrading the Business API Ecosystem is downloading new version of the main repository in order to update installation scripts.

```
cd Business-API-Ecosystem
git fetch
git checkout v6.4.0
git pull origin v6.4.0
```

The new version of *install.py* has a new dependency (PyMySQL) that has to be manually solved in order to execute the upgrading command.

```
$ pip3 install pymysql
```

Once the main repository is upgraded, the next step is using the provided script for upgrading the software.

```
$ ./install.py upgrade
```

This command do not change your configuration parameters. Nevertheless, you should review the *Configuration* section as new settings has been included.

The *upgrade* command uses a set of new commands that have been incorporated within *install.py* in order to manage the upgrade. In particular:

- **download:** Downloads the new software for the different components of the Business API Ecosystem
- **dump:** Creates a dump of the different MySQL databases within */tmp*
- **migrate:** Migrates database contents from v5.4.1 to v6.4.0

1.1.3 Configuration

At this step, the different components of the Business API Ecosystem are installed. In the case of the TMForum APIs and the RSS, this installation process has already required to configure their database connection before their deployment, so they are already configured. Nevertheless, this section contains an explanation of the function of the different settings of the RSS properties files.

Configuring the RSS

The RSS has its settings included in two files located at */etc/default/rss*. The file *database.properties* contains by default the following fields:

```
database.url=jdbc:mysql://localhost:3306/RSS
database.username=root
database.password=root
database.driverClassName=com.mysql.jdbc.Driver
```

This file contains the configuration required in order to connect to the database.

- **database.url:** URL used to connect to the database, this URL includes the host and port of the database as well as the concrete database to be used
- **database.username:** User to be used to connect to the database
- **database.password:** Password of the database user
- **database.driverClassName:** Driver class of the database. By default MySQL

The file *oauth.properties* contains by default the following fields (It is recommended not to modify them)

```
config.grantedRole=Provider
config.sellerRole=Seller
config.aggregatorRole=aggregator
```

This file contains the name of the roles (registered in the idm) that are going to be used by the RSS.

- config.grantedRole: Role in the IDM of the users with admin privileges
- config.sellerRole: Role in the IDM of the users with seller privileges
- config.aggregatorRole: Role of the users who are admins of an store instance. In the context of the Business API Ecosystem there is only a single store instance, so you can safely ignore this flag

Configuring the Charging Backend

The Charging Backend creates some objects and connections in the different APIs while working, so the first step is configuring the different URLs of the Business API Ecosystem components by modifying the file *services_settings.py*, which by default contains the following content:

```
SITE = 'http://localhost:8004/'
LOCAL_SITE = 'http://localhost:8006/'

CATALOG = 'http://localhost:8080/DSPProductCatalog'
INVENTORY = 'http://localhost:8080/DSPProductInventory'
ORDERING = 'http://localhost:8080/DSPProductOrdering'
BILLING = 'http://localhost:8080/DSBillingManagement'
RSS = 'http://localhost:8080/DSRevenueSharing'
USAGE = 'http://localhost:8080/DSUsageManagement'
AUTHORIZE_SERVICE = 'http://localhost:8004/authorizeService/apiKeys'
```

This settings points to the different APIs accessed by the charging backend. In particular:

- SITE: External URL of the complete Business API Ecosystem using for Href creation
- LOCAL_SITE: URL where the Charging Backend is going to run
- CATALOG: URL of the catalog API including its path
- INVENTORY: URL of the inventory API including its path
- ORDERING: URL of the ordering API including its path
- BILLING: URL of the billing API including its path
- RSS: URL of the RSS including its path
- USAGE: URL of the Usage API including its path
- AUTHORIZE_SERVICE: Complete URL of the usage authorization service. This service is provided by the logic proxy, and is used to generate API Keys to be used by accounting systems when providing usage information.

Once the services have been configured, the next step is configuring the database. In this case, the charging backend uses MongoDB, and its connection can be configured modifying the *DATABASES* setting of the *settings.py* file.

```
DATABASES = {
    'default': {
        'ENGINE': 'django_mongodb_engine',
        'NAME': 'wstore_db',
        'USER': '',
        'PASSWORD': '',
```

```

    'HOST': '',
    'PORT': '',
    'TEST_NAME': 'test_database',
}
}

```

This setting contains the following fields:

- **ENGINE:** Database engine, must be fixed to `django_mongodb_engine`
- **NAME:** Name of the database to be used
- **USER:** User of the database. If empty the software creates a non authenticated connection
- **PASSWORD:** Database user password. If empty the software creates a non authenticated connection
- **HOST:** Host of the database. If empty it uses the default `localhost` host
- **PORT:** Port of the database. If empty it uses the default `27017` port
- **TEST_NAME:** Name of the database to be used when running the tests

Once the database connection has been configured, the next step is configuring the name of the IdM roles to be used by updating `settings.py`

```

ADMIN_ROLE = 'provider'
PROVIDER_ROLE = 'seller'
CUSTOMER_ROLE = 'customer'

```

This settings contain the following values:

- **ADMIN_ROLE:** IDM role of the system admin
- **PROVIDER_ROLE:** IDM role of the users with seller privileges
- **CUSTOMER_ROLE:** IDM role of the users with customer privileges

The Charging Backend component is able to send email notifications to the users when they are charged or receive a payment. In this way, it is possible to provide email configuration in the `settings.py` file by modifying the following fields:

```

WSTOREMAILUSER = 'email_user'
WSTOREMAIL = 'wstore_email'
WSTOREMAILPASS = 'wstore_email_passwd'
SMTPSERVER = 'wstore_smtp_server'
SMTPPORT = 587

```

This settings contain the following values: * **WSTOREMAILUSER:** Username used for authenticating in the email server * **WSTOREMAIL:** Email to be used as the sender of the notifications * **WSTOREMAILPASS:** Password of the user for authenticating in the email server * **SMTPSERVER:** Email server host * **SMTPPORT:** Email server port

Note: The email configuration is optional. However, the field `WSTOREMAIL` must be provided since it is used internally for RSS configuration

Additionally, the Charging Backend is the component that charges customers and pays providers. For this purpose it uses PayPal. For configuring paypal, the first step is setting `PAYMENT_METHOD` to `paypal` in the `settings.py` file

```

PAYMENT_METHOD = 'paypal'

```

Then, it is required to provide PayPal application credentials by updating the file `src/wstore/charging_engine/payment_client/paypal_client.py`

```
PAYPAL_CLIENT_ID = ''
PAYPAL_CLIENT_SECRET = ''
MODE = 'sandbox' # sandbox or live
```

This settings contain the following values:

- `PAYPAL_CLIENT_ID`: Id of the application provided by PayPal
- `PAYPAL_CLIENT_SECRET`: Secret of the application provided by PayPal
- `MODE`: Mode of the connection. It can be *sandbox* if using the PayPal sandbox for testing the system. Or *live* if using the real PayPal APIs

Moreover, the Charging Backend is the component that activates the purchased services. In this regard, the Charging Backend has the possibility of signing its acquisition notifications with a certificate, so the external system being offered can validate that is the Charging Backend the one making the request. To use this functionality it is needed to configure the certificate and the private Key to be used by providing its path in the following settings of the `settings.py` file

```
NOTIF_CERT_FILE = None
NOTIF_CERT_KEY_FILE = None
```

The Charging Backend uses a Cron task to check the status of recurring and usage subscriptions, and for paying sellers. The periodicity of this tasks can be configured using the `CRONJOBS` setting of `settings.py` using the standard Cron format

```
CRONJOBS = [
    ('0 5 * * *', 'django.core.management.call_command', ['pending_charges_daemon']),
    ('0 6 * * *', 'django.core.management.call_command', ['resend_cdrs']),
    ('0 4 * * *', 'django.core.management.call_command', ['resend_upgrade'])
]
```

Once the Cron task has been configured, it is necessary to include it in the Cron tasks using the command:

```
$ ./manage.py crontab add
```

It is also possible to show current jobs or remove jobs using the commands:

```
$ ./manage.py crontab show
$ ./manage.py crontab remove
```

Configure Apache for running the Charging Backend

The Charging Backend is a Django App that can be deployed in different ways. In this case, this installation guide covers two different mechanisms: using the Django `runserver` command (as seen in *Running the Charging Backend* section) or deploying it using an Apache server. This section explains how to configure Apache and the Charging Backend to do the later.

The first step is installing Apache and mod-wsgi. In Ubuntu/Debian:

```
$ sudo apt-get install apache2 libapache2-mod-wsgi
```

Or in CentOS:


```
$ sudo yum install httpd mod_wsgi
```

The next step is populating the file *src/wsgi.py* provided with the Charging Backend

```
import os
import sys

path = 'charging_path/src'
if path not in sys.path:
    sys.path.insert(0, path)

os.environ['DJANGO_SETTINGS_MODULE'] = 'settings'

import django.core.handlers.wsgi
application = django.core.handlers.wsgi.WSGIHandler()
```

If you are using a virtualenv, then you will need to include its activation in your *wsgi.py* file, so it should look similar to the following:

```
import os
import sys
import site

site.addsitedir('virtualenv_path/local/lib/python2.7/site-packages')
path = 'charging_path/src'
if path not in sys.path:
    sys.path.insert(0, path)

os.environ['DJANGO_SETTINGS_MODULE'] = 'settings'

# Activate your virtual env
activate_env=os.path.expanduser('virtualenv_path/bin/activate_this.py')
execfile(activate_env, dict(__file__=activate_env))

import django.core.handlers.wsgi
application = django.core.handlers.wsgi.WSGIHandler()
```

Note: Pay special attention to *charging_path* and *virtualenv_path* which have to point to the Charging Backend and the virtualenv paths respectively.

Once WSGI has been configured in the Charging Backend, the next step is creating a virtualhost in Apache. To do that, you can create a new site configuration file in the Apache related directory (located in */etc/apache2/sites-available/* in an Ubuntu/Debian system or in */etc/httpd/conf.d* in a CentOS system) and populate it with the following content:

```
<VirtualHost *:8006>
    WSGIDaemonProcess char_process
    WSGIScriptAlias / charging_path/src/wsgi.py
    WSGIProcessGroup char_process
    WSGIPassAuthorization On

    WSGIApplicationGroup %{GLOBAL}
</VirtualHost>
```

Note: Pay special attention to *charging_path* which have to point to the Charging Backend path.

Depending on the version of Apache you are using, you may need to explicitly allow the access to the directory where the Charging Backend is deployed in the configuration of the virtualhost. To do that, add the following lines to your virtualhost:

Apache version < 2.4

```
<Directory charging_path/src>
    Order deny,allow
    Allow from all
</Directory>
```

Apache version 2.4+

```
<Directory charging_path/src>
    Require all granted
</Directory>
```

Once you have included the new virtualhost configuration, the next step is configuring Apache to listen in the selected port (8006 in the example). To do that, edit */etc/apache2/ports.conf* in Ubuntu/Debian or */etc/httpd/conf/httpd.conf* in CentOS and include the following line:

```
Listen 8006
```

Then, in Ubuntu/Debian systems, enable the site by linking the configuration file to the *sites-enabled* directory:

```
ln -s ../sites-available/001-charging.conf ../sites-enabled/001-charging.conf
```

Once you have the site enabled, restart Apache. In Ubuntu/Debian

```
$ sudo service apache2 restart
```

Or in CentOS

```
$ sudo apachectl restart
```

Note: Ensure that the directory where the Changing Backend is installed can be accessed by the Apache user (*www-data* in Ubuntu/Debian, and *apache* in CentOS)

Configuring the Logic Proxy

The first step for configuring the proxy is creating the configuration file by coping *config.js.template* to *config.js*

```
$ cp config.js.template config.js
```

The first setting to be configured is the port and host where the proxy is going to run, this settings are located in *config.js*

```
config.port = 80;
config.host = 'localhost';
```

If you want to run the proxy in HTTPS you can update *config.https* setting

```
config.https = {
    enabled: false,
    certFile: 'cert/cert.crt',
```

```
keyFile: 'cert/key.key',
caFile: 'cert/ca.crt',
port: 443
};
```

In this case you have to set *enabled* to true, and provide the paths to the certificate (*certFile*), to the private key (*keyFile*), and to the CA certificate (*caFile*).

Then, it is possible to modify some of the URLs of the system. Concretely, it is possible to provide a prefix for the API, a prefix for the portal, and modifying the login and logout URLs

```
config.proxyPrefix = '';
config.portalPrefix = '';
config.logInPath = '/login';
config.logOutPath = '/logout';
```

In addition, it is possible to configure the theme to be used by providing its name. Details about the configuration of Themes are provided in the *Configuring Themes* section:

```
config.theme = '';
```

Additionally, the proxy is the component that acts as the front end of the Business API Ecosystem, both providing a web portal, and providing the endpoint for accessing to the different APIs. In this regard, the Proxy has to have the OAuth2 configuration of the FIWARE IDM.

To provide OAuth2 configuration, an application has to be created in an instance of the FIWARE IdM (e.g <https://account.lab.fiware.org>), providing the following information:

- URL: `httphttps://<proxy_host>:<proxy_port>`
- Callback URL: `httphttps://<PROXY_HOST>:<PROXY_PORT>/auth/fiware/callback`
- Create a role *Seller*

Once the application has been created in the IdM, it is possible to provide OAuth2 configuration by modifying the following settings

```
config.oauth2 = {
  'server': 'https://account.lab.fiware.org',
  'clientID': '<client_id>',
  'clientSecret': '<client_secret>',
  'callbackURL': 'http://<proxy_host>:<proxy_port>/auth/fiware/callback',
  'roles': {
    'admin': 'provider',
    'customer': 'customer',
    'seller': 'seller'
  }
};
```

In this settings, it is needed to include the IDM instance being used (*server*), the client id given by the IdM (*clientID*), the client secret given by the IdM (*clientSecret*), and the callback URL configured in the IdM (*callbackURL*)

Moreover, the Proxy uses MongoDB for maintaining some info, such as the current shopping cart of a user. you can configure the connection to MongoDB by updating the following setting:

```
config.mongodb = {
  server: 'localhost',
  port: 27017,
  user: '',
```

```
password: '',
db: 'belp'
};
```

In this setting you can configure the host (*server*), the port (*port*), the database user (*user*), the database user password (*password*), and the database name (*db*).

As already stated, the Proxy is the component that acts as the endpoint for accessing the different APIs. In this way, the proxy needs to know the URLs of them in order to redirect the different requests. This endpoints can be configured using the following settings

```
config.endpoints = {
  'catalog': {
    'path': 'DSProductCatalog',
    'host': 'localhost'
    'port': '8080',
    'appSsl': false
  },
  'ordering': {
    'path': 'DSProductOrdering',
    'host': 'localhost'
    'port': '8080',
    'appSsl': false
  },
  ...
}
```

The setting *config.endpoints* contains the specific configuration of each of the APIs, including its *path*, its *host*, its *port*, and whether the API is using SSL or not.

Note: The default configuration included in the config file is the one used by the installation script, so if you have used the script for installing the Business API Ecosystem you do not need to modify these fields

Finally, there are two fields that allow to configure the behaviour of the system while running. On the one hand, *config.revenueModel* allows to configure the default percentage that the Business API Ecosystem is going to retrieve in all the transactions. On the other hand, *config.usageChartURL* allows to configure the URL of the chart to be used to display product usage to customers in the web portal.

1.1.4 Final steps

Media and Indexes

The Business API Ecosystem, allows to upload some product attachments and assets to be sold. These assets are uploaded by the Charging Backend that saves them in the file system, jointly with the generated PDF invoices.

In this regard, the directories *src/media*, *src/media/bills*, and *src/media/assets* must exist within the Charging Backend directory, and must be writable by the user executing the Charging Backend.

```
$ mkdir src/media
$ mkdir src/media/bills
$ mkdir src/media/assets
$ chown -R <your_user>:<your_user> src/media
```

Additionally, the Business API Ecosystem uses indexes for efficiency and pagination. In this regards, the directory *indexes* must exist within the Logic Proxy directory, and must be writable by the user executing it.

```
$ mkdir indexes
$ chown -R <your_user>:<your_user> indexes
```

You can populate at any time the indexes directory using the *fill_indexes.js* script provided with the Logic Proxy.

```
$ node fill_indexes.js
```

Configuring Themes

The Business API Ecosystem provides a basic mechanism for the creation of themes intended to customize the web portal of the system. Themes include a set of files which can override any of the default portal files located in the *public/resources* or *views* directories of the logic proxy. To do that, themes map the directory structure and include files with the same name of the default ones to be overridden.

The Logic Proxy can include multiple themes which should be stored in the *themes* directory located at the root of the project.

To enable themes, the *config.theme* setting is provided within the *config.js* file of the Logic Proxy. Themes are enabled by providing the name of the theme directory in this setting.

```
config.theme = 'dark-theme';
```

Note: Setting *config.theme* to an empty string makes the Business API Ecosystem to use its default theme

To start using a theme the following command has to be executed:

```
$ node collect_static.js
```

This command merges the theme files and the default ones into a *static* directory used by the Logic Proxy to retrieve portal static files.

Enabling Production

The default installation of the Business API Ecosystem deploys its different components in *debug* mode. This is useful for development and testing but it is not adequate for production environments.

Enabling the production mode makes the different components to start caching requests and views and minimizing JavaScript files.

To enable the production mode, the first step is setting the environment variable *NODE_ENV* to *production* in the machine containing the Logic Proxy.

```
$ export NODE_ENV=production
```

Then, it is needed to collect static files in order to compress JavaScript files.

```
$ node collect_static.js
```

Finally, change the setting *DEBUG* of the Charging Backend to False.

```
DEBUG=False
```

1.1.5 Running the Business API Ecosystem

Running the APIs and the RSS

Both the TM Forum APIs and the RSS are deployed in Glassfish; in this regard, the only step for running them is starting Glassfish

```
$ asadmin start-domain
```

Running the Charging Backend

The Charging Backend creates some objects and connections on startup; in this way, the Glassfish APIs must be up and running before starting it.

Using Django runserver

The Charging Backend can be started using the *runserver* command provided with Django as follows

```
$ ./manage.py runserver 127.0.0.1:<charging_port>
```

Or in background

```
$ nohup ./manage.py runserver 127.0.0.1:<charging_port> &
```

Note: If you have created a virtualenv when installing the backend or used the installation script, you will need to activate the virtualenv before starting the Charging Backend

Using Apache

If you have deployed the charging backend in Apache, you can start it with the following command in a Debian/Ubuntu system

```
$ sudo service apache2 start
```

Or in a CentOS system

```
$ sudo apachectl start
```

Running the Logic Proxy

The Logic Proxy can be started using Node as follows

```
$ node server.js
```

Or if you want to start it in background:

```
$ nohup node server.js &
```

1.1.6 Installing Asset Plugins

The Business API Ecosystem is intended to support the monetization of different kind of digital assets. The different kind of assets that may be wanted to be monetized will be heterogeneous and potentially very different between them.

Additionally, for each type of asset different validations and activation mechanisms will be required. For example, if the asset is a CKAN dataset, it will be required to validate that the provider is the owner of the dataset. Moreover, when a customer acquires the dataset, it will be required to notify CKAN that a new user has access to it.

The huge differences between the different types of assets that can be monetized in the Business API Ecosystem makes impossible to include its validations and characteristics as part of the core software. For this reason, it has been created a plugin based solution, where all the characteristics of an asset type are implemented in a plugin that can be loaded in the Business API Ecosystem.

To include an asset plugin execute the following command in the Charging Backend:

```
$ ./manage.py loadplugin ckandataset.zip
```

It is possible to list the existing plugins with the following command:

```
$ ./manage.py listplugins
```

To remove an asset plugin, execute the following command providing the plugin id given by the *listplugins* command

```
$ ./manage.py removeplugin ckan-dataset
```

Note: For specific details on how to create a plugin and its internal structure, have a look at the Business API Ecosystem Programmer Guide

At the time of writing, the following plugins are available:

- **Basic File:** Allows the creation of products by providing files as digital assets. No validations or processing is done
- **Basic URL:** Allows the creation of products by providing URLs as digital assets. No validations or processing is done
- **WireCloud Component:** Allows the monetization of WireCloud components, including Widgets, operators, and mashups
- **Accountable Service :** Allows the monetization of services protected by the [Accounting Proxy](#), including Orion Context Broker queries
- **CKAN Dataset :** Allows the monetization of CKAN datasets

1.1.7 Sanity check Procedures

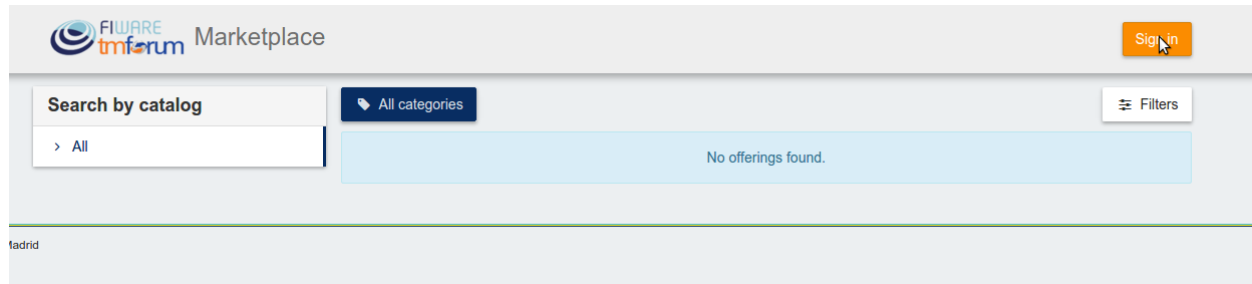
The Sanity Check Procedures are the steps that a System Administrator will take to verify that an installation is ready to be tested. This is therefore a preliminary set of tests to ensure that obvious or basic malfunctioning is fixed before proceeding to unit tests, integration tests and user validation.

End to End Testing

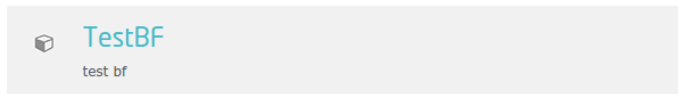
Please note that the following information is required before starting with the process: * The host and port where the Proxy is running * A valid IdM user with the *Seller* role

To Check if the Business API Ecosystem is running, follow the next steps:

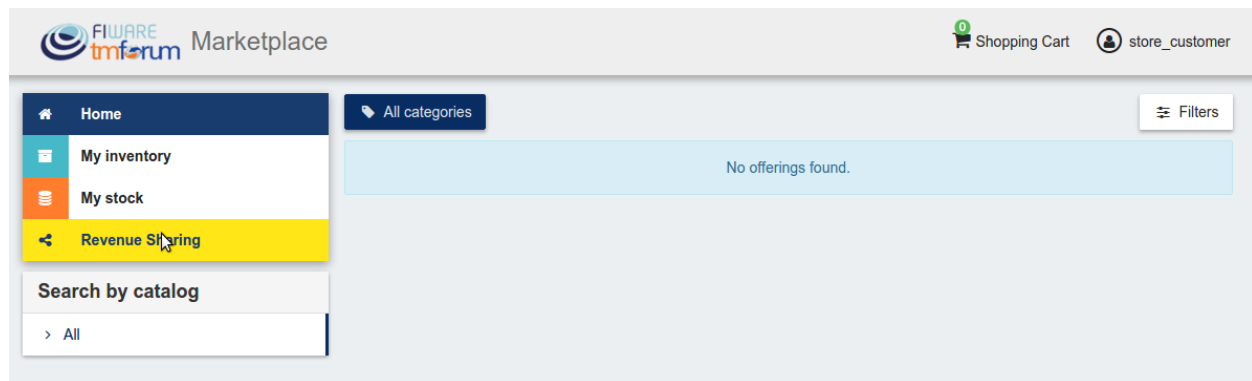
1. Open a browser and enter to the Business API Ecosystem
2. Click on the *Sign In* Button



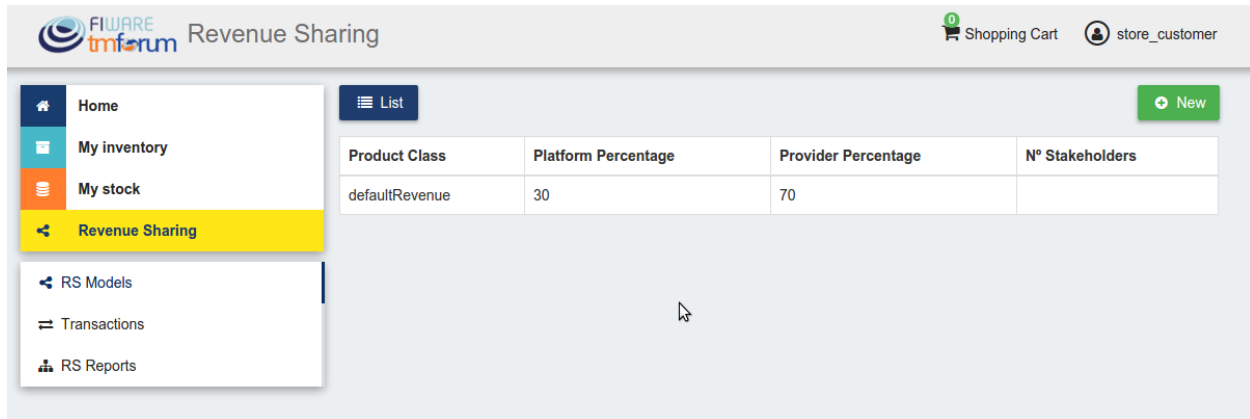
3. Provide your credentials in the IdM page

The screenshot shows a "Log In" form. It has two input fields: "Email" with the value "f.delavega.garcia@gmail.com" and "Password" with masked characters ".....". Below the password field is a "remember me" checkbox. To the right of these fields is a "Sign In" button. At the bottom, there are links for "Sign up", "Forgot password", and "Didn't receive confirmation instructions?".

4. Go to the *Revenue Sharing* section



5. Ensure that the default RS Model has been created



Revenue Sharing

Shopping Cart store_customer

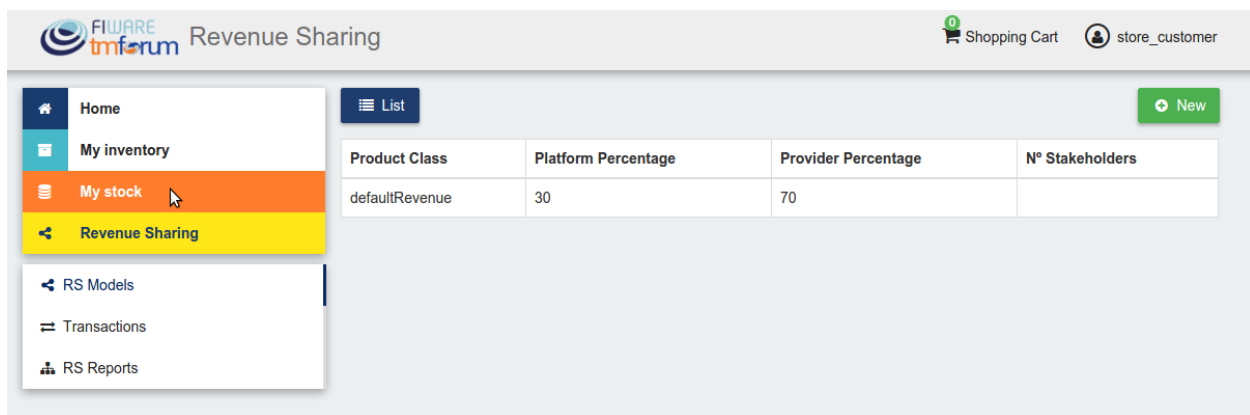
Home
My inventory
My stock
Revenue Sharing
RS Models
Transactions
RS Reports

List

New

Product Class	Platform Percentage	Provider Percentage	N° Stakeholders
defaultRevenue	30	70	

6. Go to *My Stock* section



Revenue Sharing

Shopping Cart store_customer

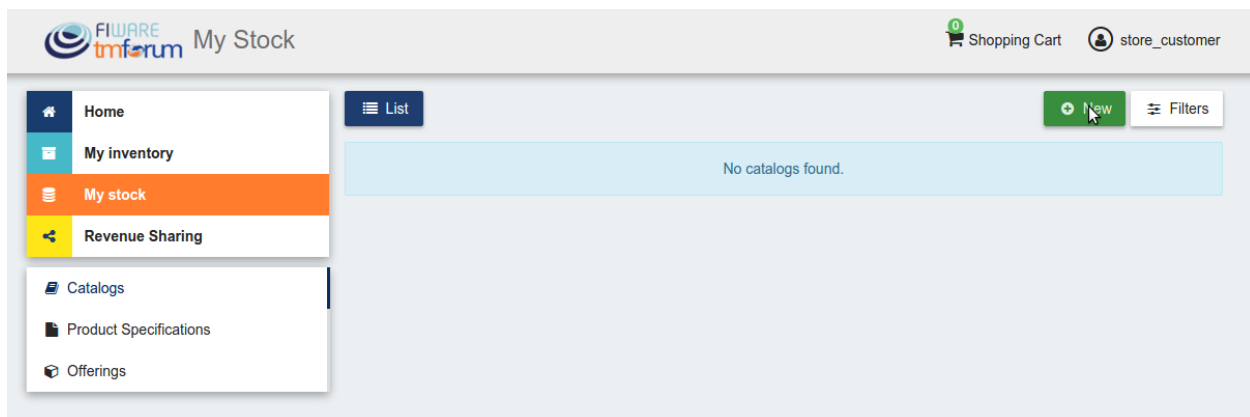
Home
My inventory
My stock
Revenue Sharing
RS Models
Transactions
RS Reports

List

New

Product Class	Platform Percentage	Provider Percentage	N° Stakeholders
defaultRevenue	30	70	

7. Click on *New* for creating a new catalog



My Stock

Shopping Cart store_customer


Home
My inventory
My stock
Revenue Sharing
Catalogs
Product Specifications
Offerings



List

New Filters

No catalogs found.

8. Provide a name and a description and click on *Next*. Then click on *Create*

 My Stock

Shopping Cart  0 store_customer 

Home

My inventory

My stock

Revenue Sharing

Catalogs

Product Specifications

Offerings

List New

New catalog

1 General

2 Finish

Step 1: General


Enter a name



New Catalog

Enter a description (optional)

This is a new example catalog

Next

 My Stock

Shopping Cart  0 store_customer 

Home

My inventory

My stock

Revenue Sharing

Catalogs

Product Specifications

Offerings

List New

New catalog

1 General

2 Finish

Step 2: Finish

Name

New Catalog

Status

Active Launched Retired Obsolete

Description

This is a new example catalog

Create

FIWARE My Stock

Shopping Cart store_customer

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List Details

New Catalog

About Parties Offerings

General

Name

New Catalog

Status

Active Launched Retired Obsolete

Description (optional)

This is a new example catalog

Update

9. Click on *Launched*, and then click on *Update*

FIWARE My Stock

Shopping Cart store_customer

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List Details

New Catalog

About Parties Offerings

General

Name

New Catalog

Status

Active Launched Retired Obsolete

Description (optional)

This is a new example catalog

Update

FIWARE My Stock

Shopping Cart store_customer

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List Details

New Catalog

About Parties Offerings

General

Name

New Catalog

Status

Active Launched Retired Obsolete

Description (optional)

This is a new example catalog

Update

10. Go to *Home*, and ensure the new catalog appears

FIWARE My Stock

Shopping Cart store_customer

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List Details

New Catalog

About Parties Offerings

General

Name

New Catalog

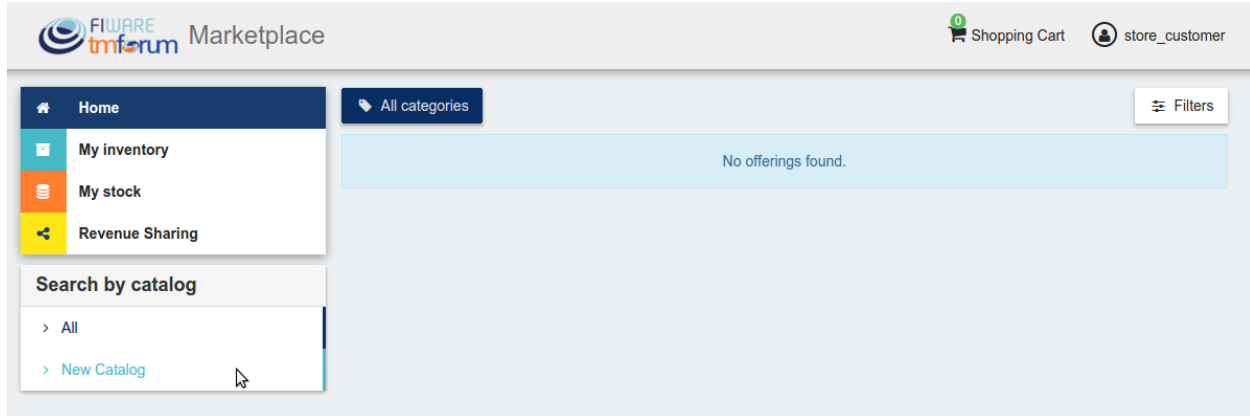
Status

Active Launched Retired Obsolete

Description (optional)

This is a new example catalog

Update



List of Running Processes

We need to check that Java for the Glassfish server (APIs and RSS), python (Charging Backend) and Node (Proxy) are running, as well as MongoDB and MySQL databases. If we execute the following command:

```
ps -ewF | grep 'java\|mongodb\|mysql\|python\|node' | grep -v grep
```

It should show something similar to the following:

```
mongodb  1014      1  0 3458593 49996 0 sep08 ?          00:22:30 /usr/bin/mongod --
↳config /etc/mongodb.conf
mysql    1055      1  0 598728 64884 2 sep08 ?          00:02:21 /usr/sbin/mysqld
francis+ 15932 27745  0 65187 39668  0 14:53 pts/24    00:00:08 python ./manage.py
↳runserver 0.0.0.0:8006
francis+ 15939 15932  1 83472 38968  0 14:53 pts/24    00:00:21 /home/user/business-
↳ecosystem-charging-backend/src/virtenv/bin/python ./manage.py runserver 0.0.0.0:8006
francis+ 16036 15949  0 330473 163556 0 14:54 pts/25    00:00:08 node server.js
root     1572      1  0 1142607 1314076 3 sep08 ?          00:37:40 /usr/lib/jvm/java-8-
↳oracle/bin/java -cp /opt/biz-ecosystem/glassfish ...
```

Network interfaces Up & Open

To check the ports in use and listening, execute the command:

```
$ sudo netstat -nltp
```

The expected results must be something similar to the following:

```
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State       PID/
↳Program name
tcp        0      0 127.0.0.1:8006          0.0.0.0:*               LISTEN      15939/
↳python
tcp        0      0 127.0.0.1:27017         0.0.0.0:*               LISTEN      1014/
↳mongodb
tcp        0      0 127.0.0.1:28017         0.0.0.0:*               LISTEN      1014/
↳mongodb
tcp        0      0 127.0.0.1:3306          0.0.0.0:*               LISTEN      1055/
↳mysqld
tcp6       0      0 :::80                   :::*                    LISTEN      16036/
↳node
```

tcp6	0	0	:::8686	:::*	LISTEN	1572/
↪ java						
tcp6	0	0	:::4848	:::*	LISTEN	1572/
↪ java						
tcp6	0	0	:::8080	:::*	LISTEN	1572/
↪ java						
tcp6	0	0	:::8181	:::*	LISTEN	1572/
↪ java						

Databases

The last step in the sanity check, once we have identified the processes and ports, is to check that MySQL and MongoDB databases are up and accepting queries. We can check that MySQL is working, with the following command:

```
$ mysql -u <user> -p<password>
```

You should see something similar to:

```
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 174
Server version: 5.5.47-0ubuntu0.14.04.1 (Ubuntu)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```

For MongoDB, execute the following command:

```
$ mongo <database> -u <user> -p <password>
```

You should see something similar to:

```
MongoDB shell version: 2.4.9
connecting to: <database>
>
```

1.1.8 Diagnosis Procedures

The Diagnosis Procedures are the first steps that a System Administrator will take to locate the source of an error in a GE. Once the nature of the error is identified with these tests, the system admin will very often have to resort to more concrete and specific testing to pinpoint the exact point of error and a possible solution. Such specific testing is out of the scope of this section.

Resource Availability

Memory use depends on the number of concurrent users as well as the free memory available and the hard disk. The Business API Ecosystem requires a minimum of 1024 MB of available RAM memory, but 2048 MB of free memory

are recommended. Moreover, the Business API Ecosystem requires at least 15 GB of hard disk space.

Remote Service Access

N/A

Resource Consumption

Resource consumption strongly depends on the load, especially on the number of concurrent users logged in.

- Glassfish main memory consumption should be between 500 MB and 2048 MB
- MongoDB main memory consumption should be between 30 MB and 500 MB
- Python main memory consumption should be between 30 MB and 200 MB
- Node main memory consumption should be between 30 MB and 200 MB
- MySQL main memory consumption should be between 30 MB and 500 MB

I/O Flows

The only expected I/O flow is of type HTTP, on port defined in the Logic Proxy configuration file

1.2 User Guide

1.2.1 Introduction

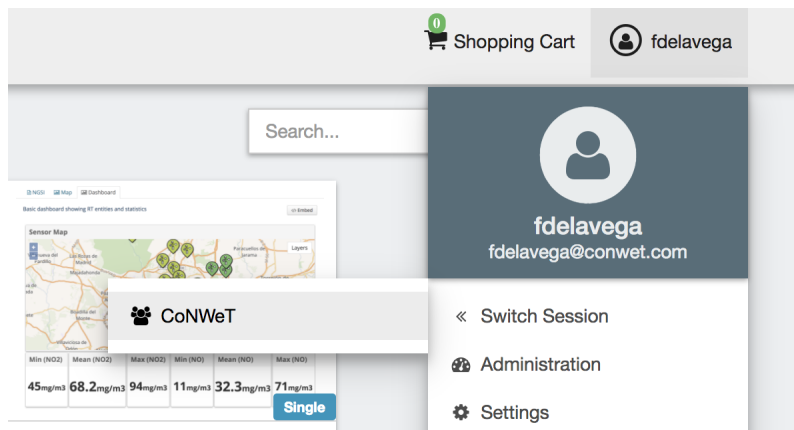
This user guide covers the Business API Ecosystem version 6.4.0, corresponding to FIWARE release 6. Any feedback on this document is highly welcomed, including bugs, typos or things you think should be included but aren't. Please send them to the "Contact Person" email that appears in the [Catalogue page for this GEi](#). Or create an issue at [GitHub Issues](#)

This user guide contains a description of the different tasks that can be performed in the Business API Ecosystem using its web interface. This section is organized so the actions related to a particular user role are grouped together.

1.2.2 Using Organizations

Starting on version 6.4.0, the Business API Ecosystem supports organizations as defined by the FIWARE IdM. These organizations can use the system as if they were users, being possible to create organizations catalogs and offerings or acquire them.

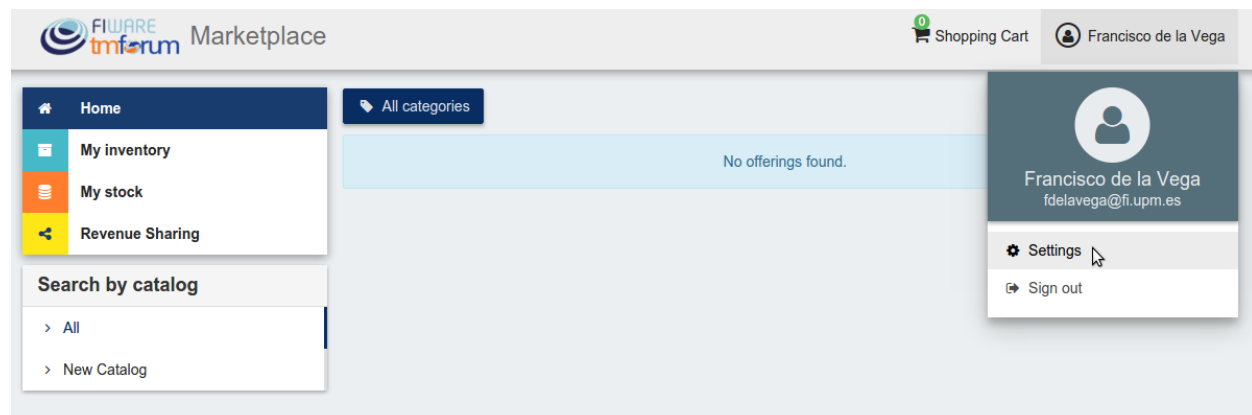
To use the platform on behalf an organization the user belongs, it is needed to change the platform context. To do that, it is used the *Switch Session* option of the user menu.



1.2.3 Profile Configuration

All the users of the system can configure their profile, so they can configure their personal information as well as their billing addresses and contact mediums.

To configure the user profile, the first step is opening the user *Settings* located in the user menu.



In the displayed view, it can be seen that some information related to the account is already included (*Username*, *Email*, *Access token*). This information is the one provided by the IdM after the login process.

The profile to be updated depends on whether the user is acting on behalf an organization or himself. In both cases, to update the profile, fill in the required information and click on *Update*.

For users, personal information is provided.

The screenshot shows the 'Settings' page of the FIWARE tmforum. The top navigation bar includes the FIWARE tmforum logo, the word 'Settings', a shopping cart icon with '0' items, and the user name 'Francisco de la Vega'. On the left, a sidebar contains a 'Back' button and a 'Personal settings' menu with 'General' (selected) and 'Contact mediums'. The main content area is divided into two sections: 'Account' and 'Profile'. The 'Account' section contains fields for 'Username' (francisco-de-la-vega), 'Access token' (hvXHgdMgqNaxNEpFCaKV5VP60jU7Ib), and 'Email' (fdelavega@fi.upm.es). The 'Profile' section has a blue warning box stating 'This information is public so it may be viewed by anyone.' Below this are fields for 'First name' (Francisco), 'Last name' (de la Vega), 'Title' (Mr), 'Marital status' (Single), 'Gender' (Male), and 'Nationality' (Spanis). A 'Birth' section includes a 'Date' field (20/09/1980) and a 'Country' field (Spain). A 'Place' field (Madrid) is also present. A green 'Update' button is located at the bottom right of the profile section.

FIWARE tmforum Settings

Shopping Cart Francisco de la Vega

< Back

Personal settings

- General
- Contact mediums

Account

Username francisco-de-la-vega **Access token** hvXHgdMgqNaxNEpFCaKV5VP60jU7Ib

Email fdelavega@fi.upm.es

Profile

This information is public so it may be viewed by anyone.

First name Francisco **Last name** de la Vega

Title Mr **Marital status** Single

Gender Male **Nationality** Spanis

Birth


Date 20/09/1980

Country Spain **Place** Madrid

Update

Note: Only the *First name* and *Last name* fields are mandatory

For organizations, general organization info is provided.

 Settings

Shopping Cart CoNWeT

[< Back](#)

Personal settings

- General
- ☒ Contact mediums

Account

Username fdelavega	Access token YsHsbnlZrTCY2bKB7ZVqvxhYaCTAb4
Email fdelavega@conwet.com	

Profile

This information is public so it may be viewed by anyone.

Trading Name CoNWeT	Type Non-profit
Legal	
CIF or Organization ID 06657654Z	Type VAT
Issuing Authority Spain	Issuing Date 10/09/1996

Update

Once you have created your profile, you can include contact mediums by going to the *Contact mediums* section.

The screenshot shows the 'Settings' page of the FIWARE inforum. The top navigation bar includes the FIWARE inforum logo, the word 'Settings', a shopping cart icon with '0' items, and a user profile icon for 'Francisco de la Vega'. On the left, a sidebar contains a 'Back' button and a 'Personal settings' section with two tabs: 'General' (selected) and 'Contact mediums'. The main content area is divided into two sections: 'Account' and 'Profile'. The 'Account' section has fields for 'Username' (francisco-de-la-vega), 'Access token' (hvXHgdMgqNaxNEpFCaKV5VP6OjU7Ib), and 'Email' (fdelavega@fi.upm.es). The 'Profile' section has a warning box stating 'This information is public so it may be viewed by anyone.' followed by fields for 'First name' (Francisco), 'Last name' (de la Vega), 'Title' (Mr), 'Marital status' (Single), 'Gender' (Male), 'Nationality' (Spanis), 'Birth' date (20/09/1980), 'Country' (Spain), and 'Place' (Madrid). An 'Update' button is located at the bottom right of the profile section.

Account	
Username	Access token
francisco-de-la-vega	hvXHgdMgqNaxNEpFCaKV5VP6OjU7Ib
Email	
fdelavega@fi.upm.es	

Profile	
This information is public so it may be viewed by anyone.	
First name	Last name
Francisco	de la Vega
Title	Marital status
Mr	Single
Gender	Nationality
Male	Spanis
Birth	
Date	
20/09/1980	
Country	Place
Spain	Madrid
Update	

In the *Contact Medium* section, there are two different tabs. On the one hand, the *Shipping addresses* tab, where you can register the shipping addresses you will be able to use when creating orders and purchasing products.

To create a shipping address, fill in the fields and click on *Create*

The screenshot shows the 'New shipping address' form in the FIWARE inforum Settings page. The page has a header with the FIWARE inforum logo, 'Settings', a shopping cart icon with '0' items, and the user name 'Francisco de la Vega'. A left sidebar contains 'Personal settings' with 'General' and 'Contact mediums' options. The main content area has tabs for 'Shipping addresses' and 'Business addresses'. A blue banner states: 'The shipping addresses will be used in your orders.' The form fields are as follows:

- Email address:** A text input field containing 'fdelavega@fi.upm.es'.
- Postal address:** A section with four fields:
 - Street:** A text input field containing 'Campus de Montegancedo S/N'.
 - Postcode:** A text input field containing '28041'.
 - City:** A text input field containing 'Madrid'.
 - State / Province:** A text input field containing 'Madrid'.
- Country:** A dropdown menu showing 'Spain'.
- Telephone number:** A section with two fields:
 - Type:** A text input field containing 'Mobile'.
 - Number:** A text input field containing '+34 611111111'.

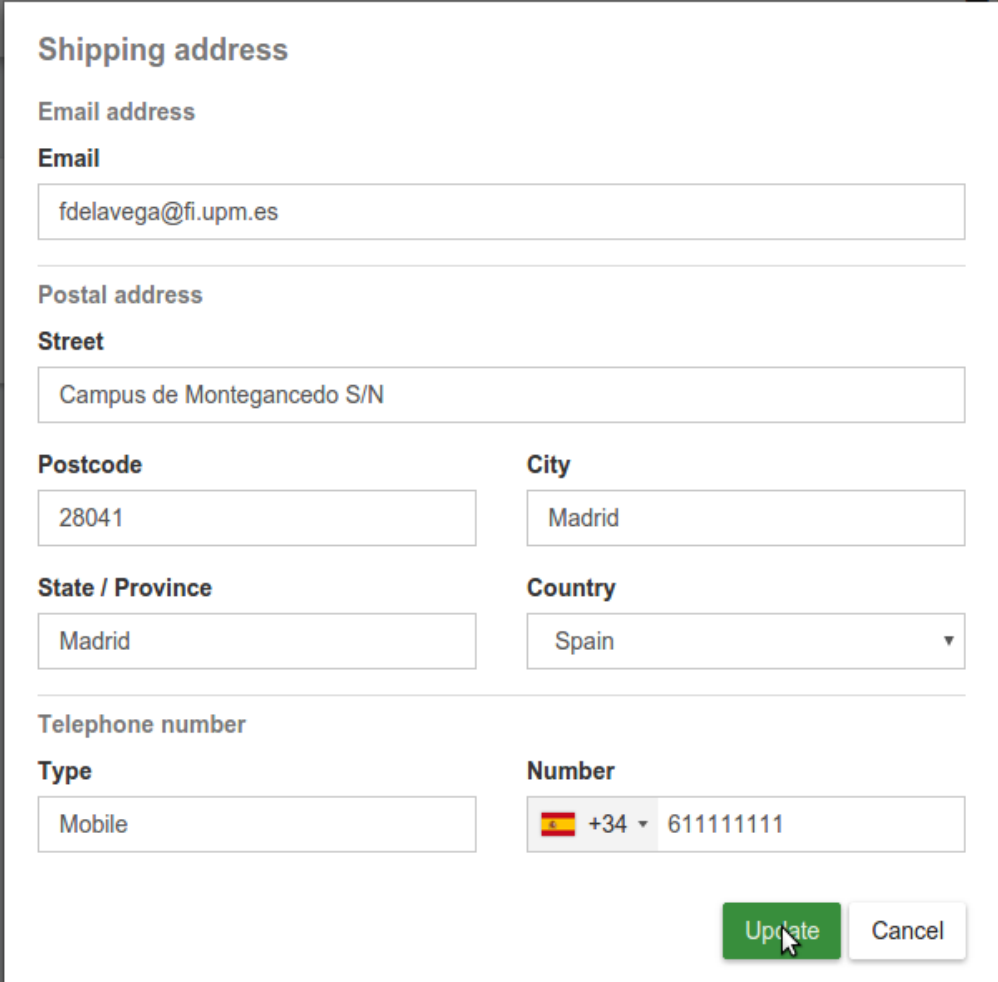
An orange 'Create' button is located at the bottom right of the form.

Once created, you can edit the address by clicking on the *Edit* button of the specific address, and changing the wanted fields.

The screenshot shows the 'My shipping addresses' page in the FIWARE inforum Settings page. The layout is similar to the previous screenshot, but the main content area now displays a table of existing shipping addresses. The table has four columns: 'Email address', 'Postal address', 'Telephone number', and 'Actions'. There is one row of data. Below the table is a 'New shipping address' form, which is partially visible and contains an 'Email address' field with the label 'Email'.

Email address	Postal address	Telephone number	Actions
fdelavega@fi.upm.es	Campus de Montegancedo S/N 28041 Madrid (Madrid) Spain	Mobile, +34611111111	

Below the table, the 'New shipping address' form is visible, showing the 'Email address' field with the label 'Email'.



Shipping address

Email address

Email

fdelavega@fi.upm.es

Postal address

Street

Campus de Montegancedo S/N

Postcode

28041

City

Madrid

State / Province

Madrid

Country

Spain

Telephone number

Type

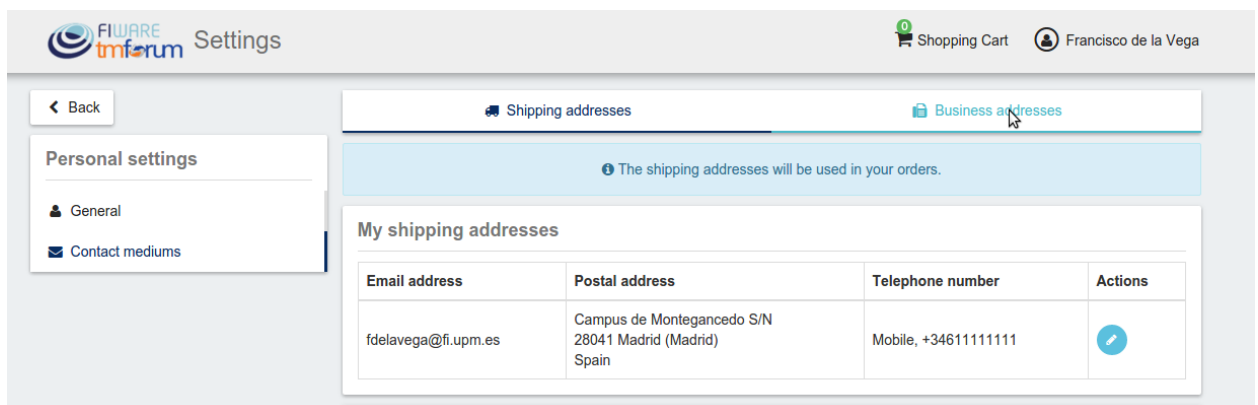
Mobile

Number

+34 611111111

Update **Cancel**

On the other hand, if you have the *Seller* role you can create *Business Addresses*, which can be used by your customers in order to allow them to contact you.



Settings

Shopping Cart Francisco de la Vega

Back

Personal settings

- General
- Contact mediums


Shipping addresses Business addresses

The shipping addresses will be used in your orders.

My shipping addresses

Email address	Postal address	Telephone number	Actions
fdelavega@fi.upm.es	Campus de Montegancedo S/N 28041 Madrid (Madrid) Spain	Mobile, +34611111111	

In the *Business Addresses* tab you can create, different kind of contact mediums, including emails, phones, and addresses. To create a contact medium, fill in the fields and click on *Create*

 Settings

Shopping Cart 0 Francisco de la Vega

[< Back](#)

Personal settings

- General
- Contact mediums

Shipping addresses

Business addresses

This information is public so it may be viewed by anyone.

New business address


Medium

Email address

Email

fdelavega.provider@fi.upm.es

Create

 Settings

Shopping Cart 0 Francisco de la Vega

[< Back](#)

Personal settings

- General
- Contact mediums

Shipping addresses

Business addresses

This information is public so it may be viewed by anyone.

My business addresses

Medium	Details	Actions
Email address	fdelavega.provider@fi.upm.es	Edit Delete

New business address

Medium

Telephone number

Type

mobile

Number

Spain +34 622222222

Create

FIWARE Infocenter Settings

Shopping Cart Francisco de la Vega

Back

Personal settings

- General
- Contact mediums

Shipping addresses Business addresses

This information is public so it may be viewed by anyone.

My business addresses

Medium	Details	Actions
Email address	fdelavega.provider@fi.upm.es	
Telephone number	mobile, +34622222222	

New business address

Medium

Postal address

Street

Campus de Montegancedo S/N

Postcode

28041

City

Madrid

State / Province

Madrid

Country

Spain

Create

You can *Edit* or *Remove* the contact medium by clicking on the corresponding button

FIWARE Infocenter Settings

Shopping Cart Francisco de la Vega

Back

Personal settings

- General
- Contact mediums

Shipping addresses Business addresses

This information is public so it may be viewed by anyone.

My business addresses

Medium	Details	Actions
Email address	fdelavega.provider@fi.upm.es	
Telephone number	mobile, +34622222222	
Postal address	Campus de Montegancedo S/N 28041 Madrid (Madrid) Spain	

New business address

Medium

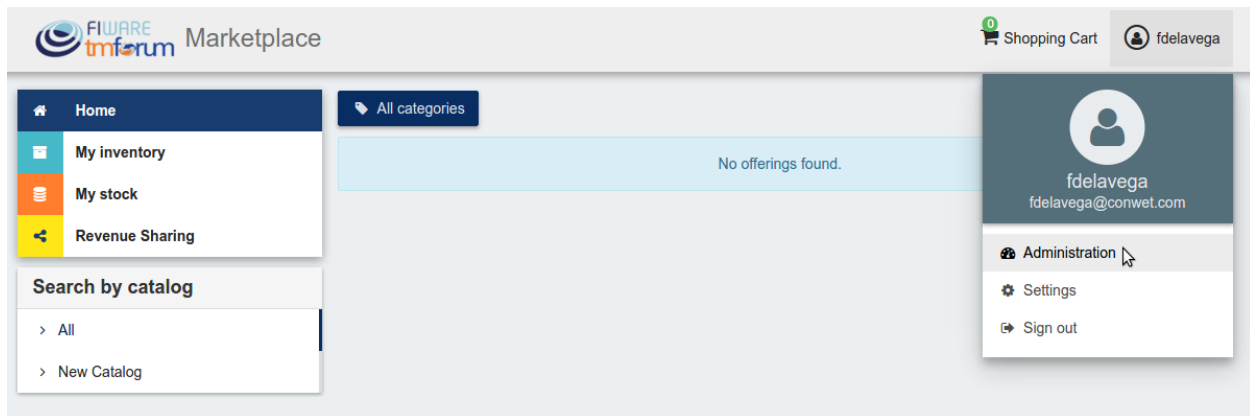
Email address

Email

Create

1.2.4 Admin

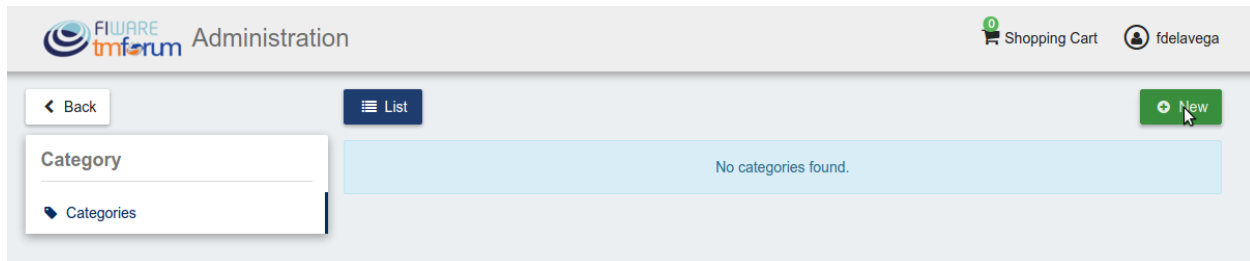
If the user of the Business API Ecosystem is an admin, he will be able to access the *Administration* section of the web portal. This section is located in the user menu.



Manage Categories

Admin users are authorized to create the system categories that can be used by *Sellers* to categorize their catalogs, products, and offerings.

To create categories, go to the *Administration* section, and click on *New*



Then, provide a name and an optional description for the category. Once the information has been included, click on *Next*, and then on *Create*

The image displays two screenshots of the FIWARE Administration interface, specifically the 'New Category' form.

Top Screenshot (Step 1: General):

- Header:** FIWARE Administration, Shopping Cart (0), fdelavega.
- Left Sidebar:** Category, Categories.
- Form Title:** New Category.
- Steps:** 1 General (selected), 2 Finish.
- Step 1: General:**
 - Enter a name:** Cloud Services
 - Enter a description (optional):** Cloud services category
 - Choose a parent category:** (toggle switch)
 - Next:** (button)

Bottom Screenshot (Step 2: Finish):

- Header:** FIWARE Administration, Shopping Cart (0), fdelavega.
- Left Sidebar:** Category, Categories.
- Form Title:** New Category.
- Steps:** 1 General, 2 Finish (selected).
- Step 2: Finish:**
 - Name:** Cloud Services
 - Status:** Active, Launched (selected), Retired, Obsolete
 - Description:** Cloud services category
 - Create:** (button)

Categories in the Business API Ecosystem can be nested, so you can choose a parent category if you want while creating.

The screenshot shows the 'New Category' form in the FIWARE tmforum Administration interface. The form is titled 'New Category' and has two steps: '1 General' and '2 Finish'. The '1 General' step is active. It contains the following fields:

- Enter a name:** A text input field containing 'VM Services'.
- Enter a description (optional):** A text input field containing 'VM Services category'.
- Choose a parent category:** A toggle switch is turned on. Below it is a table with two columns: 'Name' and 'Updated'.

Name	Updated
Cloud Services	a minute ago

At the bottom right of the form is a 'Next' button.

Existing categories can be updated. To edit a category click on the category name.

The screenshot shows the 'List' view of categories in the FIWARE tmforum Administration interface. It displays a table with three columns: 'Status', 'Name', and 'Updated'.

Status	Name	Updated
● Launched	Cloud Services	a minute ago
● Launched	Cloud Services / VM Services	a few seconds ago

Then edit the corresponding fields and click on *Update*.

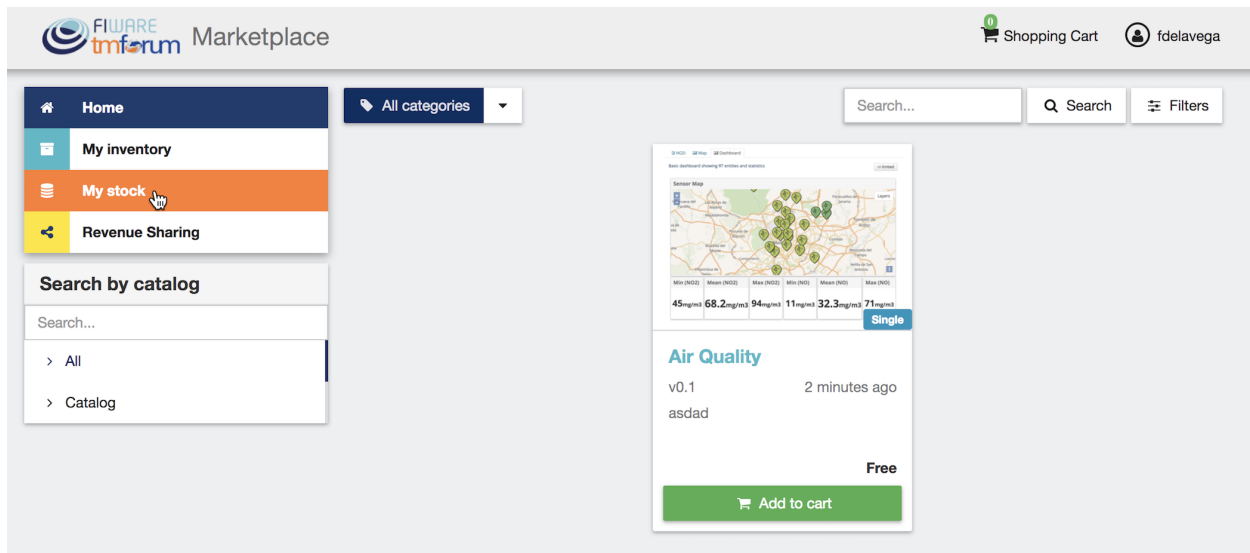
The screenshot shows the 'Detail' view of a category in the FIWARE tmforum Administration interface. The form is titled 'General' and contains the following fields:

- Name:** A text input field containing 'VM Services'.
- Status:** A horizontal progress bar with four stages: 'Active', 'Launched', 'Retired', and 'Obsolete'. The 'Launched' stage is currently selected.
- Description (optional):** A text input field containing 'VM Services category'.

At the bottom right of the form is an 'Update' button.

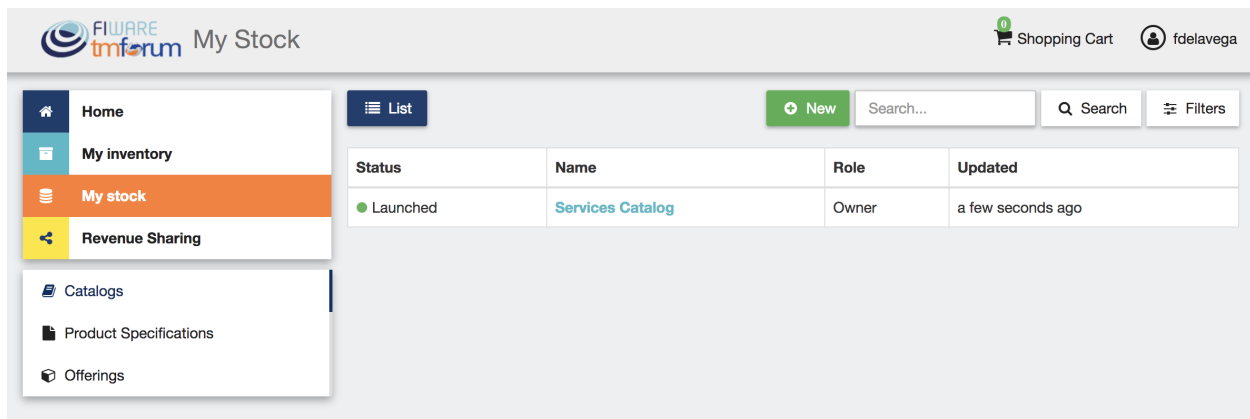
1.2.5 Seller

If the user of the Business API Ecosystem has the *Seller* role, he will be able to monetize his products by creating, catalogs, product specifications and product offerings. All these objects are managed accessing *My Stock* section.

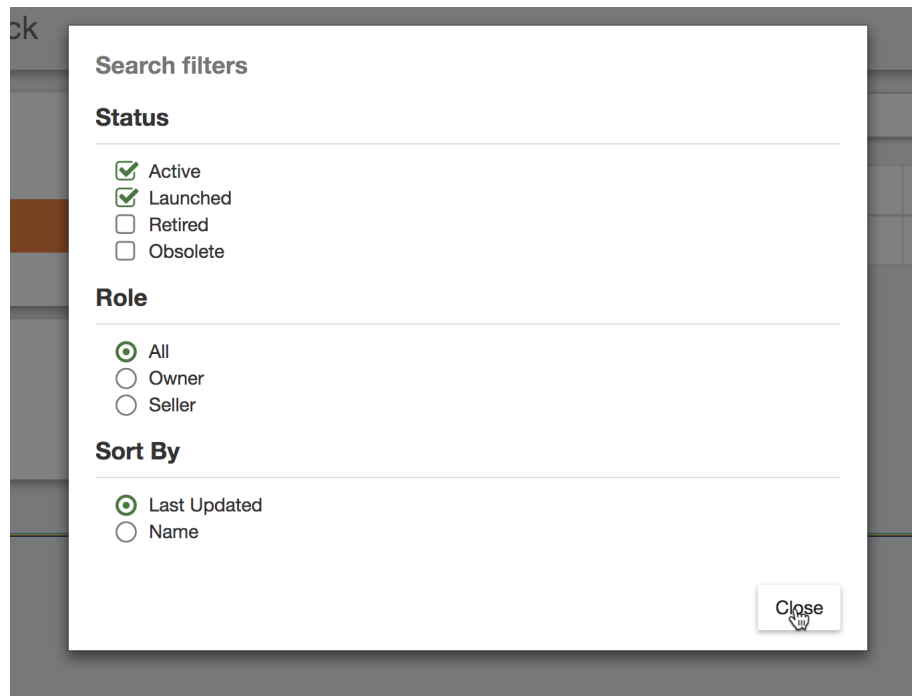
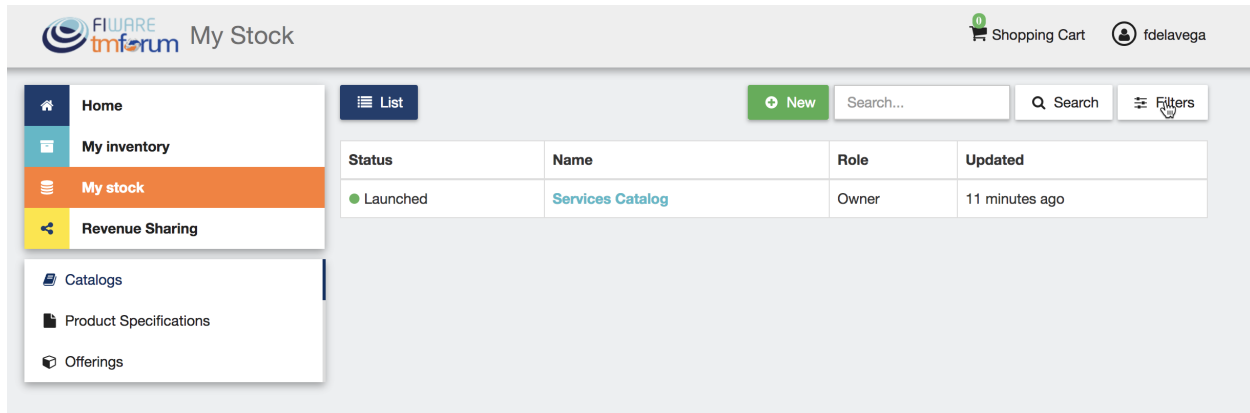


Manage Catalogs

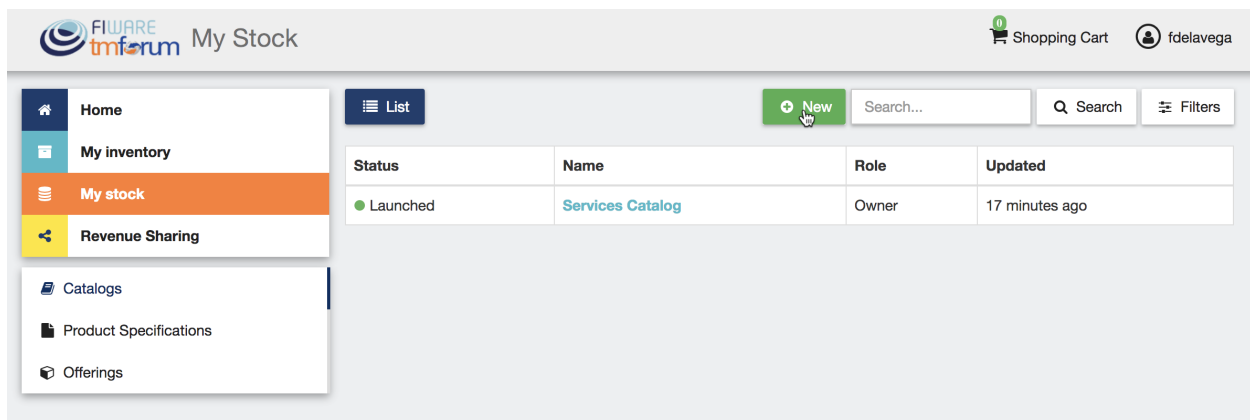
The *Catalogs* section is the one that is open by default when the seller accesses *My Stock* section. This section contains the catalogs the seller has created.



Additionally, it has been defined several mechanisms for searching and filtering the list of catalogs displayed. On the one hand, it is possible to search catalogs by keyword using the search input provided in the menu bar. On the other hand, it is possible to specify how catalog list should be sorted or filter the shown catalogs by status and the role you are playing. To do that, click on *Filters*, choose the required parameters, and click on *Close*.



To create a new catalog click on the *New* button.



Then, provide a name and an optional description for the catalog. Once you have filled the fields, click on *Next*, and then on *Create*

FIWARE **My Stock** Shopping Cart fdelavega

Home My inventory **My stock** Revenue Sharing Catalogs Product Specifications Offerings

List New

New catalog

1 General 2 Finish

Step 1: General

Enter a name
Widgets Catalog

Enter a description (optional)
A catalog for selling widgets

Next

FIWARE **My Stock** Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List New

New catalog

1 General 2 Finish

Step 2: Finish

Name
Widgets Catalog

Status
Active Launched Retired Obsolete

Description
A catalog for selling widgets

Create

Sellers can also update their catalogs. To do that, click on the name of the catalog to open the update view.

FIWARE **My Stock** Shopping Cart fdelavega

List New Search... Search Filters

Status	Name	Role	Updated
Launched	Services Catalog	Owner	27 minutes ago
Active	Widgets Catalog	Owner	6 minutes ago

Then, update the fields you want to modify and click on *Update*. In this view, it is possible to change the *Status* of the catalog. To start monetizing the catalog, and make it appear in the *Home* you have to change its status to *Launched*

The screenshot shows the 'My Stock' interface with a sidebar menu on the left containing: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main content area is titled 'Widgets Catalog' and has tabs for 'About', 'Parties', and 'Offerings'. The 'About' tab is active, showing a 'General' section with a 'Name' field containing 'Widgets Catalog', a 'Status' section with a progress bar showing 'Active', 'Launched' (selected), 'Retired', and 'Obsolete', and a 'Description (optional)' field containing 'A catalog for selling widgets'. An 'Update' button is at the bottom right.

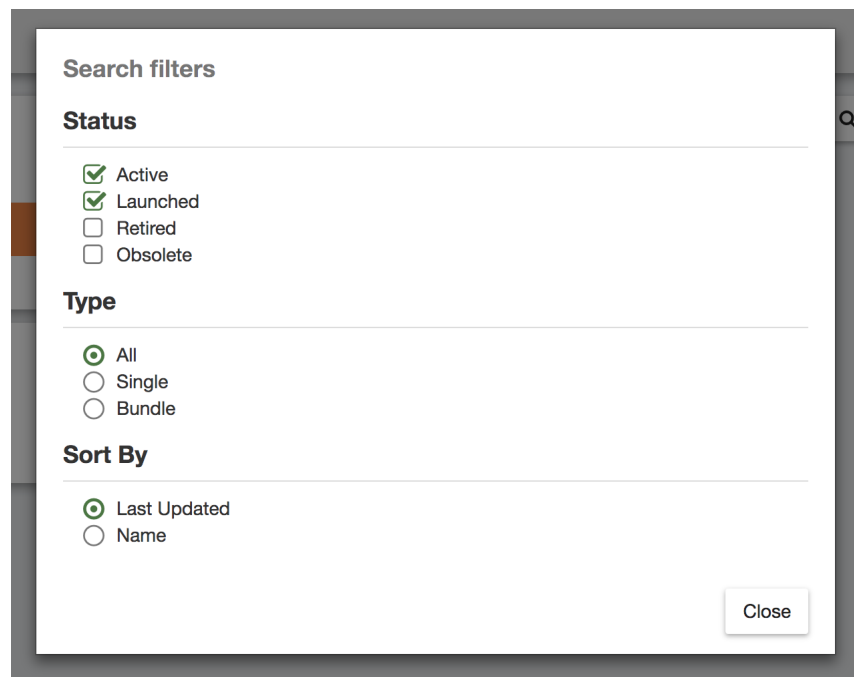
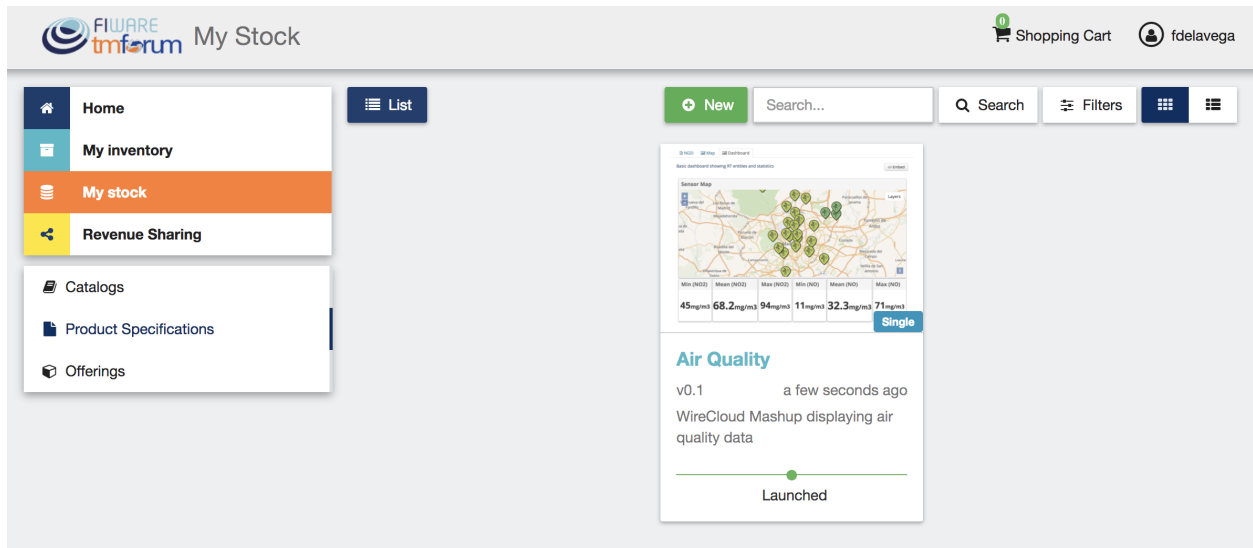
Manage Product Specifications

Product Specifications represent the product being offered, both digital and physical. To list your product specifications go to *My Stock* section and click on *Product Specifications*

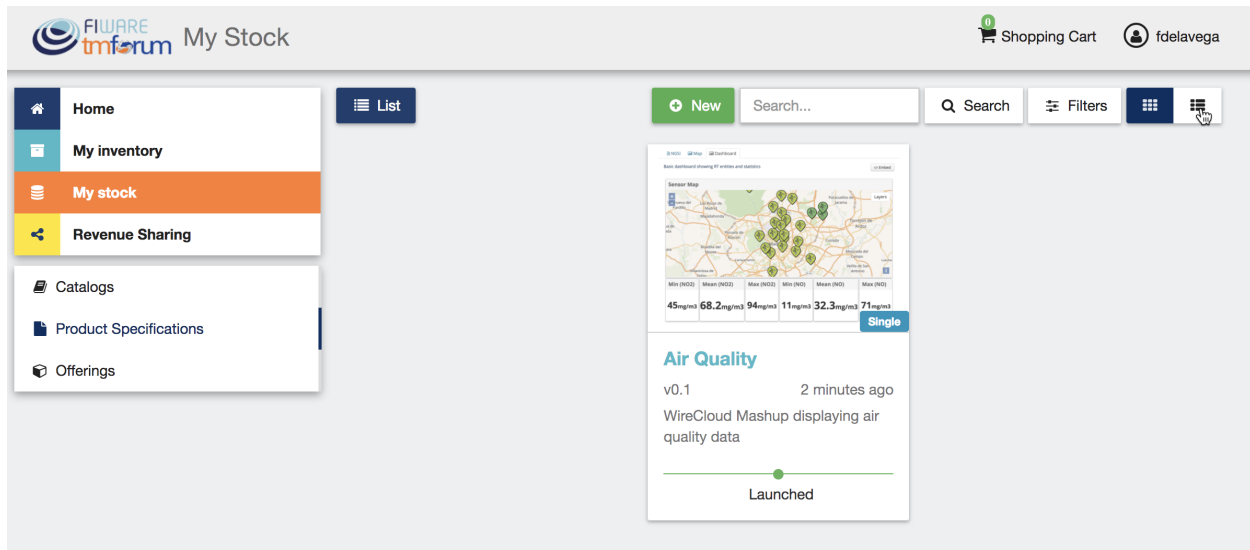
The screenshot shows the 'My Stock' interface with the sidebar menu on the left. The main content area is titled 'Product Specifications' and has a 'List' tab. Above the table are buttons for '+ New', a search bar, and 'Search' and 'Filters' buttons. The table has columns: Status, Name, Role, and Updated.

Status	Name	Role	Updated
Launched	Services Catalog	Owner	2 hours ago
Active	Widgets Catalog	Owner	an hour ago

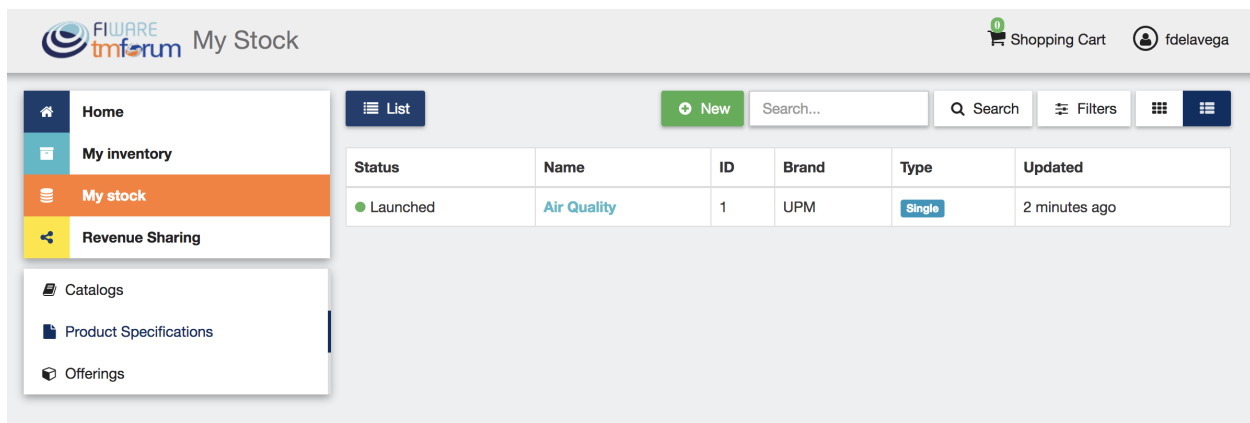
In the same way as catalogs, product specifications can be searched by keyword, sorted, or filtered by status and whether they are bundles or not. To filter or sort product specifications, click on *Filters*, choose the appropriate properties, and click on *Close*



Additionally, it is possible to switch between the grid view and the tabular view using the provided buttons.



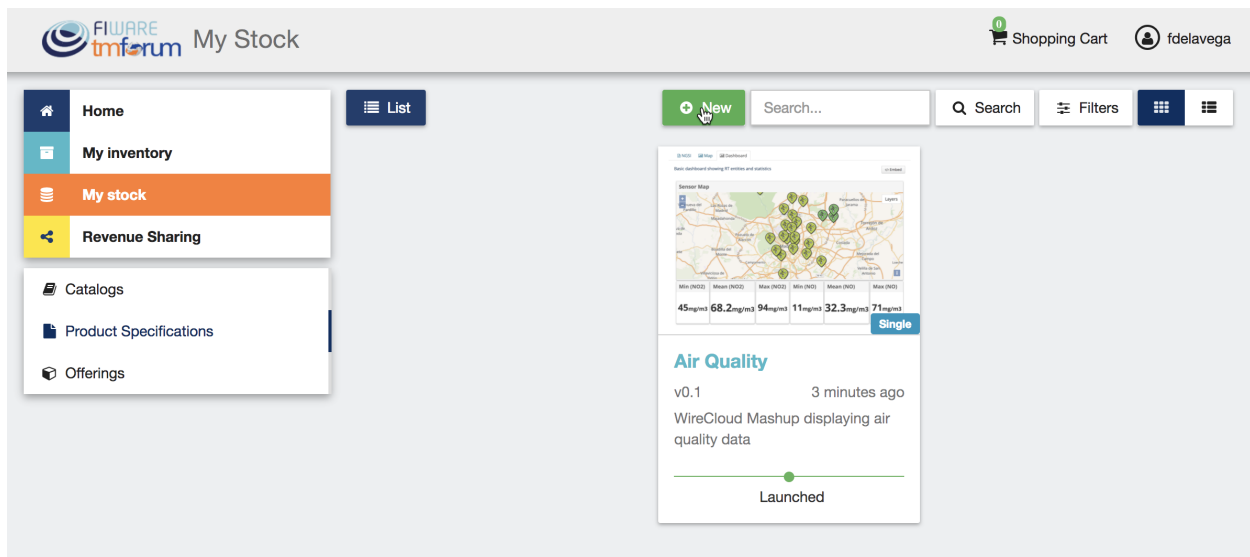
The screenshot shows the FIWARE My Stock dashboard. On the left is a sidebar menu with options: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main area displays a map with green dots representing air quality data points. Below the map is a table with columns: Min (NO2), Mean (NO2), Max (NO2), Min (NO), Mean (NO), and Max (NO). The data values are: 45mg/m3, 68.2mg/m3, 94mg/m3, 11mg/m3, 32.3mg/m3, and 71mg/m3. A 'Single' button is next to the table. Below the table is a section titled 'Air Quality' with version 'v0.1', a timestamp '2 minutes ago', and a description 'WireCloud Mashup displaying air quality data'. A progress bar is shown with a green dot and the word 'Launched'.



The screenshot shows the FIWARE My Stock dashboard with a table of product specifications. The table has columns: Status, Name, ID, Brand, Type, and Updated. The data row shows: Launched, Air Quality, 1, UPM, Single, and 2 minutes ago.

Status	Name	ID	Brand	Type	Updated
Launched	Air Quality	1	UPM	Single	2 minutes ago

To create a new product specification click on *New*



The screenshot shows the FIWARE My Stock dashboard with the 'New' button highlighted. The sidebar menu is the same as in the previous screenshots. The main area displays the same map and 'Air Quality' section, but the 'New' button is highlighted with a mouse cursor.

In the displayed view, provide the general information of the product spec. including its name, version, and an optional description. In addition, you have to include the product brand (Your brand), and an ID number which identifies the product in your environment. Then, click on *Next*.

FIWARE **My Stock** Shopping Cart fdelavega

New product

Step 1: General

1 General 2 Bundle 3 Assets 4 Characteristics 5 Attachments 6 Relationships 7 Terms & Conditions 8 Finish

Enter a name
Basic Chart

Enter a version
0.1

Enter a brand
UPM

Enter an ID Number
1234

Enter a description (optional)
A basic widget for showing charts

Next

In the next step, you can choose whether your product specification is a bundle or not. Product bundles are logical containers that allow you to sell multiple products as if it were a single one. Once you have selected the right option click on *Next*

FIWARE **My Stock** Shopping Cart fdelavega

New product

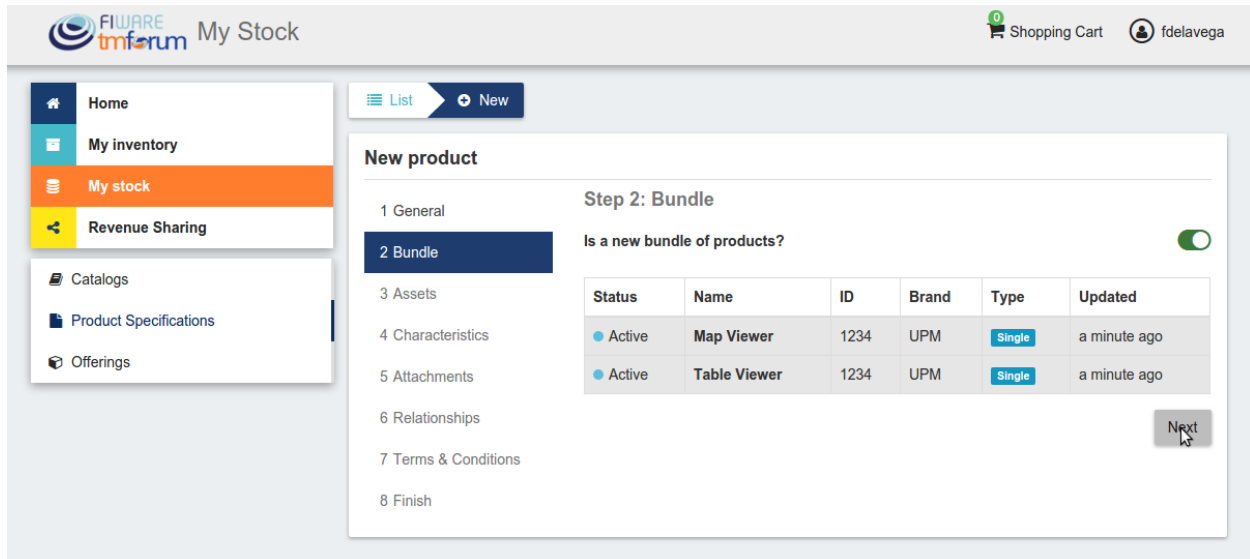
Step 2: Bundle

1 General 2 Bundle 3 Assets 4 Characteristics 5 Attachments 6 Relationships 7 Terms & Conditions 8 Finish

Is a new bundle of products?

Next

If you have decided to create a bundle, you will be required to choose 2 or more product specs to be included in the bundle.



New product

1 General

2 Bundle

3 Assets

4 Characteristics

5 Attachments

6 Relationships

7 Terms & Conditions

8 Finish

Step 2: Bundle

Is a new bundle of products? ☒

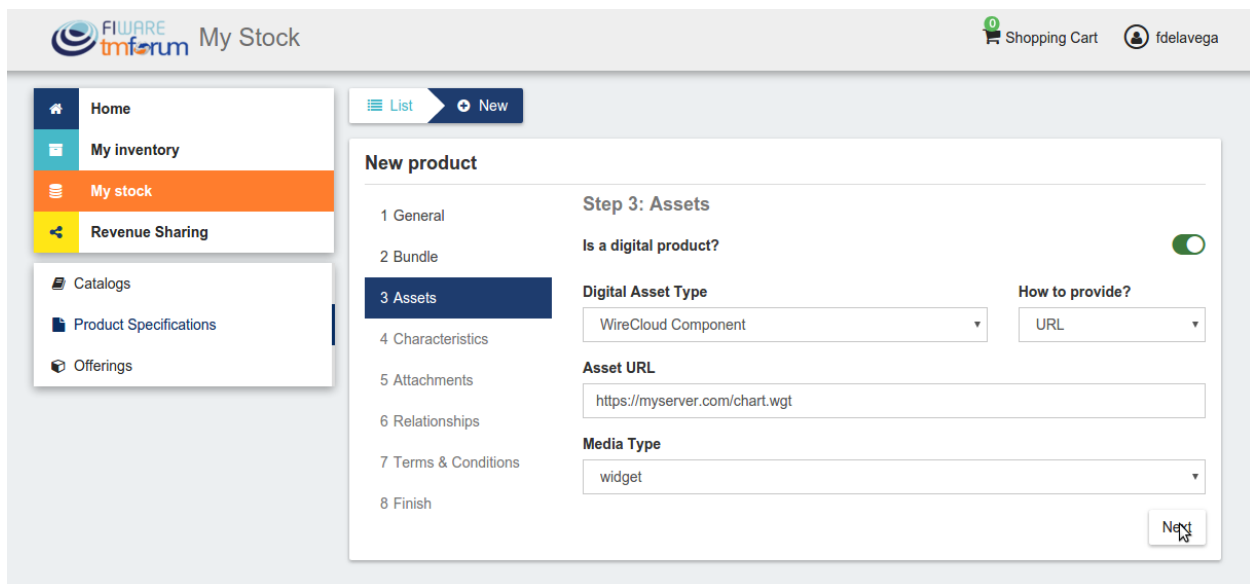
Status	Name	ID	Brand	Type	Updated
Active	Map Viewer	1234	UPM	Single	a minute ago
Active	Table Viewer	1234	UPM	Single	a minute ago

Next

In the next step you can choose if your product is a digital product. If this is the case, you will be required to provide the asset.

Note: If you are creating a product bundle, you will not be allowed to provide a digital asset since the offered ones will be the included in the bundled products

For providing the asset, you have to choose between the available asset types, choose how to provide the asset between the available options, provide the asset, and include its media type.



New product

1 General

2 Bundle

3 Assets

4 Characteristics

5 Attachments

6 Relationships

7 Terms & Conditions

8 Finish

Step 3: Assets

Is a digital product? ☒

Digital Asset Type

WireCloud Component

How to provide?

URL

Asset URL

https://myserver.com/chart.wgt

Media Type

widget

Next

The next step in the creation of a product is including its characteristics. For including a new characteristic click on *New Characteristic*

In the form, include the name, the type (string or number) and an optional description. Then create the values of the characteristic by filling the *Create a value* input and clicking on +.

FIWARE My Stock

Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List New

New product

1 General 2 Bundle 3 Assets 4 Characteristics 5 Attachments 6 Relationships 7 Terms & Conditions 8 Finish

Step 4: Characteristics

No characteristic included.

Enter a name Charts

Choose a type Number

Enter a description (optional) Number of charts included within the widget

Values

Value	Unit	Action
Default 5 charts		

Create a value

10 Unit charts

Create

Next

Once you have included all the characteristic info, save it clicking on *Create*

FIWARE My Stock

Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List New

New product

1 General 2 Bundle 3 Assets 4 Characteristics 5 Attachments 6 Relationships 7 Terms & Conditions 8 Finish

Step 4: Characteristics

No characteristic included.

Enter a name Charts

Choose a type Number

Enter a description (optional) Number of charts included within the widget

Values

Value	Unit	Action
Default 5 charts		
Default 10 charts		

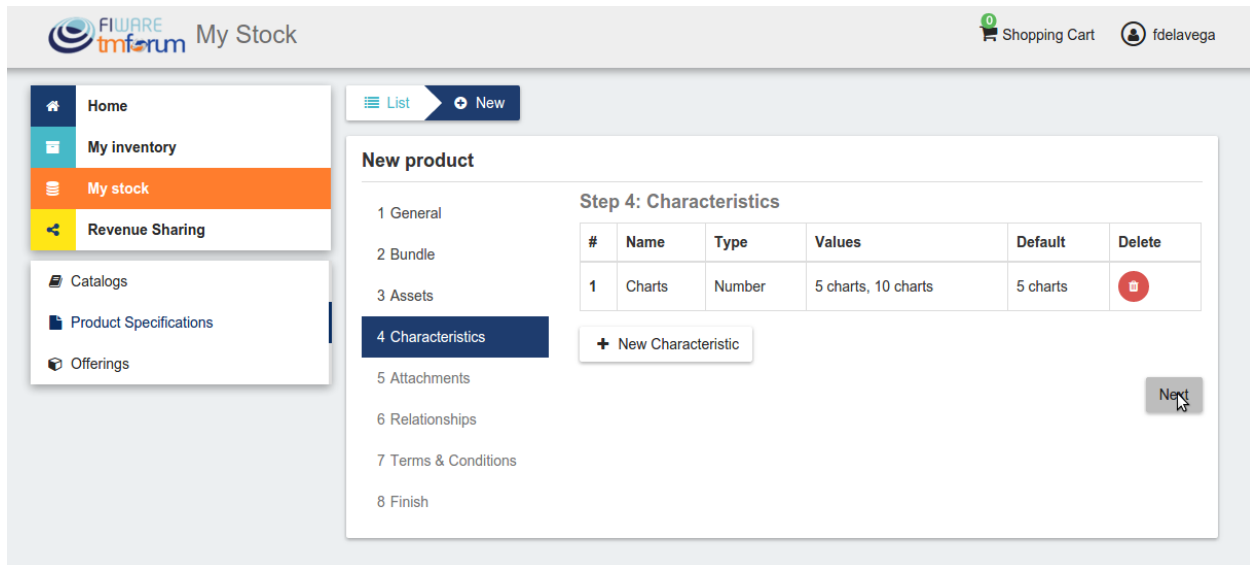
Create a value

Unit

Create

Next

Once you have included all the required characteristics click on *Next*



New product

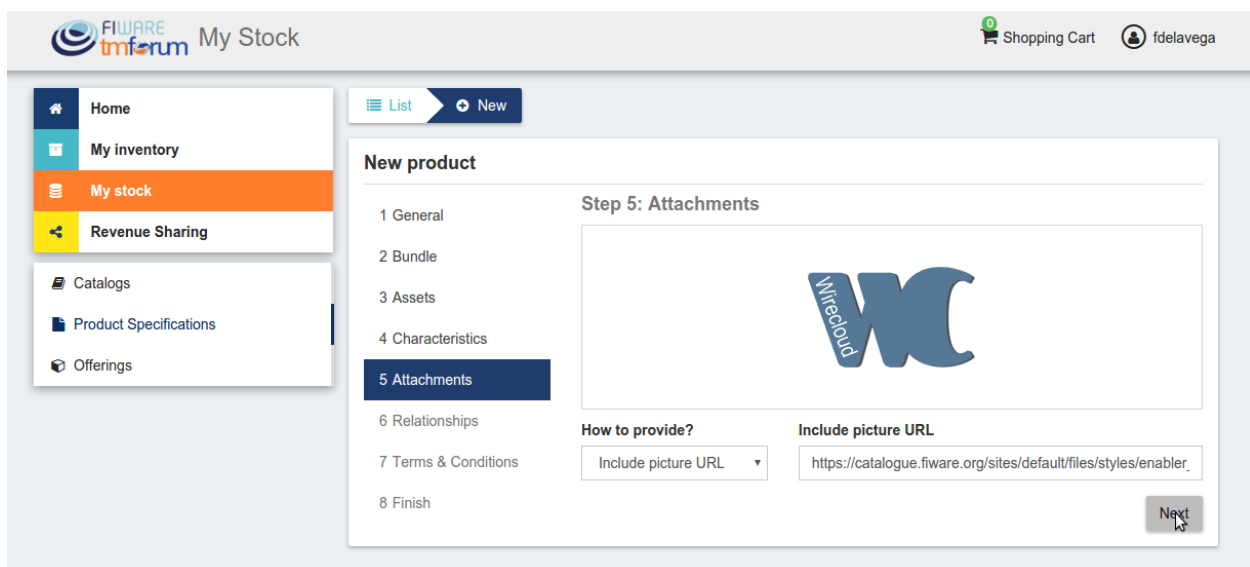
Step 4: Characteristics

#	Name	Type	Values	Default	Delete
1	Charts	Number	5 charts, 10 charts	5 charts	

[+ New Characteristic](#)


[Next](#)

In the next step you can include a picture for your product spec. You have two options, providing an URL pointing to the picture or directly uploading it. Once provided click *Next*



New product

Step 5: Attachments



How to provide?

Include picture URL

Include picture URL

[Next](#)

Then, you can specify relationships of the product you are creating with other of your product specs.

In the last step, you can specify the terms and conditions that apply to your product and that must be accepted by those customers who want to acquire it. To do that, include a title and a text for your terms and click on *Next*. Note that the terms and conditions are not mandatory.

The screenshot shows the FIWARE My Stock web application. The top navigation bar includes the FIWARE logo, the text 'My Stock', a shopping cart icon with '0' items, and a user profile icon labeled 'fdelavega'. A left sidebar contains a menu with 'Home', 'My inventory', 'My stock' (highlighted in orange), 'Revenue Sharing', 'Catalogs', 'Product Specifications', and 'Offerings'. The main content area is titled 'New product' and features a vertical list of steps: 1 General, 2 Bundle, 3 Assets, 4 Characteristics, 5 Attachments, 6 Relationships, 7 Terms & Conditions (highlighted in dark blue), and 8 Finish. The 'Step 7: Terms & Conditions' form includes two optional fields: 'Enter agreement title' with the value 'Non-commercial use', and 'Enter agreement text' with the value 'The current product cannot be used for commercial purposes'. A 'Next' button is located at the bottom right of the form.

Once done click on *Next* and then on *Create*

The screenshot shows the 'My Stock' application interface. On the left is a sidebar menu with options: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main content area is titled 'New product' and shows 'Step 8: Finish'. A progress bar on the left lists steps 1 through 8, with '8 Finish' selected. The form fields include:

- Name:** Basic Chart
- Version:** 0.1
- Status:** A progress bar with markers for Active, Launched, Retired, and Obsolete. 'Active' is currently selected.
- Brand:** UPM
- ID Number:** 1234
- Description:** A widget for showing basic charts
- Characteristics:** A table with 5 columns: #, Name, Type, Values, and Default.

#	Name	Type	Values	Default
1	Charts	Number	5 charts, 10 charts	5 charts
- Attachments:**
 - Picture URL:** http://antares.ls.fi.upm.es:8004/charging/media/assets/fdelavega/globallogo.png
 - Agreement title:** Non-commercial use
 - Enter agreement text:** The current product cannot be used for commercial purposes

A 'Create' button is located at the bottom right of the form.

Sellers can update their products. To do that click on the product specification to be updated.

The screenshot shows the 'My Stock' application interface with a list of products. The sidebar menu is the same as in the previous screenshot. The main content area has a 'List' button and a 'New' button. Below these are two product cards:

- Map Viewer:** v0.1, a few seconds ago, Map Viewer WireCloud Widget. Status: Active.
- Air Quality:** v0.1, 29 minutes ago, WireCloud Mashup displaying air quality data. Status: Launched.

Each card has a 'Single' button in the top right corner. The 'Air Quality' card also displays a map with green dots representing data points.

Update the required values and click on *Update*. Note that for start selling an offering that includes the product specification you will be required to change its status to *Launched*


The screenshot shows the 'My Stock' interface with a sidebar menu on the left containing: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main content area has a 'List' and 'Details' tab, with 'Details' selected. At the top of the details view is the 'Wirecloud WC' logo. Below it is a 'Map Viewer' title and an 'Upgrade' button. A navigation bar includes 'About', 'Characteristics', 'Attachments', and 'Relationships'. The 'General' section contains the following fields:

General	
Name	Version
<input type="text" value="Map Viewer"/>	<input type="text" value="0.1"/>
Status	
<div>Active <input checked="" type="radio"/> Launched <input type="radio"/> Retired <input type="radio"/> Obsolete <input type="radio"/></div>	
Brand	ID Number
<input type="text" value="UPM"/>	<input type="text" value="1"/>
Description (optional)	
<input type="text" value="Map Viewer WireCloud Widget"/>	

An 'Update' button is located at the bottom right of the form.

Note: For digital products it is not allowed to update the version using this form. Instead it is required to follow the process for upgrading the product version.

The basic information of the product specification is not the only information that can be updated, but it is also possible to update the *Attachments* and the *Relationships* by clicking of the related tab.

 My Stock

Shopping Cart fdelavega

Home

My inventory

My stock

Revenue Sharing


Catalogs


Product Specifications

Offerings

List

Details


Map Viewer
About Characteristics Attachments Relationships
Upgrade

Attachments
Picture

How to provide? Include picture URL
Include picture URL
https://catalogue.fiware.org/sites/default/files/styles/enabler_icon_large/public/fiware.png
Update

The screenshot displays the FIWARE My Stock web application. The top navigation bar includes the FIWARE logo, the text 'My Stock', a shopping cart icon with '0' items, and a user profile icon for 'fdelavega'. A left sidebar contains a menu with 'My inventory', 'My stock' (highlighted in orange), 'Revenue Sharing', 'Catalogs', 'Product Specifications', and 'Offerings'. The main content area features a 'Wirecloud WC' logo and a 'Map Viewer' section with an 'Upgrade' button. Below this is a 'Relationships' section showing 'No relationships included.' and a 'New relationship' form. The form includes a 'Choose a relationship' dropdown set to 'Migration', a 'Choose a product specification' search bar, and a table with one entry: 'Air Quality' with type 'Single' and updated '33 minutes ago'. A 'Create' button is at the bottom right of the form.

FIWARE My Stock

Shopping Cart 0 fdelavega

My inventory
My stock
Revenue Sharing
Catalogs
Product Specifications
Offerings

Wirecloud WC

Map Viewer

Upgrade

About Characteristics Attachments Relationships

Relationships

No relationships included.

New relationship

Choose a relationship
Migration

Choose a product specification
Search... Search

Name	Type	Updated
Air Quality	Single	33 minutes ago

Create

The displayed details form can be used for digital products specifications in order to provide new versions of the digital assets being offered. This can be done by clicking on *Upgrade*.

The screenshot shows the 'My Stock' interface with a sidebar menu on the left containing: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main content area displays the 'Map Viewer' product details. At the top, there's a 'Wirecloud' logo and a 'Map Viewer' title. Below the title, there's an 'Upgrade' button with a plus icon. A navigation bar includes 'About', 'Characteristics', 'Attachments', and 'Relationships'. The 'General' section contains fields for 'Name' (Map Viewer), 'Version' (0.1), 'Status' (Active, Launched, Retired, Obsolete), 'Brand' (UPM), and 'ID Number' (1).

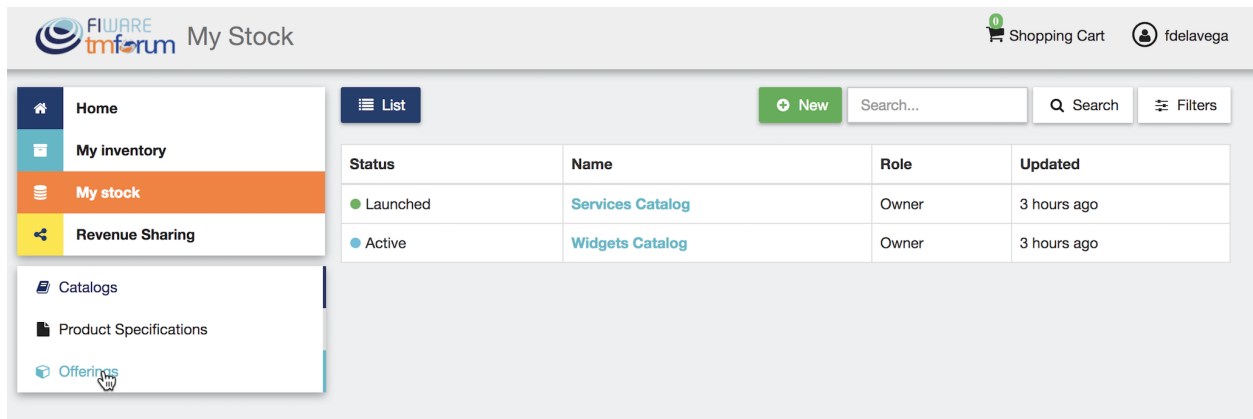
In the displayed form, it is required to include a new version for the product specification and to provide the new digital asset to be offered.

The 'Upgrade Product Spec' dialog box contains the following fields: 'New Version' (0.2), 'Digital Asset Type' (WireCloud Component), 'How to provide?' (FILE), 'Asset File' (Seleccionar archivo CoNWeT_ol3-map_1.0.1rc2.wgt), and 'Media Type' (widget). At the bottom, there are 'Upgrade' and 'Cancel' buttons.

Note: All the customers who have acquired an offering including the current product specification will be able to access to the new version of the digital asset.

Manage Product Offerings

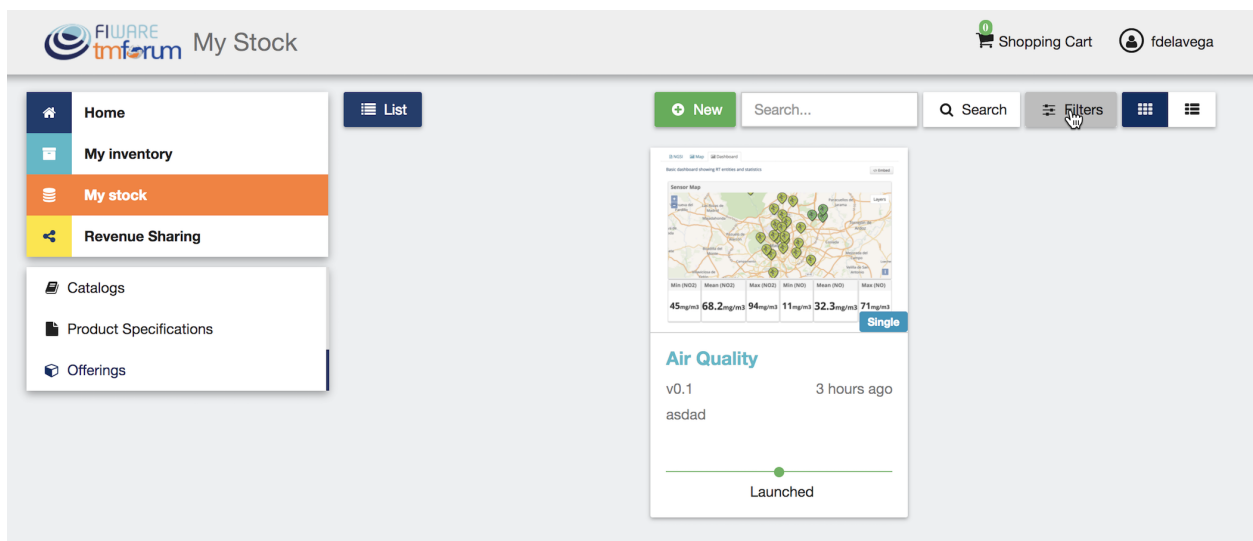
Product Offerings are the entities that contain the pricing models and revenue sharing info used to monetize a product specification. To list your product offerings, go to *My Stock* section and click on *Offerings*



The screenshot shows the FIWARE Inference My Stock interface. On the left, a sidebar menu includes Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main area displays a table of product offerings with columns for Status, Name, Role, and Updated. The table contains two entries: 'Services Catalog' (Launched, Owner, 3 hours ago) and 'Widgets Catalog' (Active, Owner, 3 hours ago). Above the table are buttons for 'List', 'New', 'Search...', and 'Filters'.

Status	Name	Role	Updated
Launched	Services Catalog	Owner	3 hours ago
Active	Widgets Catalog	Owner	3 hours ago

The existing product offerings can be searched by keyword, sorted, or filtered by status and whether they are bundles or not. To filter or sort product offerings, click on *Filters*, choose the appropriate properties, and click on *Close*



The screenshot shows the FIWARE Inference My Stock interface with the 'Filters' dialog open. The dialog displays a map of Madrid with green markers indicating air quality stations. Below the map, a table shows air quality data for various stations, including '45mg/m3', '68.2mg/m3', '94mg/m3', '11mg/m3', '32.3mg/m3', and '71mg/m3'. The 'Single' button is highlighted. The 'Air Quality' section shows 'v0.1' and 'asdad' with a 'Launched' status and '3 hours ago' timestamp.

Search filters

Status

☒ Active
☒ Launched
☐ Retired
☐ Obsolete

Type

☒ All
☐ Single
☐ Bundle

Sort By

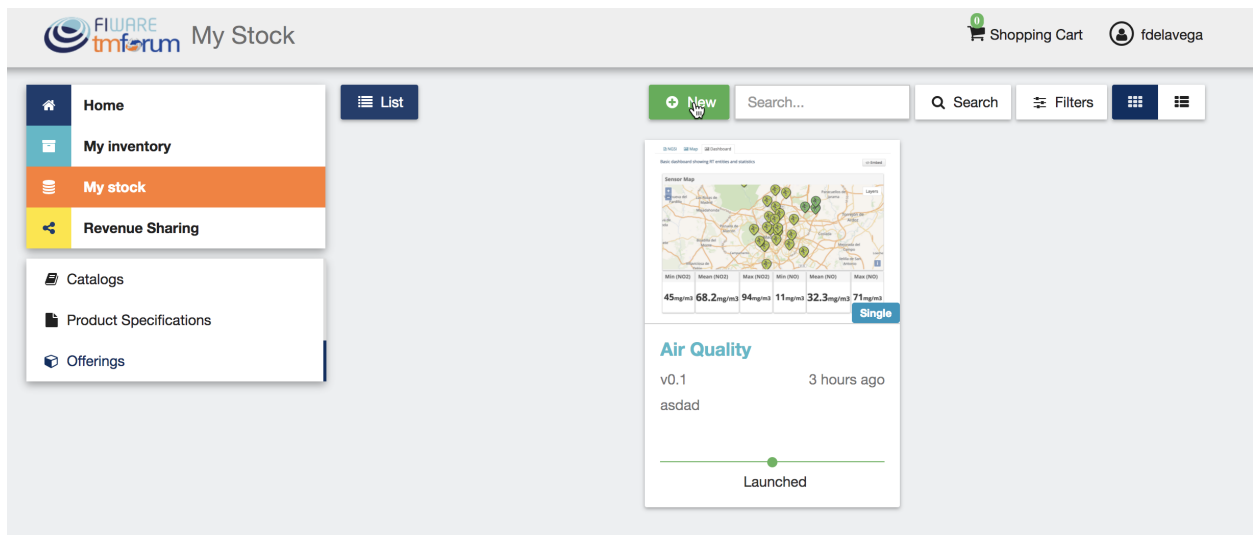
☒ Last Updated
☐ Name

Close

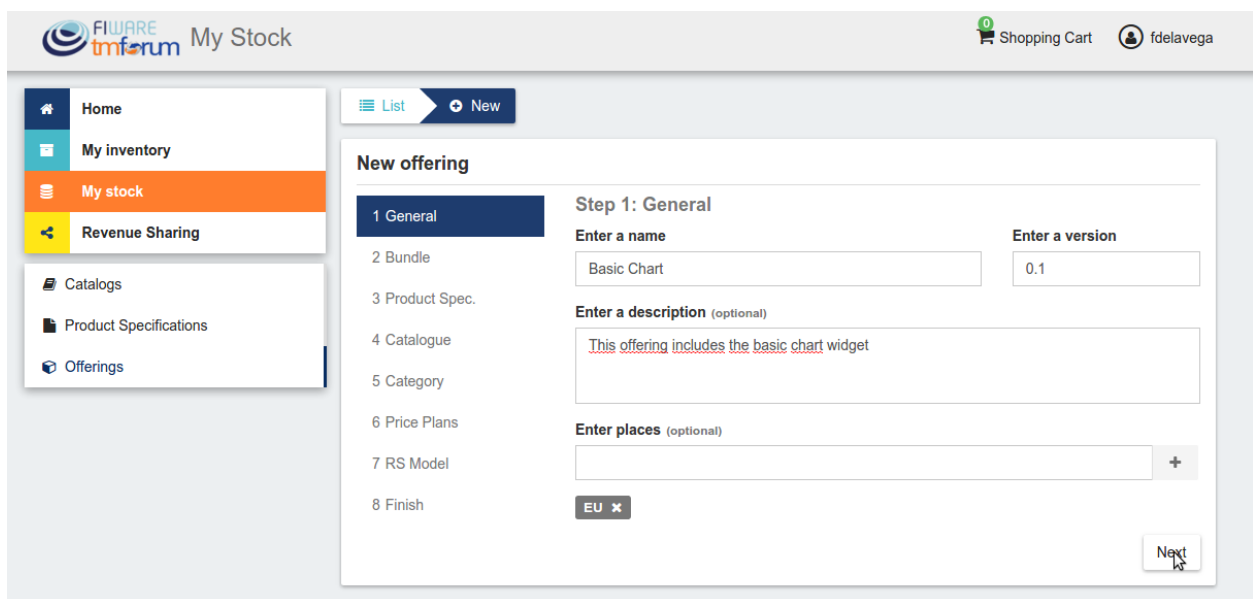
Additionally, it is possible to switch between the grid view and the tabular view by clicking on the specific button.

Status	Name	Product Spec.	Type	Updated
Launched	Air Quality	Air Quality	Single	3 hours ago

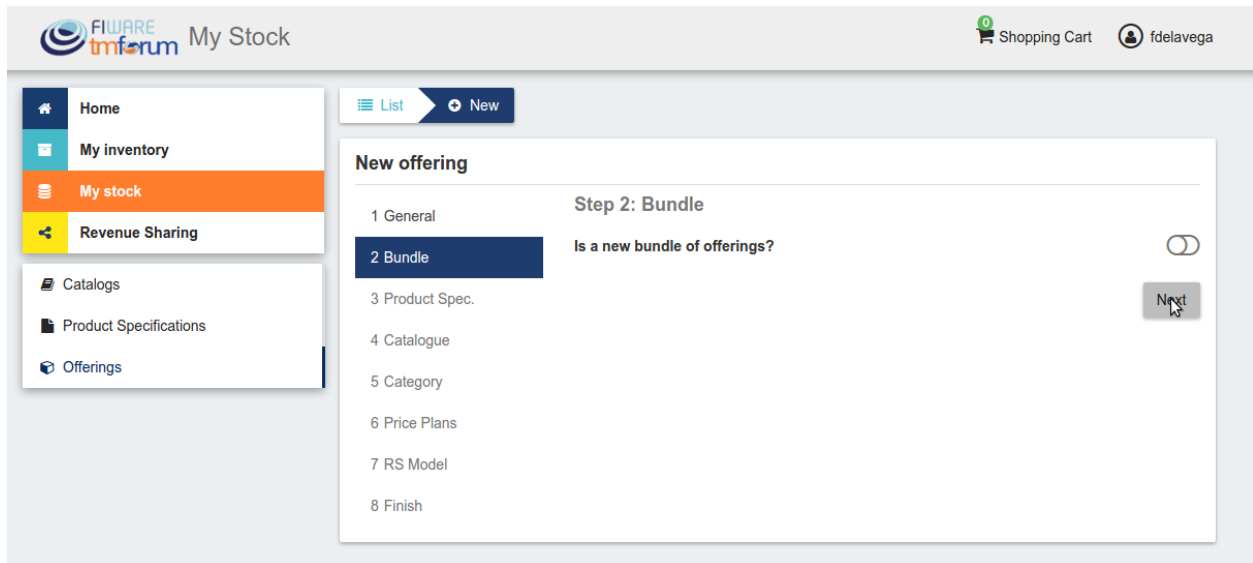
To create a new offering click on *New*



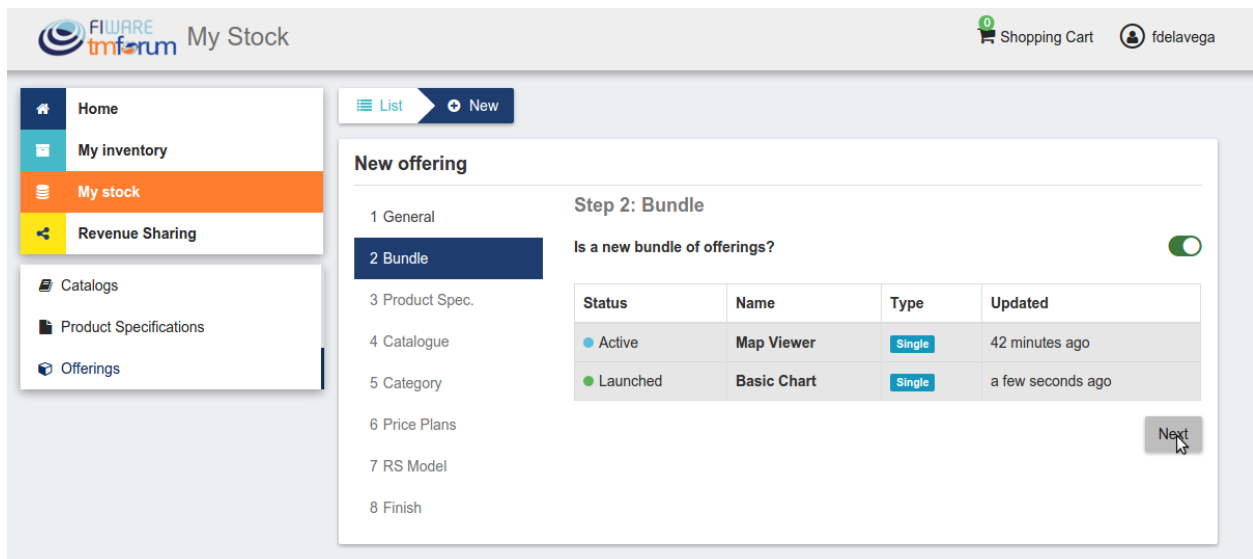
In the displayed form, include the basic info of the offering. Including, its name, version, an optional description, and an optional set of places where the offering is available. Once the information has been provided click on *Next*



In the next step, you can choose whether your offering is a bundle or not. In this case, offering bundles are logical containers that allow you to provide new pricing models when a set of offerings are acquired together. Once selected click on *Next*



If you want to create a bundle you will be required to include at least two bundled offerings.



In the next step you have to select the product specification that is going to be monetized in the current offering. Once selected click on *Next*.

The screenshot shows the FIWARE My Stock interface. The top navigation bar includes the FIWARE logo, 'My Stock', a Shopping Cart icon with '0' items, and a user profile 'fdelavega'. The left sidebar contains a menu with 'Home', 'My inventory', 'My stock' (highlighted), 'Revenue Sharing', 'Catalogs', 'Product Specifications', and 'Offerings'. The main content area is titled 'New offering' and shows 'Step 3: Product Spec.'. A list of steps (1-8) is on the left, with '3 Product Spec.' selected. The main table displays two offerings:

Status	Name	ID	Brand	Type	Updated
Active	Map Viewer	1234	UPM	Single	17 hours ago
Launched	Basic Chart	1234	UPM	Single	16 hours ago

A 'Next' button is visible at the bottom right of the main content area.

Note: If you are creating an offering bundle, you will not be allowed to include a product specification

Then, you have to select the catalog where you want to publish your offering and click on *Next*

The screenshot shows the FIWARE My Stock interface at 'Step 4: Catalogue'. The layout is similar to the previous step. The left sidebar remains the same. The main content area shows 'Step 4: Catalogue'. A list of steps (1-8) is on the left, with '4 Catalogue' selected. The main table displays two offerings:

Status	Name	Role	Updated
Launched	Widgets Catalog	Owner	17 hours ago
Active	Services Catalog	Owner	17 hours ago

A 'Next' button is visible at the bottom right of the main content area.

In the next step, you can optionally choose categories for your offering. Once done, click on *Next*

The screenshot shows the 'New offering' form at Step 5: Category. The left sidebar contains a navigation menu with 'Home', 'My inventory', 'My stock' (highlighted), 'Revenue Sharing', 'Catalogs', 'Product Specifications', and 'Offerings'. The main content area has a 'List' button and a 'New' button. Below the 'New' button is a list of steps: 1 General, 2 Bundle, 3 Product Spec., 4 Catalogue, 5 Category (highlighted), 6 Price Plans, 7 RS Model, and 8 Finish. The 'Step 5: Category' section is titled 'Choose categories (optional)' and contains a table with two columns: 'Name' and 'Updated'.

Name	Updated
Cloud Services	18 hours ago
Cloud Services / VM Services	18 hours ago

A 'Next' button is located at the bottom right of the form.

The next step is the more important for the offering. In the displayed form you can create different price plans for you offering, which will be selectable by customers when acquiring the offering. If you do not include any price plan the offering is considered free.

To include a new price plan the first step is clicking on *New Price Plan*

The screenshot shows the 'New offering' form at Step 6: Price Plans. The left sidebar is the same as in the previous screenshot. The main content area has the same step list, but '6 Price Plans' is now highlighted. The 'Step 6: Price Plans' section displays a light blue box with the text 'No price plans included.' Below this box is a 'New price plan' button. A 'Next' button is located at the bottom right of the form.

For creating the price plan, you have to provide a name, and an optional description. Then, you have to choose the type of price plan between the provided options.

The available types are: *one time* for payments that are made once when purchasing the offering, *recurring* for charges that are made periodically (e.g a monthly payment), and *usage* for charges that are calculated applying the pricing model to the actual usage made of the acquired service.

If you choose *one time*, you have to provide the price and the currency.

FIWARE Inforum My Stock

Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List New

New offering

- General
- Bundle
- Product Spec.
- Catalogue
- Category
- Price Plans**
- RS Model
- Finish

Step 6: Price Plans

No price plans included.

New price plan

Enter a name: Single payment plan

Choose a type: ONE TIME

Enter a price: 10 EUR

Enter a description (optional): A 10 EUR payment price plan

Create

Next

If you choose *recurring*, you have to provide the price, the currency, and the period between charges.

FIWARE Inforum My Stock

Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List New

New offering

- General
- Bundle
- Product Spec.
- Catalogue
- Category
- Price Plans**
- RS Model
- Finish

Step 6: Price Plans

Name	Description	Price	Actions
Single payment plan	A 10 EUR payment price plan	10 EUR	

New price plan

Enter a name: Subscription plan

Choose a type: RECURRING

Enter a price: 1 EUR

Choose a charge period: / MONTHLY

Enter a description (optional): A monthly payment of 1 EUR

Create

Next

If you choose usage, you have to provide the unit to be accounted, the currency, and the price per unit

FIWARE My Stock Shopping Cart fdelavega

Home My inventory **My stock** Revenue Sharing Catalogs Product Specifications Offerings

List New

New offering

1 General 2 Bundle 3 Product Spec. 4 Catalogue 5 Category **6 Price Plans** 7 RS Model 8 Finish

Step 6: Price Plans

Name	Description	Price	Actions
Single payment plan	A 10 EUR payment price plan	10 EUR	
Subscription plan	A monthly payment of 1 EUR	1 EUR / MONTHLY	

New price plan

Enter a name: Usage plan

Choose a type: USAGE

Enter a price: 0.5 EUR

Enter a unit: / call

Enter a description (optional): 5 cents per call to the service

Create

Next

You can update or remove plans by clicking on the corresponding action button.

FIWARE My Stock Shopping Cart fdelavega

Home My inventory **My stock** Revenue Sharing Catalogs Product Specifications Offerings

List New

New offering

1 General 2 Bundle 3 Product Spec. 4 Catalogue 5 Category **6 Price Plans** 7 RS Model 8 Finish

Step 6: Price Plans

Name	Description	Price	Actions
Single payment plan	A 10 EUR payment price plan	10 EUR	
Subscription plan	A monthly payment of 1 EUR	1 EUR / MONTHLY	
Usage plan	5 cents per call to the service	0.5 EUR / CALL	

New price plan

Next

Once you have created your pricing model click on *Next*

FIWARE **My Stock** Shopping Cart fdelavega

Home My inventory **My stock** Revenue Sharing Catalogs Product Specifications Offerings

List New

New offering

1 General 2 Bundle 3 Product Spec. 4 Catalogue 5 Category **6 Price Plans** 7 RS Model 8 Finish

Step 6: Price Plans

Name	Description	Price	Actions
Single payment plan	A 10 EUR payment price plan	10 EUR	
Subscription plan	A monthly payment of 1 EUR	1 EUR / MONTHLY	

New price plan

Next

In the last step of the process, you have to choose the revenue sharing model to be applied to you offering between the available ones. Once done, click on *Next* and then on *Create*.

FIWARE **My Stock** Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List New

New offering

1 General 2 Bundle 3 Product Spec. 4 Catalogue 5 Category 6 Price Plans **7 RS Model** 8 Finish

Step 7: RS Model

Product Class	Platform Percentage	Provider Percentage	N° Stakeholders
defaultRevenue	30	70	0

Next

7 RS Model

8 Finish

Places

EU

Product Spec.

Status	Name	Type	Updated
Launched	Basic Chart	Single	16 hours ago

Catalogue

Status	Name	Rol	Updated
Launched	Widgets Catalog	Owner	17 hours ago

Categories

Name	Updated
Cloud Services / VM Services	18 hours ago

Price plans

#	Name	Description	Price
1	Single payment plan	A 10 EUR payment price plan	10 EUR
2	Subscription plan	A monthly payment of 1 EUR	1 EUR / MONTHLY

Revenue Sharing Model

Product Class	Platform Percentage	Provider Percentage	N° Stakeholders
defaultRevenue	30	70	0

Create

Sellers can also edit their offerings. To do that click on the offering to be updated.

FIWARE Inforum My Stock

Shopping Cart fdelavega

Home

My inventory

My stock

Revenue Sharing

Catalogs

Product Specifications

Offerings

List

New

Search...

Search

Filters

WireCloud

Basic Chart

v0.1 a few seconds ago

This offering includes the basic chart widget

Active

Air Quality

v0.1 6 minutes ago

WireCloud Mashup displaying air quality data

Launched

In the displayed form, change the fields you want to edit and click on *Update*. Note that for start selling you offering you have to update its status to *Launched*

The screenshot shows the 'My Stock' interface with the 'Basic Chart' offering selected. The left sidebar contains navigation links: My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main content area displays the 'Basic Chart' offering details, including a 'Wirecloud' logo, tabs for About, Price plans, and Categories, and a form for updating the offering.

Basic Chart

General

Name
Basic Chart

Version
0.1

Product Spec.
[Basic Chart](#)

Updated
Today at 5:00 PM

Status

Active **Launched** Retired Obsolete

Description (optional)
This offering includes the basic chart widget

Places
EU

Update

It is also possible to update the *Price Plans* and *Categories* of the offering by accessing to the related tab.

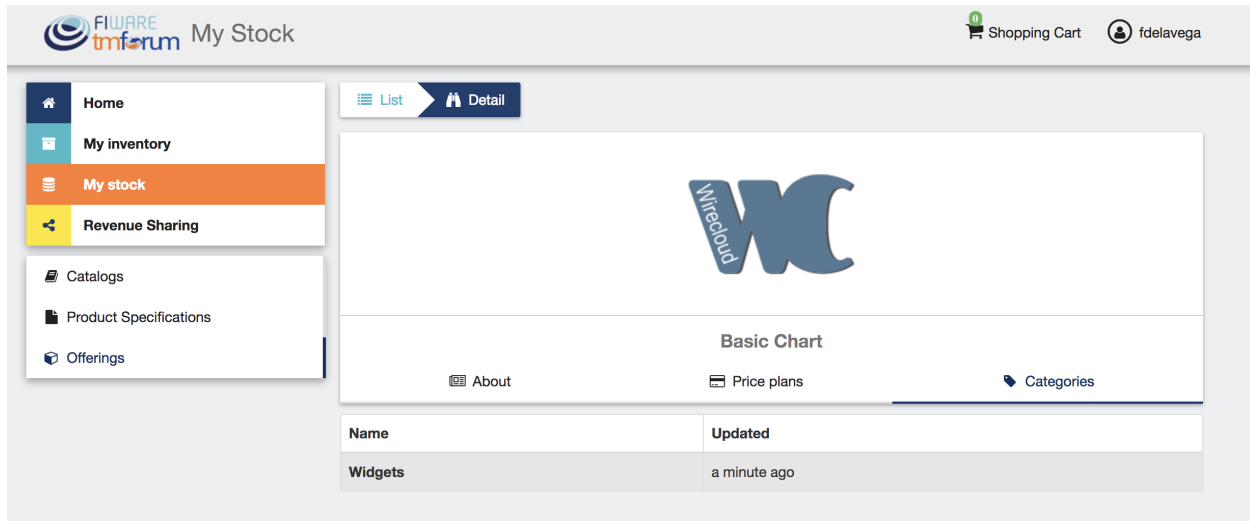
The screenshot shows the 'My Stock' interface with the 'Basic Chart' offering selected and the 'Price plans' tab active. The left sidebar contains navigation links: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main content area displays the 'Basic Chart' offering details, including a 'Wirecloud' logo, tabs for About, Price plans (highlighted), and Categories, and a table of price plans.

Basic Chart

Price plans

Name	Description	Price	Actions
Single payment plan	A 10 EUR payment plan	10 EUR	Edit Delete
Subscription plan	A monthly payment of 1 EUR	1 EUR / MONTHLY	Edit Delete

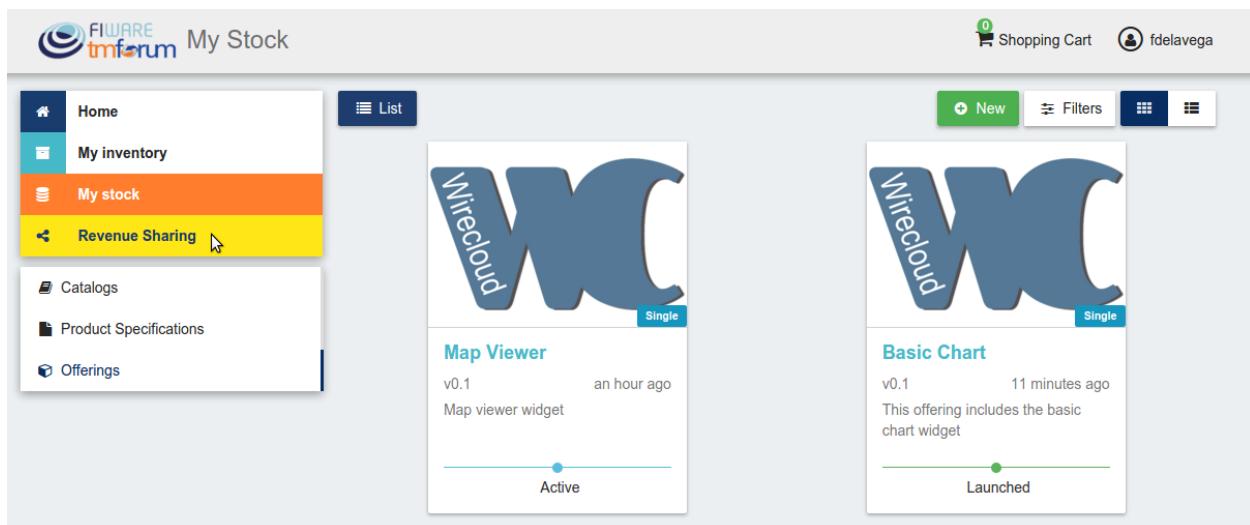
New price plan



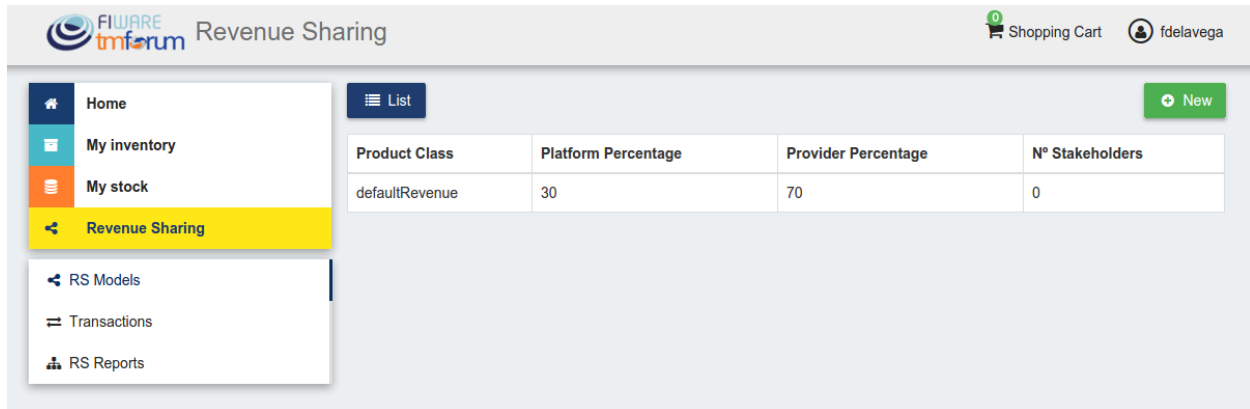
Manage Revenue Sharing Models

Revenue Sharing Models specify how the revenues generated by an offering or set of offerings must be distributed between the owner of the Business API Ecosystem instance, the provider of the offering, and the related stakeholders involved.

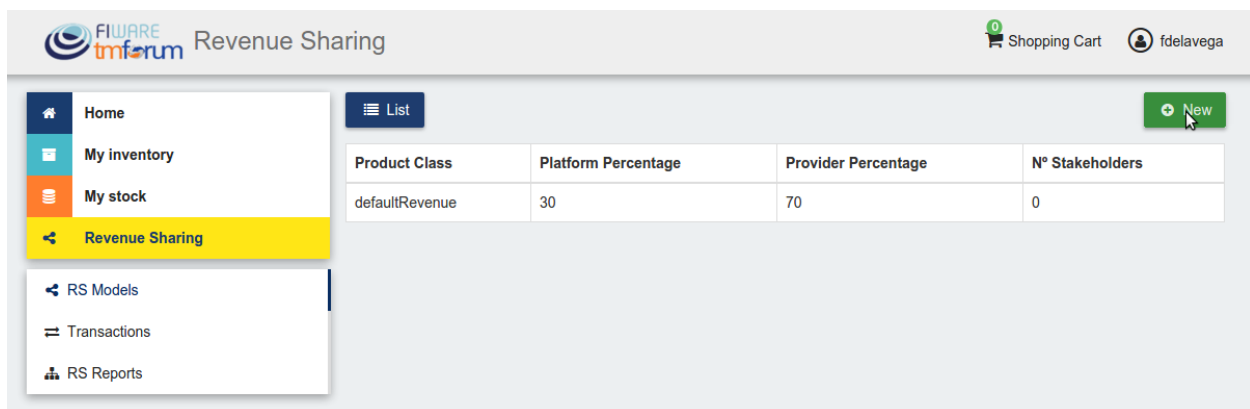
To manage RS models go to the *Revenue Sharing* section.



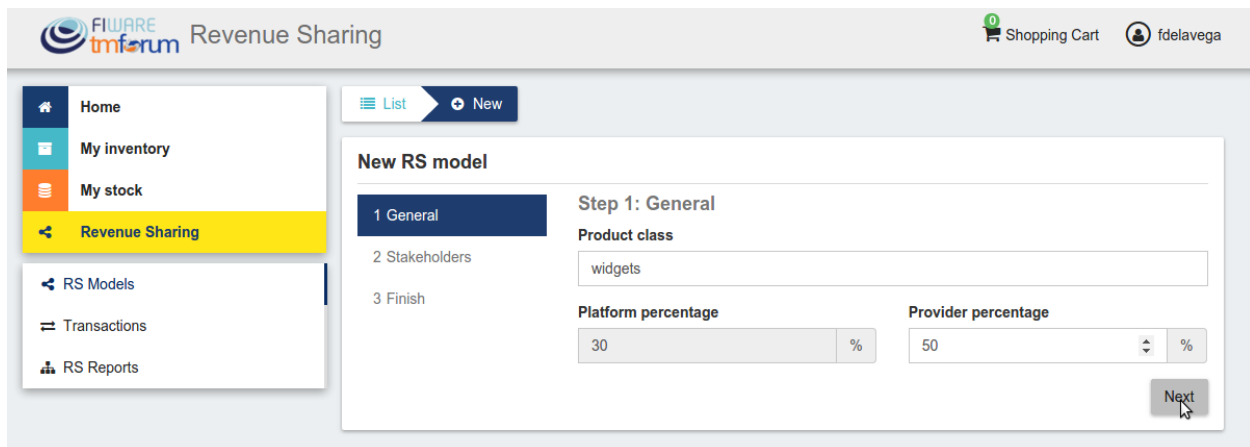
In this view, you can see the revenue sharing models you have available. By default it will appear the default RS model which establishes the revenue distribution between you and the Business API Ecosystem instance owner.



You can create a new RS model clicking on *New*



In the first step of the process you have to provide a product class, which identifies the RS model, and the percentage you want to receive. The platform percentage is fixed and cannot be modified. Once provided click on *Next*



In the next step, you can optionally add more stakeholders to the RS model. To do that click on *New Stakeholder*

FIWARE **tmforum** Revenue Sharing Shopping Cart fdelavega

Home My inventory My stock **Revenue Sharing** RS Models Transactions RS Reports

List New

New RS model

1 General 2 Stakeholders 3 Finish

Step 2: Stakeholders

No stakeholders included.

+ New stakeholder

Next

Then, select the Stakeholder between the available users, and provide its percentage. Finally, save it clicking on *Create*

FIWARE **tmforum** Revenue Sharing Shopping Cart fdelavega

Home My inventory My stock **Revenue Sharing** RS Models Transactions RS Reports

List New

New RS model

1 General 2 Stakeholders 3 Finish

Step 2: Stakeholders

No stakeholders included.

Select stakeholder

store_customer

Stakeholder percentage

20 %

Create Cancel

Next

Note: The total percentage (provider + platform + stakeholders) must be equal to 100

Finally, click on *Next* and then on *Create*

FIWARE **tmforum** Revenue Sharing Shopping Cart fdelavega

Home My inventory My stock **Revenue Sharing** RS Models Transactions RS Reports

List New

New RS model

1 General 2 Stakeholders 3 Finish

Step 2: Stakeholders

User	Percentage	Delete
store-customer	20 %	

+ New stakeholder

Next

New RS model

Step 3: Finish

General

Product class

widgets

Platform percentage

30 %

Provider percentage

50 %

Stakeholders

User	Percentage
store-customer	20 %

Total: 100 %

Create

Sellers can also update their RS model. To do that click on the RS model to be updated.

List

Product Class	Platform Percentage	Provider Percentage	N° Stakeholders
defaultRevenue	30	70	0
widgets	30	50	1

New

Then, update the required fields (including the stakeholders if you want), and click on *Save Changes*

FIWARE Inforum Revenue Sharing

Shopping Cart fdelavega

Home My inventory My stock **Revenue Sharing** RS Models Transactions RS Reports

List Detail

widgets About

Product class
widgets

Platform percentage 30 % Provider percentage 50 %

User	Percentage	Delete
store-customer	20 %	

Total: 100 %

Save changes

Manage Transactions

Sellers can manage the transactions related to their products in order to know how much money their products are generating, and to launch the revenue sharing process. To manage your seller transactions go to *Revenue Sharing* and click on *Transactions*

FIWARE Inforum Revenue Sharing

Shopping Cart fdelavega

Home My inventory My stock **Revenue Sharing** RS Models **Transactions** RS Reports

List New

Product Class	Platform Percentage	Provider Percentage	N° Stakeholders
defaultRevenue	30	70	0
widgets	30	50	1

In the displayed view, you can see the transactions pending to be paid to you and your stakeholders. It is also possible to display the transactions in tabular way

The screenshot shows the 'Revenue Sharing' dashboard. On the left is a sidebar with navigation links: Home, My inventory, My stock, Revenue Sharing (highlighted), RS Models, Transactions, and RS Reports. The main area displays two transaction cards for 'defaultRevenue' by 'fi-lab-user-example'.

Top card (Timestamp: Tue, Sep 13th 2016, 13:22):

Transaction Type	Charged Amount
Charge	10 EUR
Product Offering	Description
19 Basic Chart 0.1	One time payment: 10.00 EUR

Bottom card (Timestamp: Tue, Sep 13th 2016, 14:02):

Transaction Type	Charged Amount
Charge	300 EUR
Product Offering	Description
24 Nice Phone 0.1	One time payment: 300.00 EUR

The screenshot shows the 'Revenue Sharing' dashboard with a table view of transactions. The sidebar is the same as in the previous screenshot.

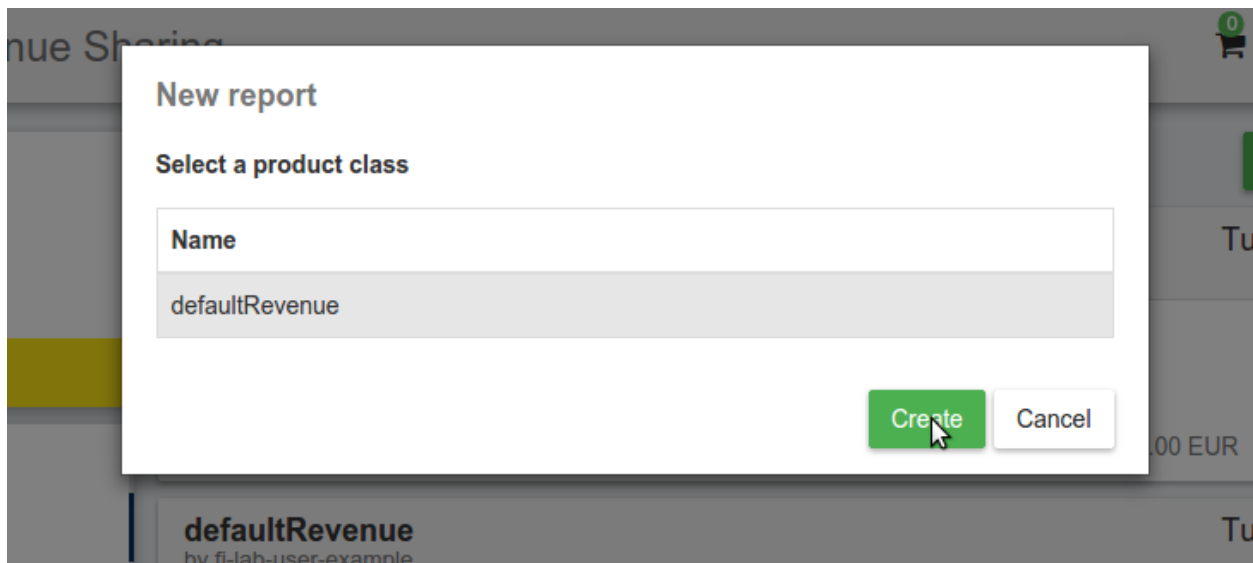
Timestamp	Type	Product class	Customer	Product offering	Amount	Description
Tue, Sep 13th 2016, 13:22	Charge	defaultRevenue	fi-lab-user-example	19 Basic Chart 0.1	10 EUR	One time payment: 10.00 EUR
Tue, Sep 13th 2016, 14:02	Charge	defaultRevenue	fi-lab-user-example	24 Nice Phone 0.1	300 EUR	One time payment: 300.00 EUR

These transactions are aggregated and paid by the Business API Ecosystem periodically once a month. Nevertheless, if you need to be paid, you can force the revenue sharing calculus and payment of your pending transactions by manually generating a revenue sharing report.

To create a new report click on *New Report*

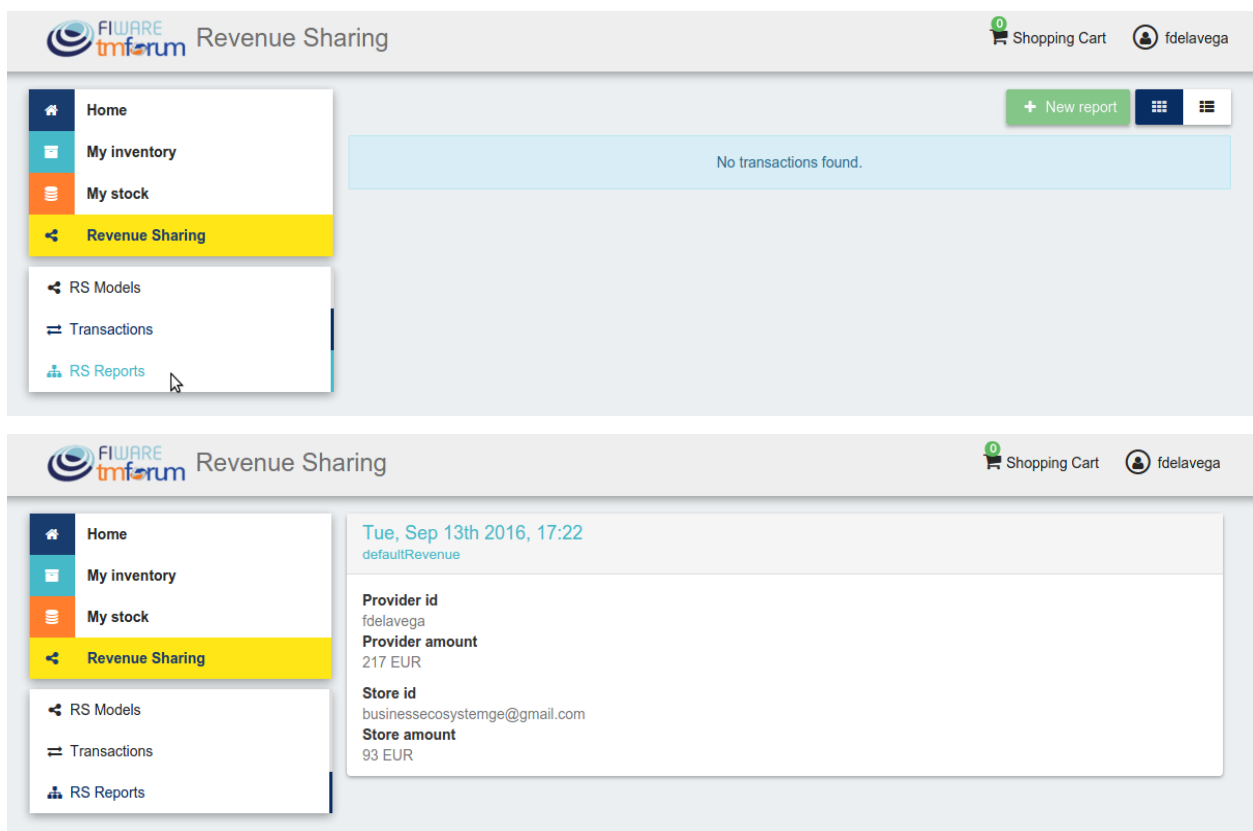
This screenshot is identical to the one above, but with a mouse cursor hovering over the '+ New report' button in the top right corner of the main area.

In the displayed modal, choose the product classes to be calculated and click on *Create*



This process will aggregate all the transactions with the selected product classes, calculate the amount to be paid to each stakeholder using the related revenue sharing model, generate a revenue sharing report, and pay the seller and the stakeholders using their PayPal account.

You can see the generated reports clicking on *RS Reports*

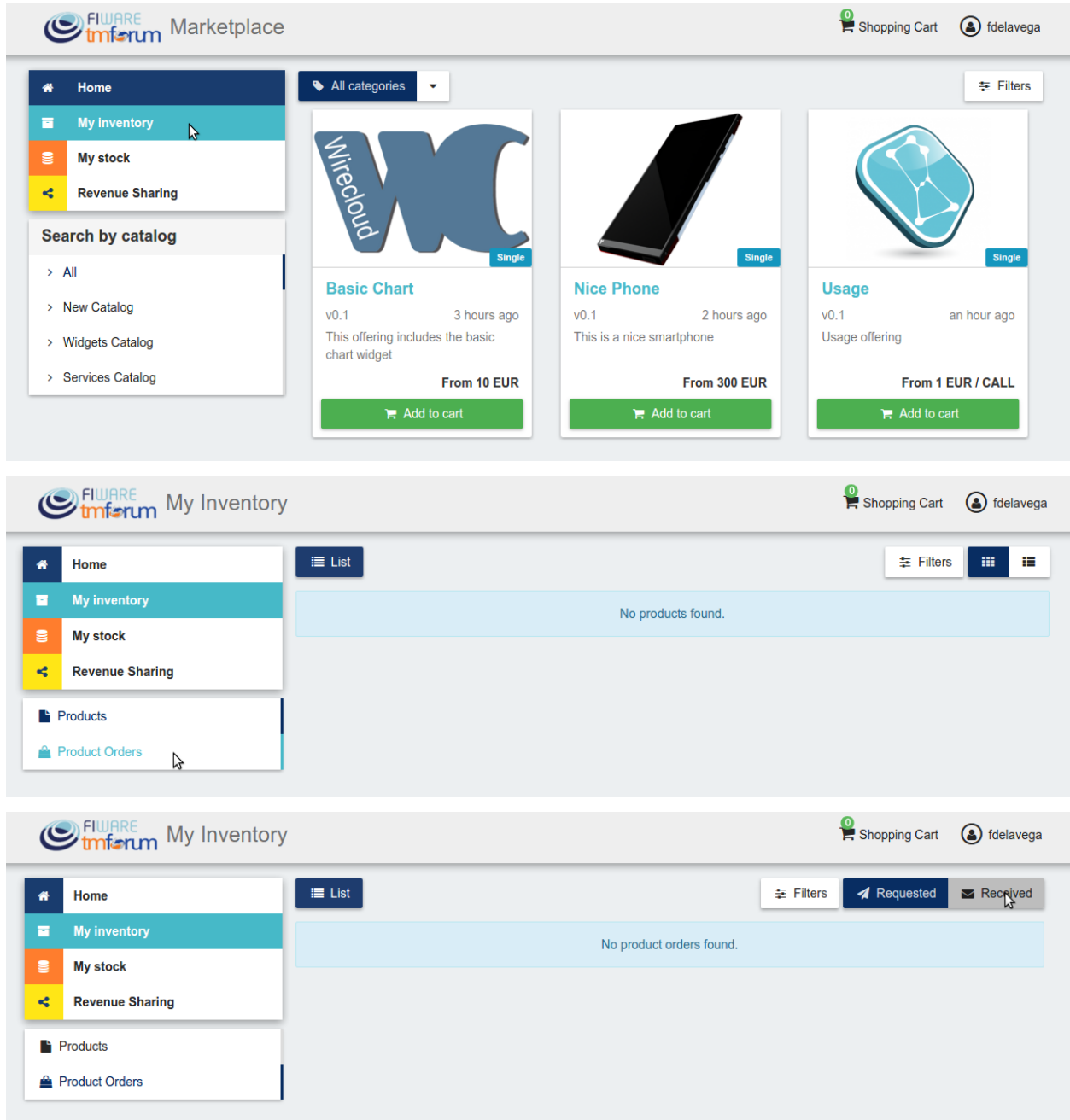


Note: Sellers would need to have a PayPal account associated to the email of their FIWARE IdM account in order to be paid for their products

Manage Received Orders

Sellers can manage the orders they have received in order to see the chosen characteristics, read customer notes, or process the order in case it has been acquired a physical product.

To view your received orders go to *My inventory* section, click on *Product orders*, and open the *Received* section.



You can view the details of a received order clicking on the order date

The screenshot shows the 'My Inventory' application interface. On the left is a sidebar with navigation links: Home, My inventory (selected), My stock, Revenue Sharing, Products, and Product Orders. The main content area has a top bar with 'List', 'Filters', 'Requested', and 'Received' tabs. Below this, a header shows 'Today at 1:55 PM' and a timestamp 'Tuesday, September 13th 2016, 1:55 pm'. The product details for 'Nice Phone' are displayed, including a description, state (Acknowledged), price (300 EUR), and appointment status (No appointment included). At the bottom of the product card are 'Sent' and 'Reject' buttons.

In the displayed view you can review the details of the order and the details of your products acquired by the customer, including the chosen characteristics.

Additionally, you can view the customer notes clicking on the *Notes* tab

This screenshot shows the 'My Inventory' application with the 'Order details' and 'Notes' tabs selected. The 'Order details' section displays customer information (Name, Customer name, Notification email, Shipping address) and order information (Order date, Priority, Status, Desired delivery date, Expected delivery date). Below this, the 'Products' tab is active, showing 'Product 1' with its image, offering name ('Nice Phone'), status (Acknowledged), vendor name (fdelavega), characteristics (Color: white), and price (300 EUR). The 'Notes' tab is also visible at the bottom right of the product section.

You can also give a reply to customer notes including it in the text area and clicking on the send button

My Inventory

Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Products Product Orders

List Details

Order details

Name
No data provided.

Customer name
fi-lab-user-example

Notification email
pablo@email.com

Shipping address
Campus de Montegancedo S/N
28041 Madrid (Madrid)
Spain

Order date
Tuesday, September 13th 2016, 1:55 pm

Priority
4

Status
InProgress

Desired delivery date
Tuesday, September 13th 2016, 1:55 pm

Expected delivery date
No data provided

Products Notes

Notes

Enter a note

There are't any remaining silver phone

Send

fi-lab-user-example
Today at 2:16 PM I prefer the silver phone instead

If the acquired product is not digital, the order needs to be processed manually by the seller, in the sense that the seller will have to send the acquired product to the customer. To deal with this situation, the order details view allows sellers to manually change the status of the order.

To reject a received order you have to click in the *Reject* button located in the search or in the details view of the order.

My Inventory

Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Products Product Orders

List Requested Received

Today at 1:55 PM

Customer fi-lab-user-example

Status InProgress

Priority 4

Nice Phone

Description
This is a nice smartphone

State
Acknowledged

Price
300 EUR


Appointment
No appointment included.

Sent Reject

The screenshot shows the 'My Inventory' interface with a sidebar menu containing 'Home', 'My inventory', 'My stock', 'Revenue Sharing', 'Products', and 'Product Orders'. The main content area is titled 'Order details' and displays the following information:

Order details	
Name No data provided. Customer name fi-lab-user-example Notification email pablo@email.com Shipping address Campus de Montegancedo S/N 28041 Madrid (Madrid) Spain	Order date Tuesday, September 13th 2016, 1:55 pm Priority 4 Status InProgress Desired delivery date Tuesday, September 13th 2016, 1:55 pm Expected delivery date No data provided

Below the order details, there is a section for 'Product 1' with a 'Reject' button. The product details are as follows:


Product 1
 Offering Nice Phone Status Acknowledged Vendor name fdelavega Characteristics Color white Price 300 EUR

In case you accept the order and send the product to the customer, you have to put it as *inProgress* clicking on the *Sent* button

The screenshot shows the 'My Inventory' interface with the same sidebar menu. The main content area is titled 'List' and displays the following information:

List
Today at 1:55 PM Customer fi-lab-user-example Status InProgress Priority 4

Below the list, there is a section for 'Product 1' with a 'Sent' button and a 'Reject' button. The product details are as follows:

Product 1
 Nice Phone Description This is a nice smartphone State Acknowledged Price 300 EUR Appointment No appointment included.

The screenshot shows the 'My Inventory' application interface. On the left is a sidebar with navigation links: Home, My inventory (selected), My stock, Revenue Sharing, Products, and Product Orders. The main content area is titled 'Order details' and displays information for 'Product 1'. The order details are organized into two columns:

Order details	Order details
Name No data provided.	Order date Tuesday, September 13th 2016, 1:55 pm
Customer name fi-lab-user-example	Priority 4
Notification email pablo@email.com	Status InProgress
Shipping address Campus de Montegancedo S/N 28041 Madrid (Madrid) Spain	Desired delivery date Tuesday, September 13th 2016, 1:55 pm
	Expected delivery date No data provided

Below the order details, there is a section for 'Product 1' which includes an image of a smartphone and the following information:

- Offering**: Nice Phone
- Status**: Acknowledged
- Vendor name**: fdelavega
- Characteristics**: Color white
- Price**: 300 EUR

At the top right of the main content area, there are links for 'List' and 'Details', and a 'Set as sent' button.

Finally, when the product arrives at its destination, you have to put it as *Completed* clicking on the *Delivered* button

The screenshot shows the 'My Inventory' application interface after the product has been delivered. The sidebar remains the same. The main content area is titled 'Today at 1:55 PM' and displays information for 'Product 1'. The product details are organized into two columns:

Product details	Product details
Customer fi-lab-user-example	Description This is a nice smartphone
Status InProgress	State InProgress
Priority 4	Price 300 EUR
	Appointment No appointment included.

Below the product details, there is a section for 'Product 1' which includes an image of a smartphone and two buttons: 'Delivered' (highlighted) and 'Reject'.

The screenshot shows the 'My Inventory' page in the FIWARE tmforum interface. The left sidebar contains navigation links: Home, My inventory (selected), My stock, Revenue Sharing, Products, and Product Orders. The main content area is titled 'Order details' and displays the following information:

Order details	
Name No data provided. Customer name fi-lab-user-example Notification email pablo@email.com Shipping address Campus de Montegancedo S/N 28041 Madrid (Madrid) Spain	Order date Tuesday, September 13th 2016, 1:55 pm Priority 4 Status InProgress Desired delivery date Tuesday, September 13th 2016, 1:55 pm Expected delivery date No data provided

Below the order details, there is a section for 'Product 1' showing an image of a smartphone and the following details:

- Offering**: Nice Phone
- Status**: InProgress
- Vendor name**: fdelavega
- Characteristics**: Color white
- Price**: 300 EUR

A 'Set as delivered' button is visible in the top right corner of the product section.

1.2.6 Customer

All of the users of the system have by default the *Customer* role. Customers are able to create orders for acquiring offerings.

List Available Offerings

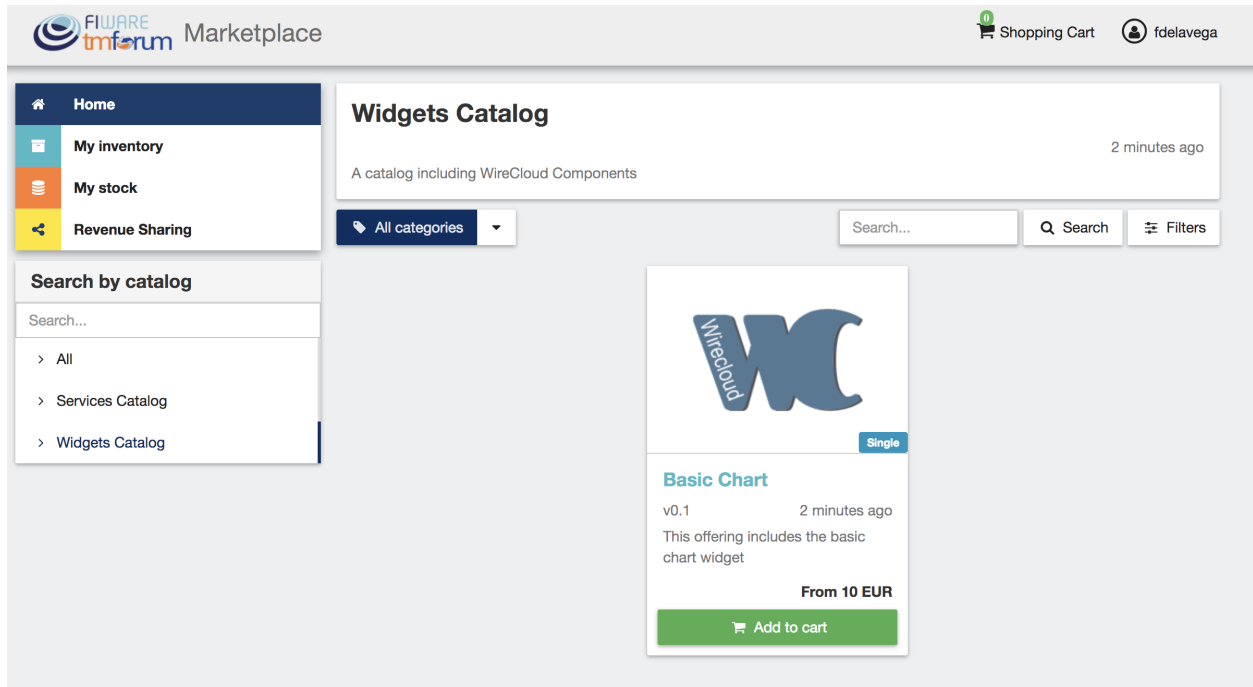
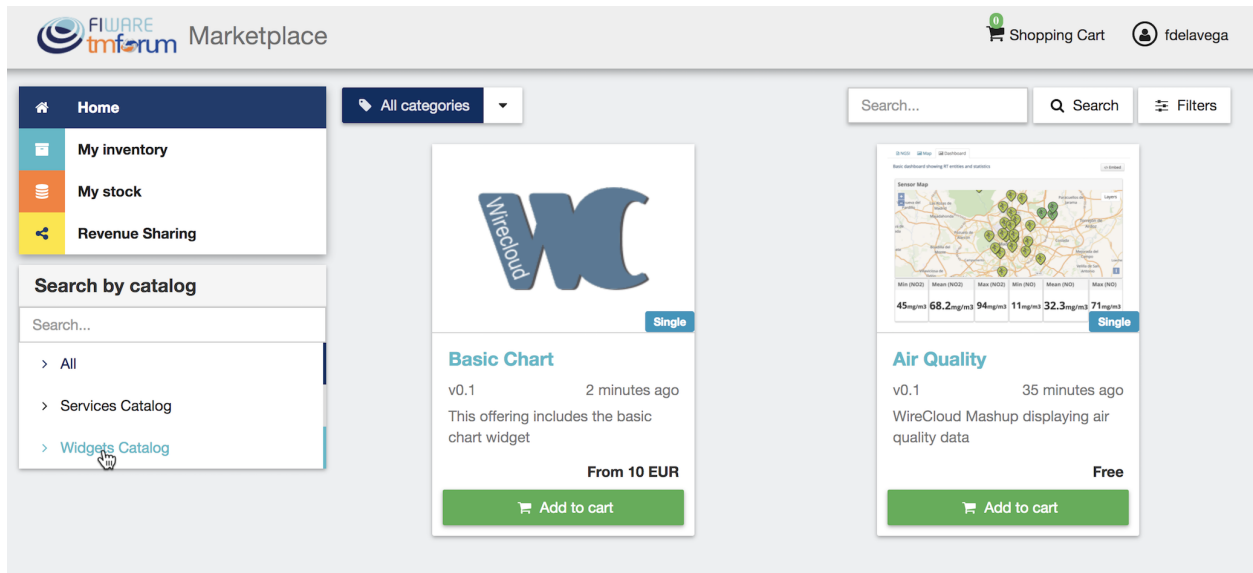
All the available (*Launched*) offerings appear in the *Home* page of the Business API Ecosystem, so they can be seen by customers.

The screenshot shows the 'Marketplace' page in the FIWARE tmforum interface. The left sidebar contains navigation links: Home, My inventory, My stock, Revenue Sharing, and a 'Search by catalog' section with links to All, Services Catalog, and Widgets Catalog. The main content area displays a list of offerings:

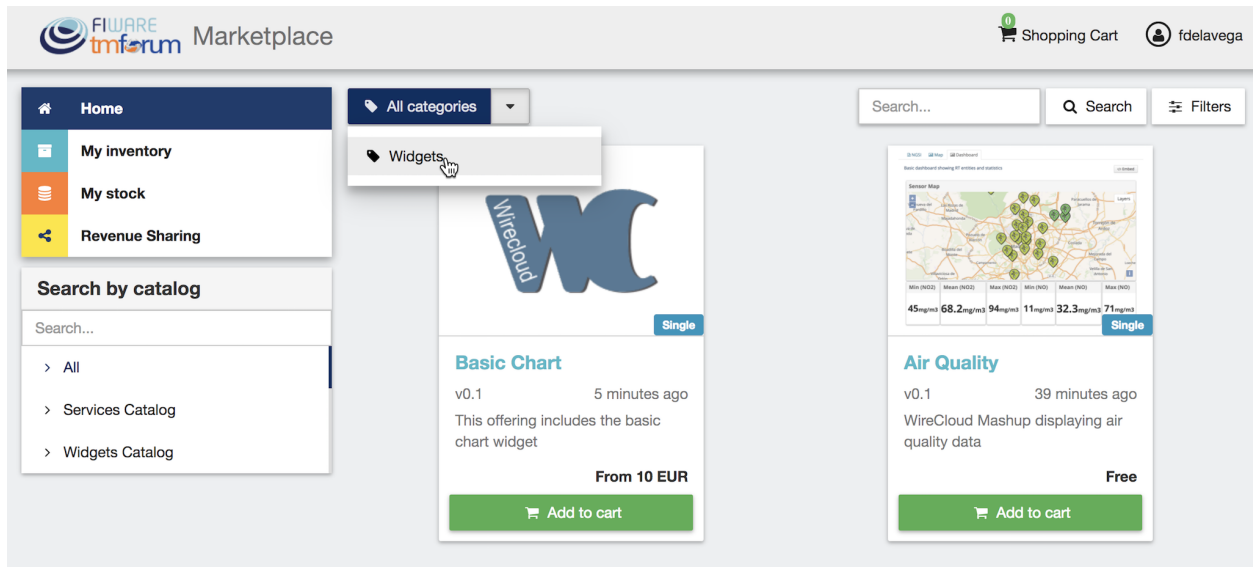
- Wirecloud Basic Chart**: v0.1, a few seconds ago. This offering includes the basic chart widget. Price: From 10 EUR. Add to cart button.
- Air Quality**: v0.1, 34 minutes ago. WireCloud Mashup displaying air quality data. Price: Free. Add to cart button.

The top right of the interface shows a 'Shopping Cart' icon and the user 'fdelavega'.

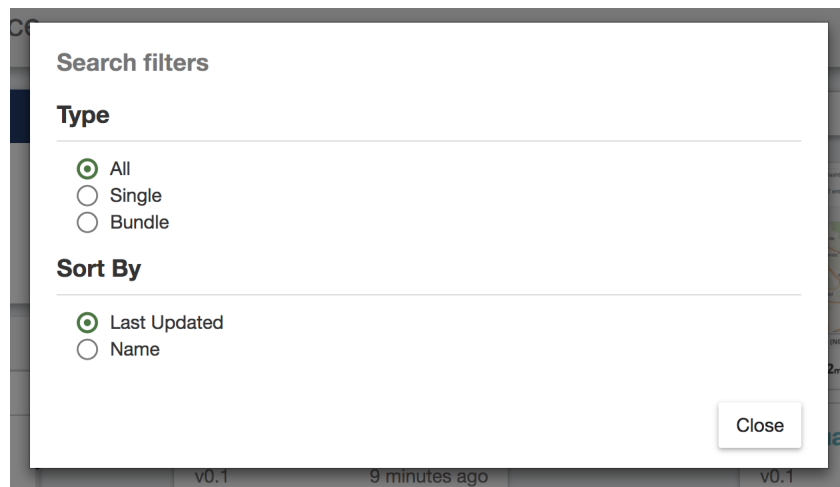
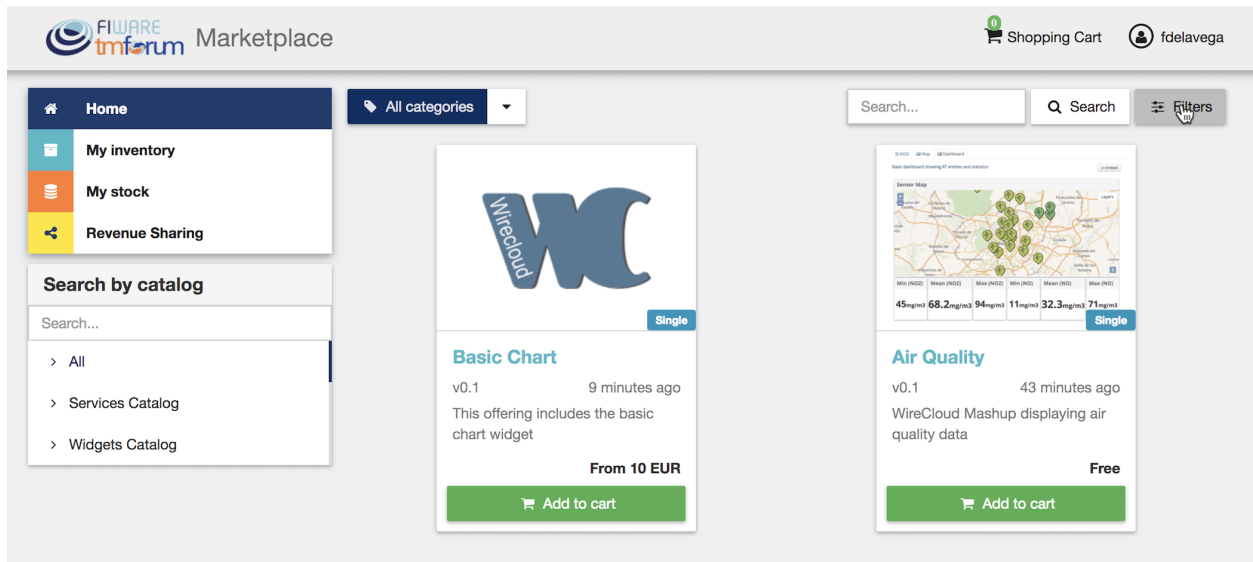
Additionally, customers can select a specific catalog of offerings by clicking on it.



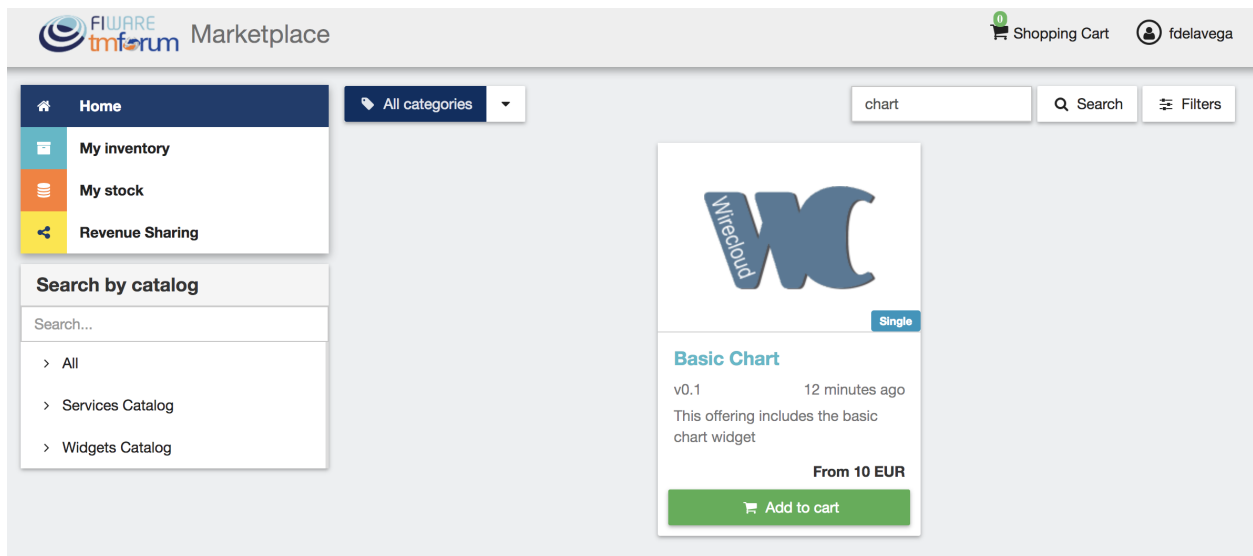
Moreover, customers can filter the shown offerings by category using the categories dropdown and choosing the wanted one.



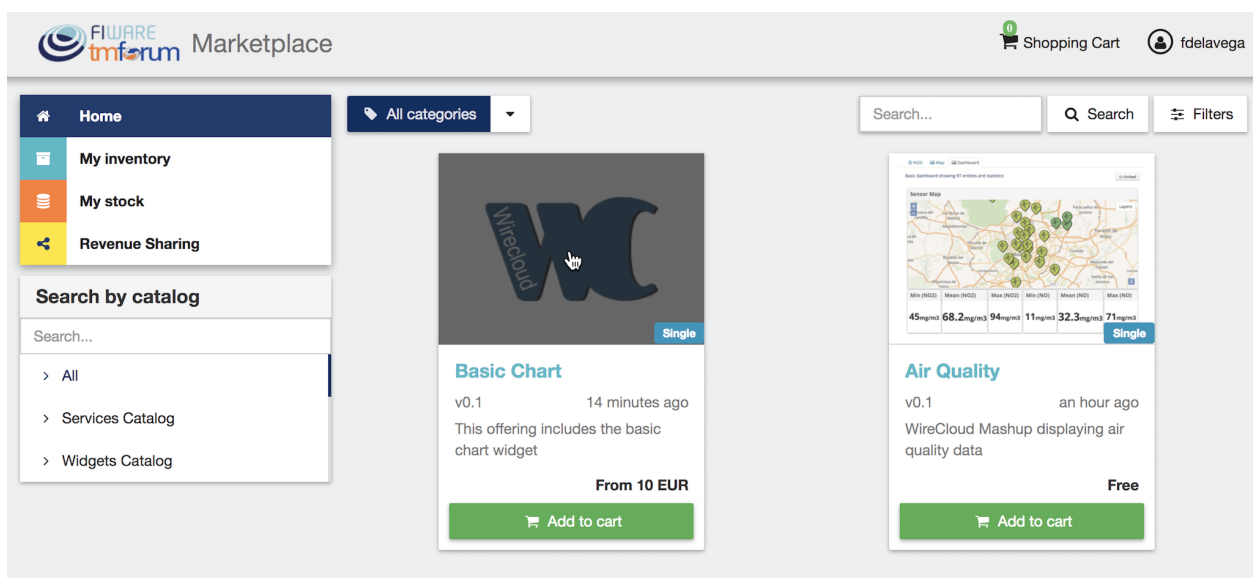
Customers can also filter bundle or single offerings using the *Filters* modal as well as choosing its sorting.




Finally, customers can search offerings by keyword using the provided search bar



Customers can open the details of an offering by clicking on it



In the displayed view, it is shown the general info about the offering and its included product, the characteristics of the product, the price plans of the offering, and the existing relationships.


 Marketplace

Shopping Cart

fdelavega

Back

Details



Basic Chart

Widgets

From 10 EUR

Add to cart

About

Characteristics

Price plans

Relationships

EU

This offering includes the basic chart widget

Extra Info

Offering Version

0.1

Product Name

Basic Chart

Brand

UPM

Updated

Tuesday, December 19th 2017, 5:28 pm

Product Version


0.1

ID Number


2

88

Chapter 1. Index


Marketplace
Shopping Cart
fdelavega

[< Back](#)
[Details](#)



Basic Chart

[Widgets](#)

From 10 EUR
[Add to cart](#)

[About](#)
[Characteristics](#)
[Price plans](#)
[Relationships](#)

Chart Type

Type of charts to be used

☒ line
 ☐ bar

Asset type


Type of the digital asset described in this product specification

☒ WireCloud Component

Media type

Media type of the digital asset described in this product specification

☒ widget



Basic Chart

[Widgets](#)

From 10 EUR
[Add to cart](#)

[About](#)
[Characteristics](#)
[Price plans](#)
[Relationships](#)

Single payment plan

10 EUR

A 10 EUR payment plan

Subscription plan

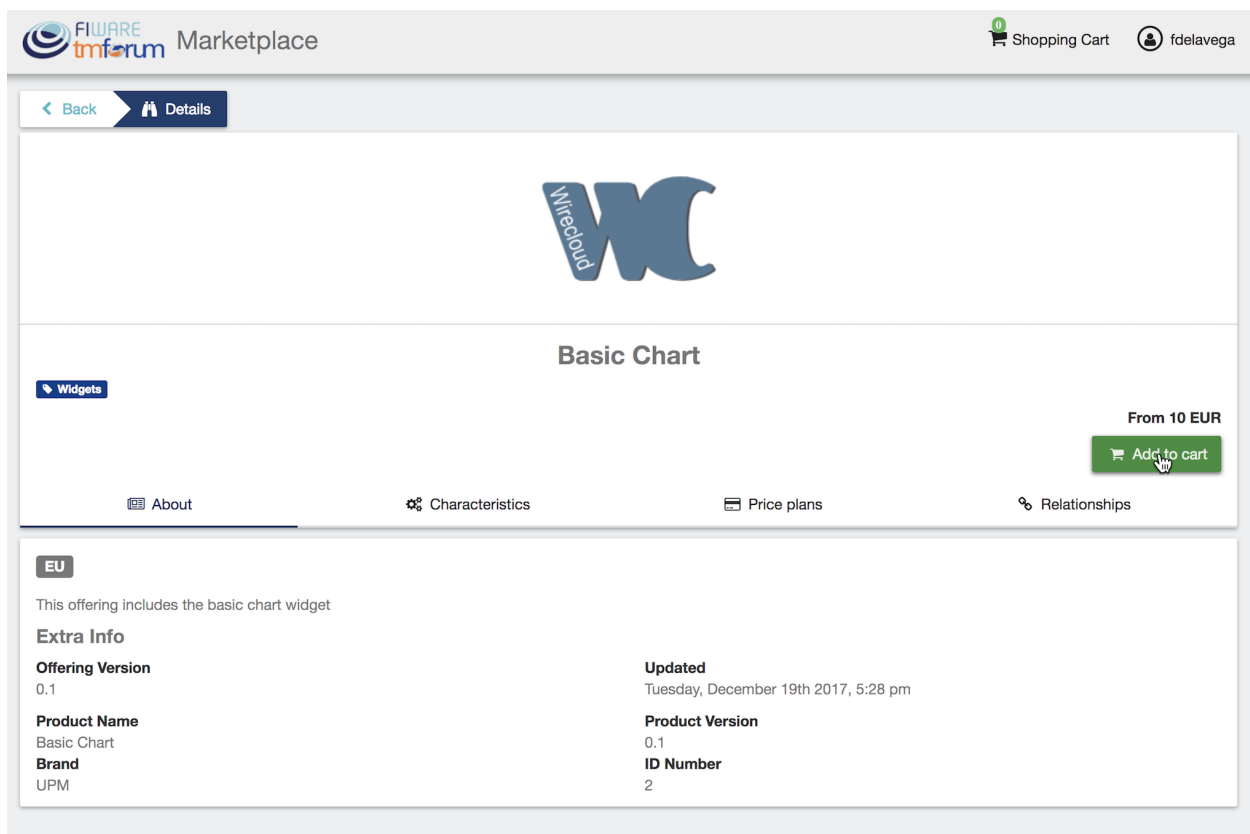
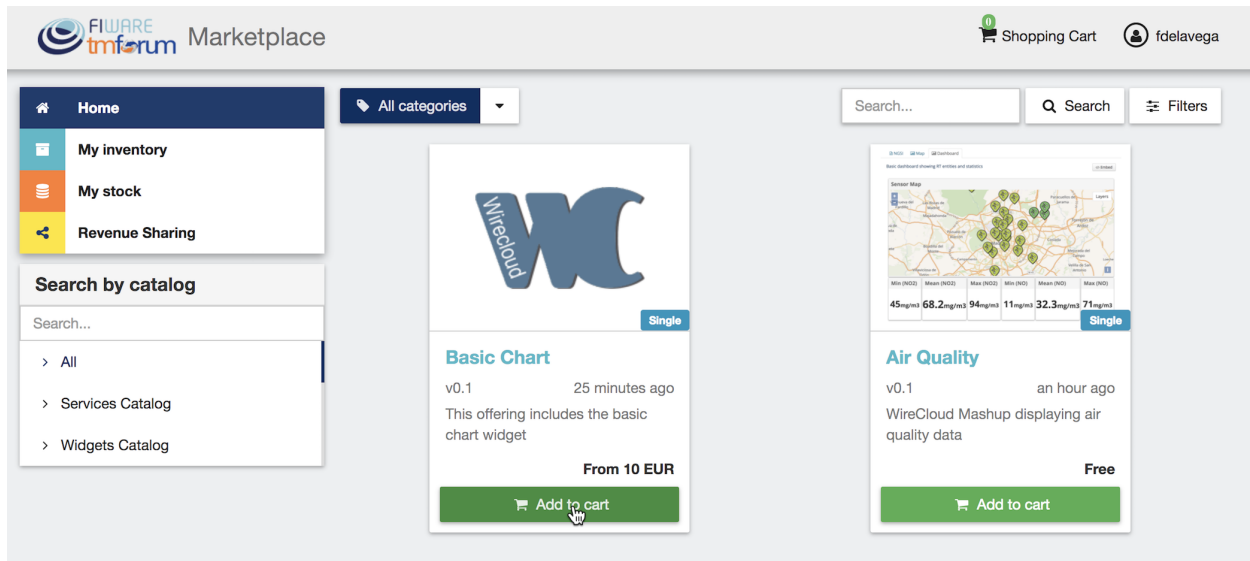
1 EUR
/ monthly

A monthly payment of 1 EUR

Create Order

Customers can create orders for acquiring offerings. The different offerings to be included in an order are managed using the *Shopping Cart*.

To include an offering in the shopping cart there are two possibilities. You can click on the *Add to Cart* button located in the offering panel when searching, or you can click on the *Add to Cart* button located in the offering details view.



If the offering has configurable characteristics, multiple price plans or terms and conditions, a modal will be displayed where you can select your preferred options

Available Options

1. Characteristics2. Terms & Conditions3. Price plans

Chart Type

Type of charts to be used

☐ line

☒ bar

Asset type

Type of the digital asset described in this product specification

☒ WireCloud Component

Media type


Media type of the digital asset described in this product specification

☒ widget

Location

URL pointing to the digital asset described in this product specification

☒ http://proxy.docker:8004/charging/media/assets/fdelavega/BasicChart_CoNWeT_panel

 Add to cart

Close


Available Options

1. Characteristics2. Terms & Conditions3. Price plans

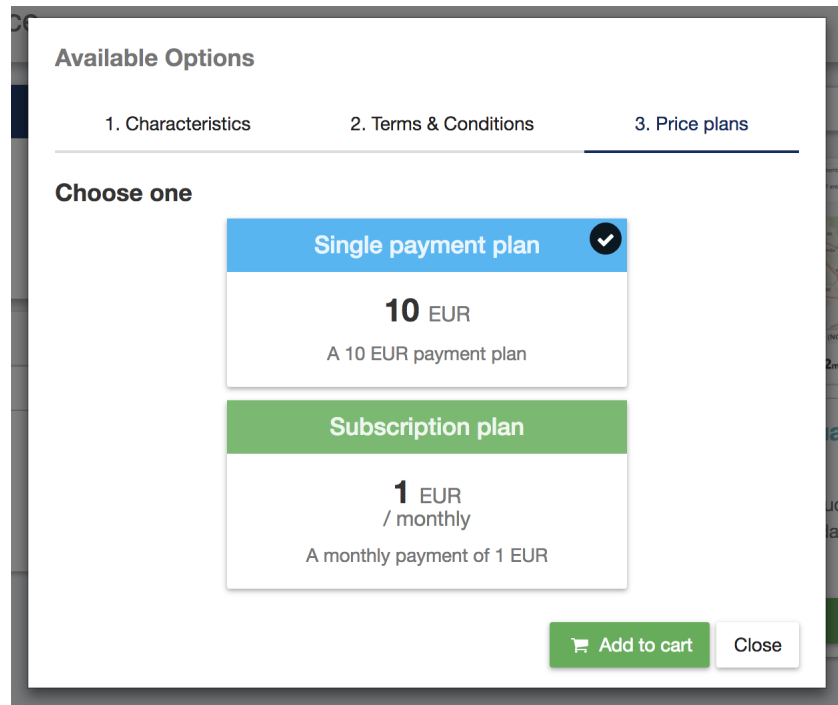
Non-Commercial Use

This widget cannot be used for commercial purposes

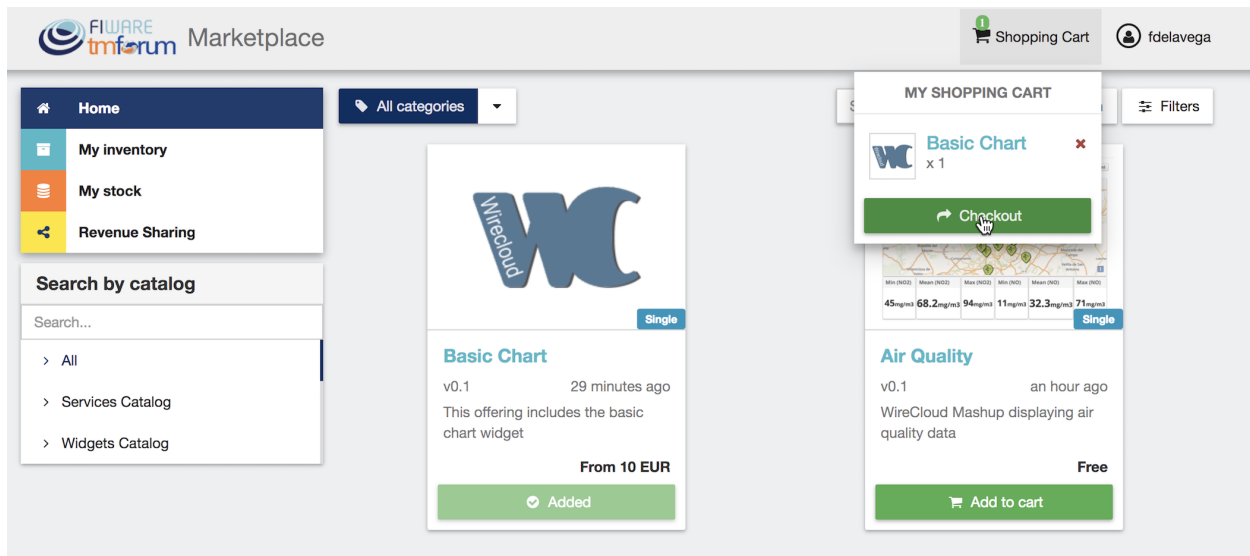
☒ I have read and agreed the terms and conditions

 Add to cart

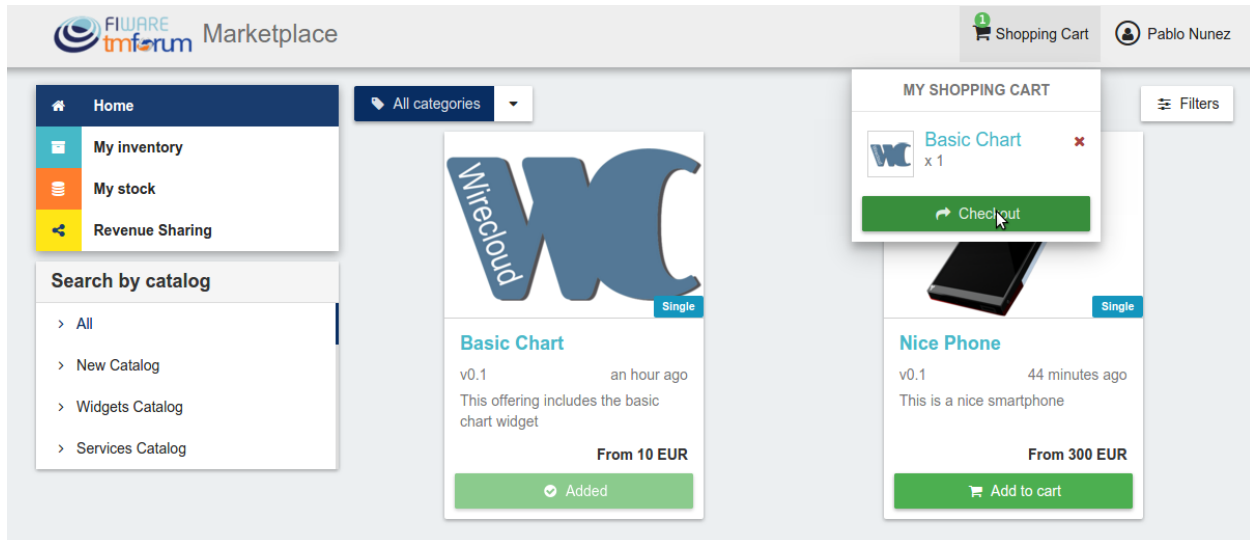
Close



Once you have selected your preferences for the offering click on *Add to Cart*



Once you have included all the offerings you want to acquire to the shopping cart, you can create the order clicking on *Shopping Cart*, and then on *Checkout*



In the displayed form, you can include an optional name, an optional description, or an optional note. Notes can include any additional information you want to provide to the sellers of the acquired offerings.

Then, you have to choose a priority for your order, and select one of your shipping addresses.

Once you have provided all the required information you can start the order creation clicking on *Checkout*

 The screenshot shows the 'Confirm and checkout' form. It includes fields for:

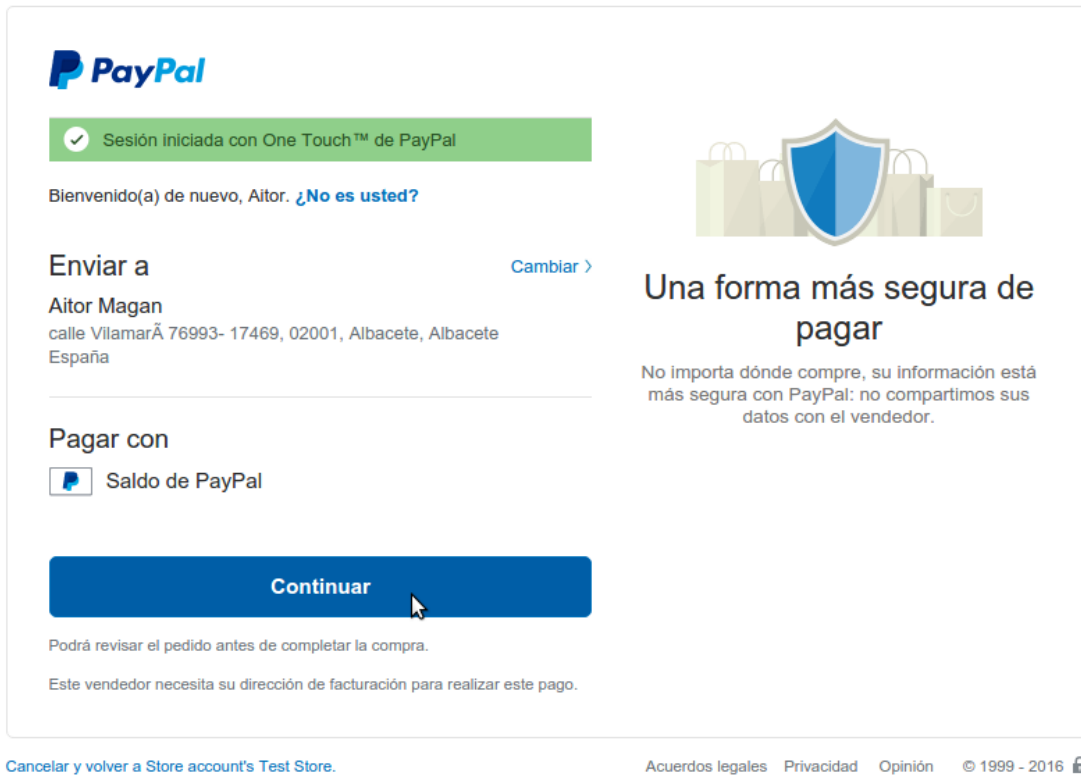
- Enter a name (optional):** A text input field containing 'My widget order'.
- Choose a priority:** A dropdown menu set to '4 (the lowest)'.
- Enter a description (optional):** A large text area.
- Enter a note (optional):** A text input field containing 'I need to have a bar chart'.
- Choose a shipping address:** A table with three columns: Email address, Postal address, and Telephone number.

Email address	Postal address	Telephone number
pablo@email.com	Campus de Montegancedo S/N 28041 Madrid (Madrid) Spain	mobile, +34611111111
- Shopping cart:** A summary row showing 'Basic Chart' for '10 EUR'.

 At the bottom right is a green 'Checkout' button.

In the next step, you will be redirected to *PayPal* so you can pay for the offerings according to their pricing models

Store account's Test Store



The screenshot shows the PayPal checkout interface. At the top left is the PayPal logo. Below it, a green banner indicates 'Sesión iniciada con One Touch™ de PayPal'. A welcome message says 'Bienvenido(a) de nuevo, Aitor. ¿No es usted?'. The shipping section, titled 'Enviar a', lists 'Aitor Magan' and an address in Albacete, Spain, with a 'Cambiar >' link. The payment section, titled 'Pagar con', shows 'Saldo de PayPal' as the selected method. A large blue 'Continuar' button is prominent. To the right, a graphic of shopping bags with a shield is accompanied by the text 'Una forma más segura de pagar' and a security assurance. At the bottom, a blue button says 'Continuar'. Footer links include 'Cancelar y volver a Store account's Test Store.', 'Acuerdos legales', 'Privacidad', 'Opinión', and '© 1999 - 2016'.

PayPal

Sesión iniciada con One Touch™ de PayPal

Bienvenido(a) de nuevo, Aitor. ¿No es usted?

Enviar a [Cambiar >](#)

Aitor Magan
calle VilamarÃ 76993- 17469, 02001, Albacete, Albacete
España

Pagar con

☒ Saldo de PayPal

[Continuar](#)

Podrá revisar el pedido antes de completar la compra.

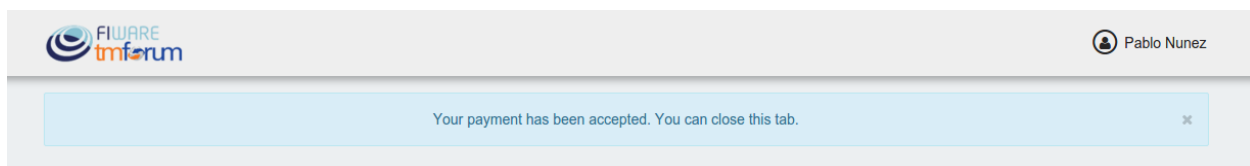
Este vendedor necesita su dirección de facturación para realizar este pago.

Una forma más segura de pagar

No importa dónde compre, su información está más segura con PayPal: no compartimos sus datos con el vendedor.

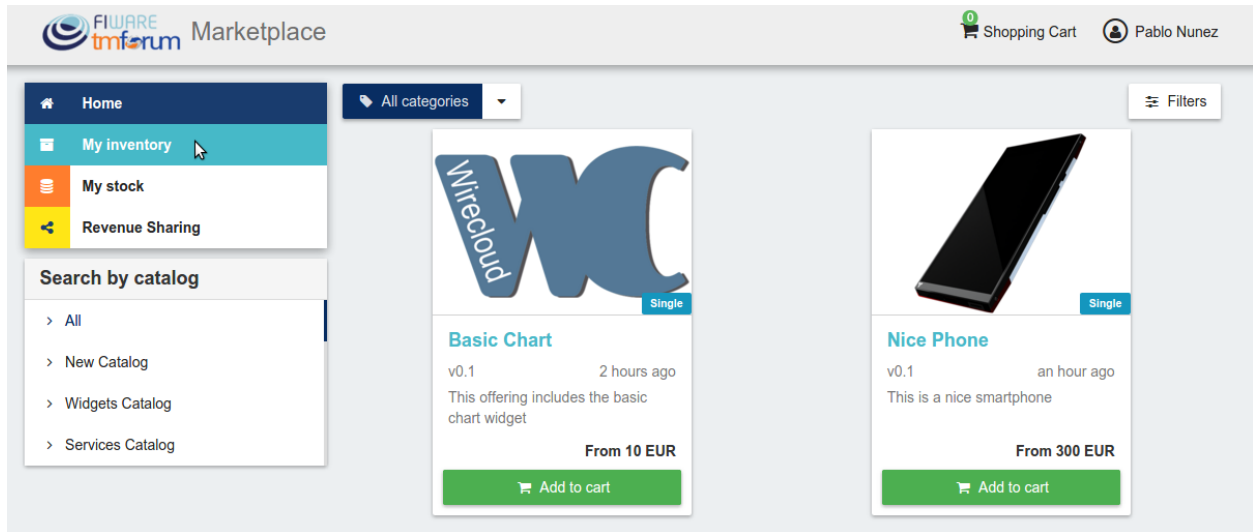
[Cancelar y volver a Store account's Test Store.](#) [Acuerdos legales](#) [Privacidad](#) [Opinión](#) © 1999 - 2016

Finally, you will see a confirmation page

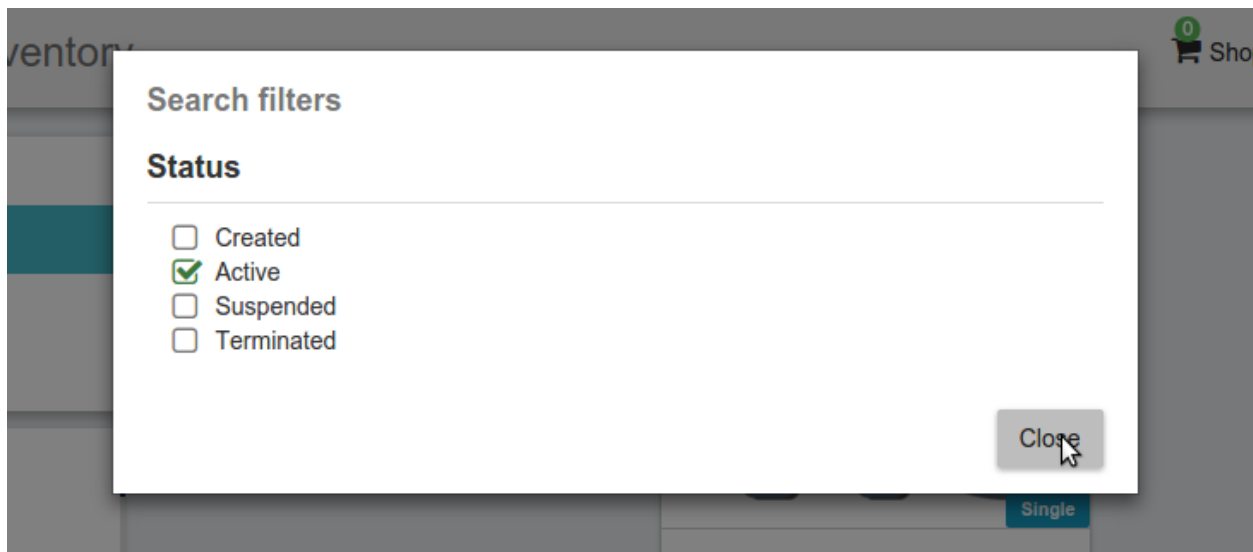
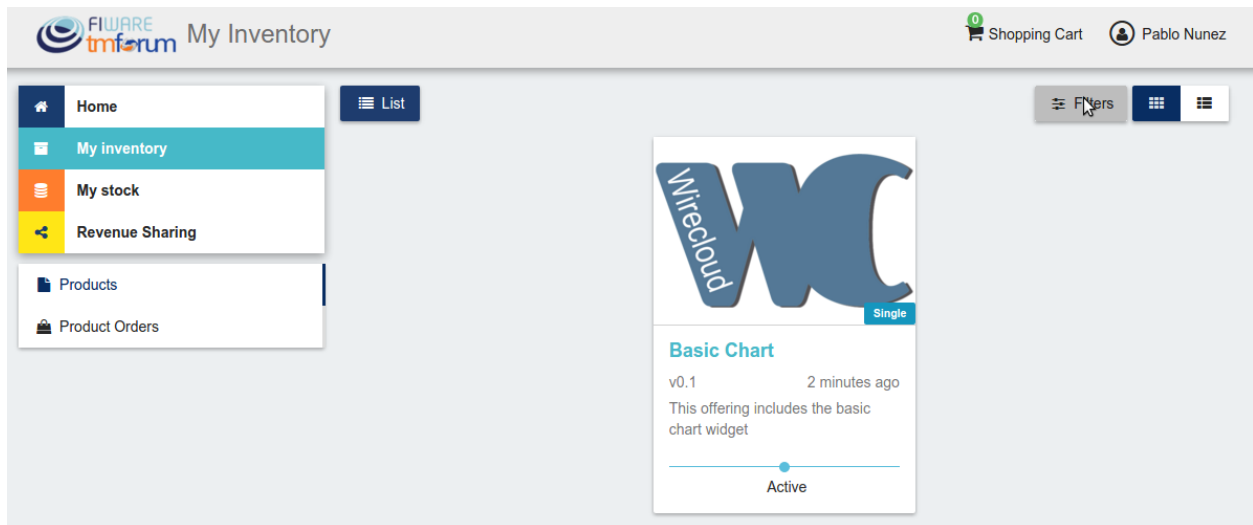


Manage Acquired Products

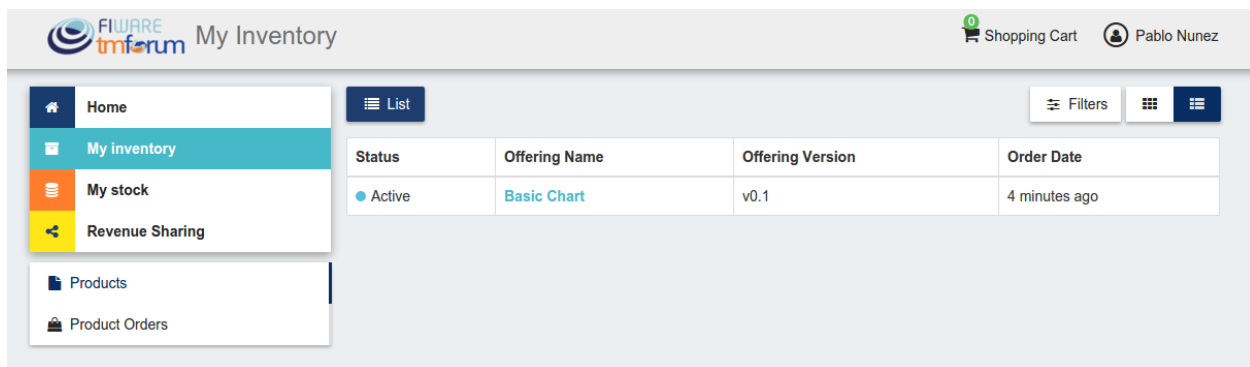
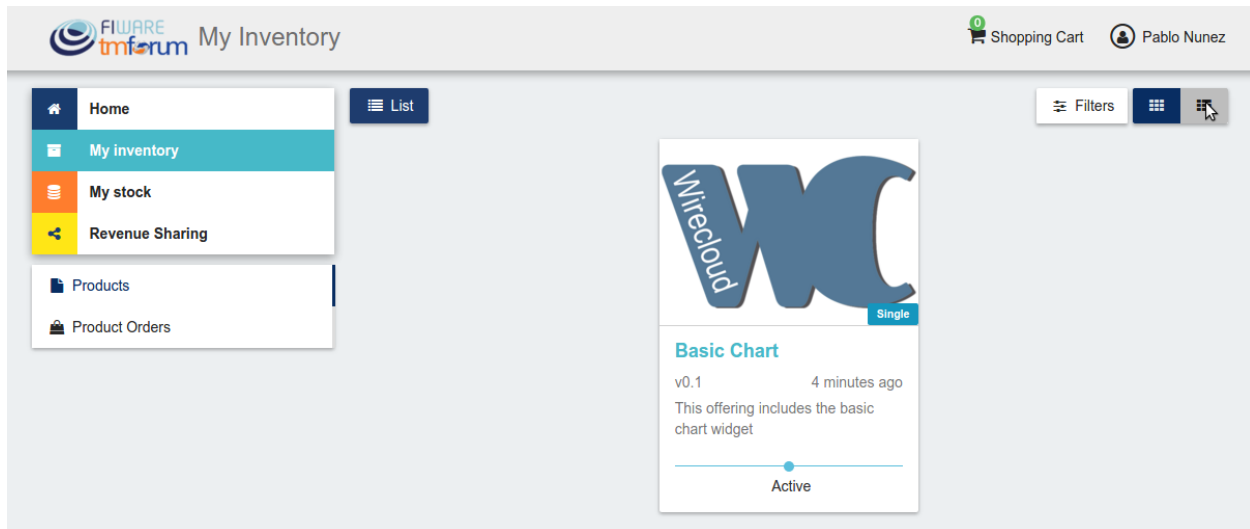
The products you have acquired are located in *My Inventory*, there you can list them, check their status, or download different assets.



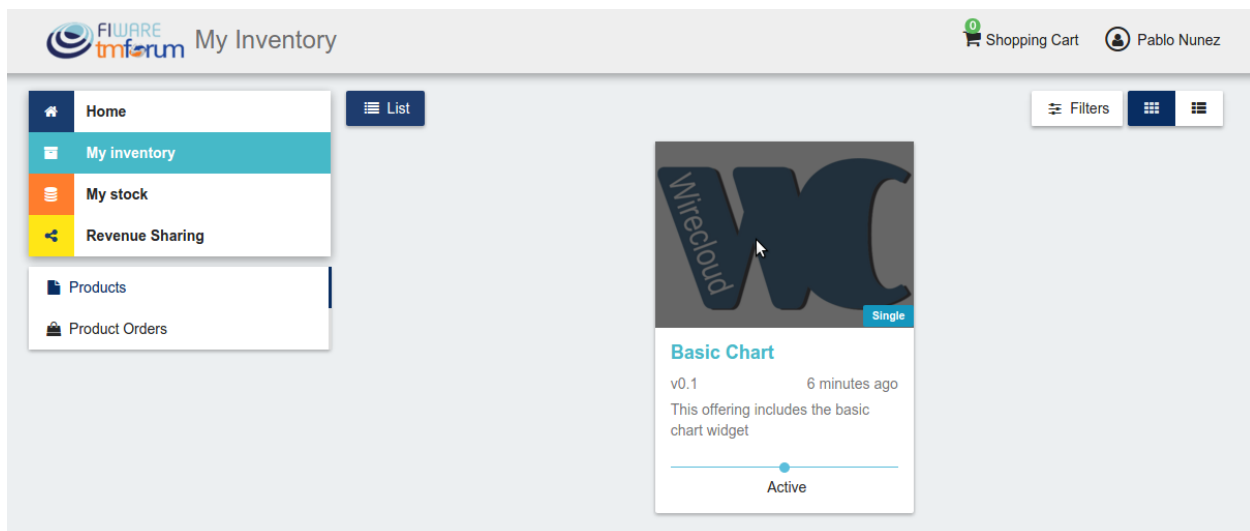
In this view, it is possible to filter your products by its status. To do that click on *Filters*, select the related statuses, and click on *Close*



It is also possible to switch between the grid and tabular views using the related buttons



You can manage a specific acquired product clicking on it



In the displayed view, you can see the general info of the acquired product, and the characteristics and pricing you have selected.

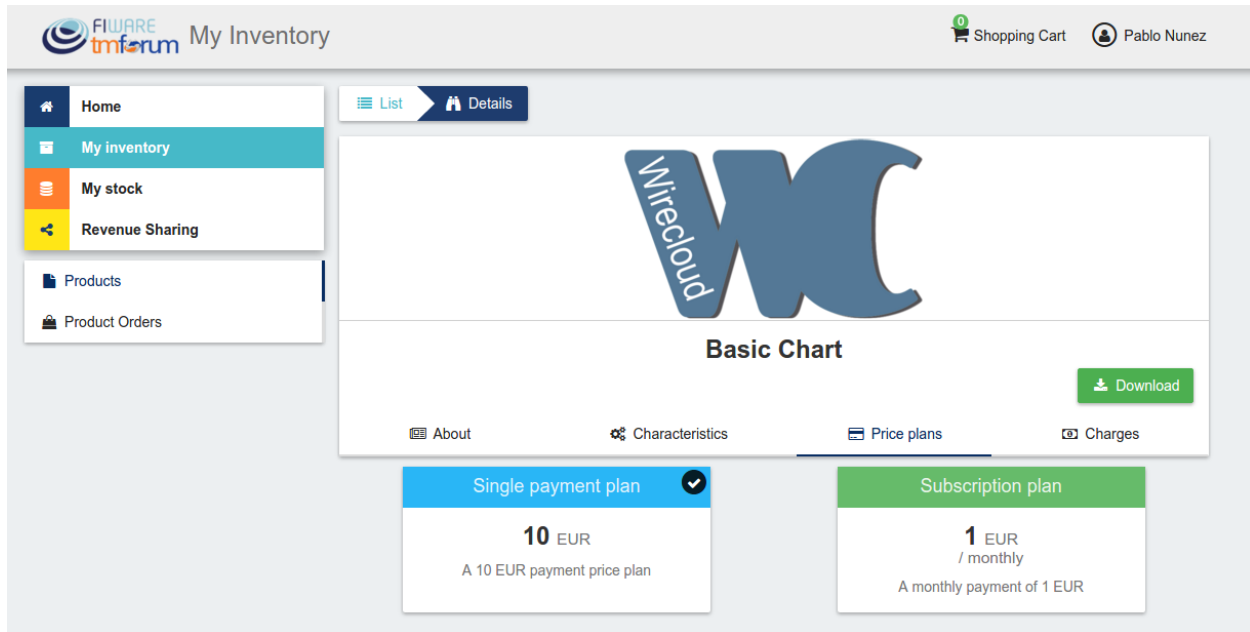
The image displays two screenshots of the 'My Inventory' web application, showing the 'Basic Chart' details page. The interface includes a sidebar with navigation links: Home, My inventory, My stock, Revenue Sharing, Products, and Product Orders. The top right shows a Shopping Cart icon and the user name 'Pablo Nunez'.

Top Screenshot (General Tab):

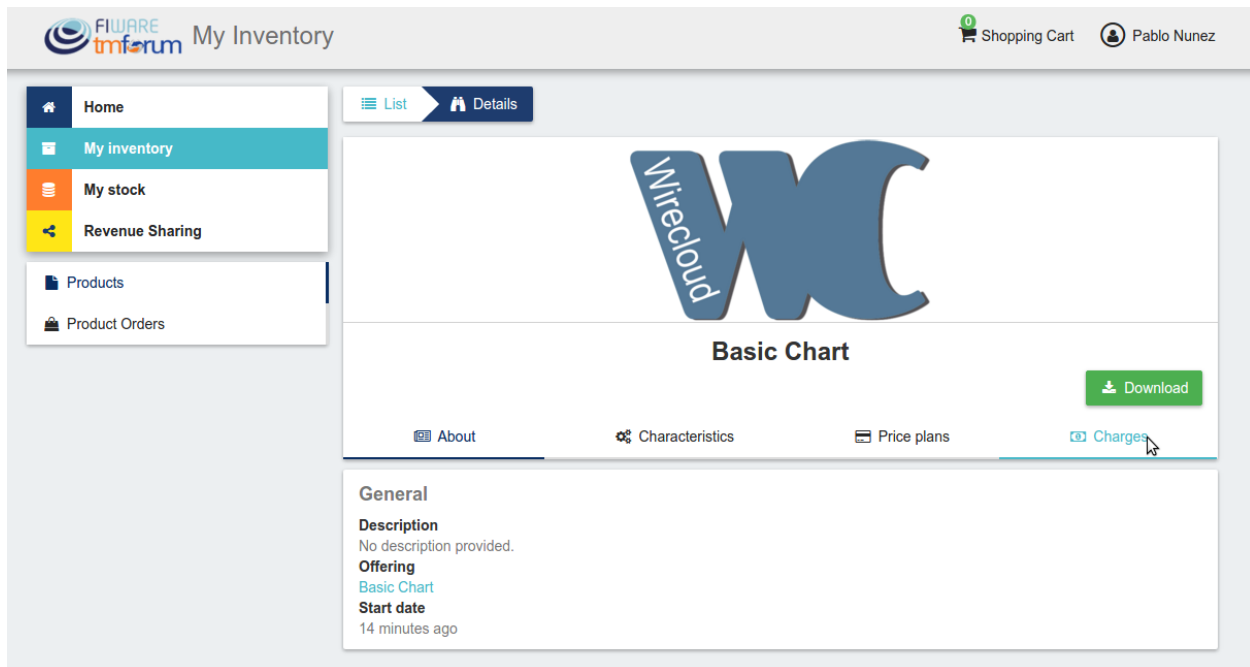
- Wirecloud WC** logo.
- Basic Chart** title.
- Download** button.
- Navigation tabs: About, Characteristics, Price plans, Charges.
- General** section:
 - Description:** No description provided.
 - Offering:** Basic Chart
 - Start date:** 9 minutes ago

Bottom Screenshot (Characteristics Tab):

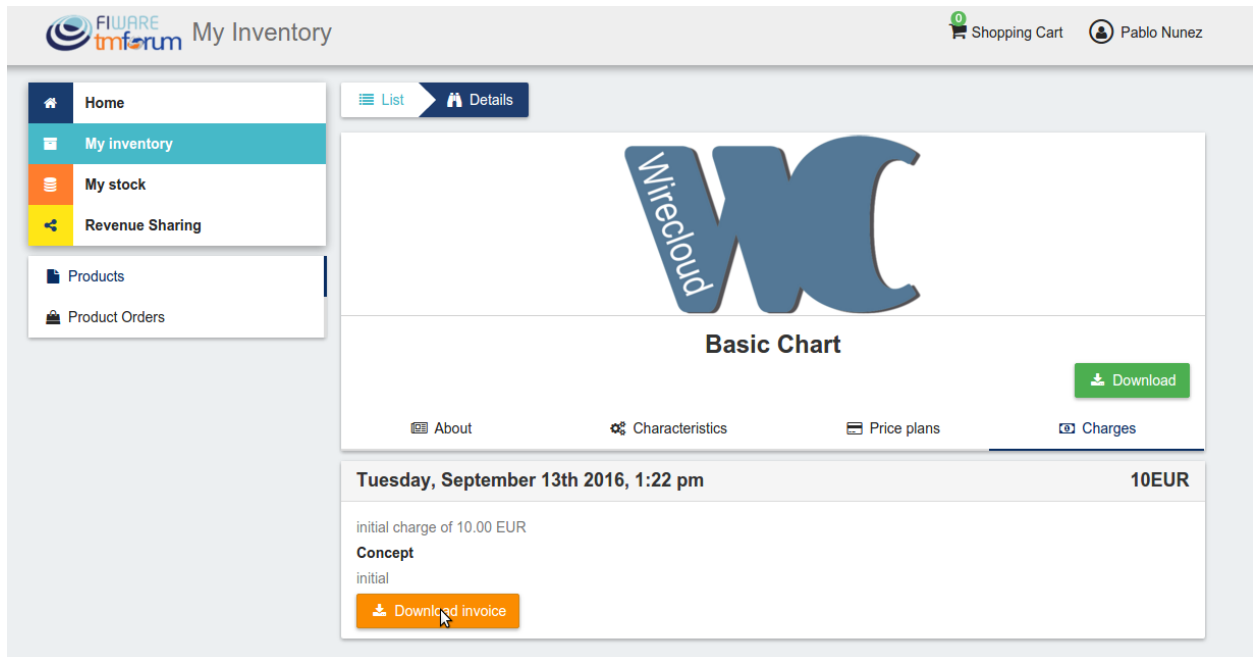
- Wirecloud WC** logo.
- Basic Chart** title.
- Download** button.
- Navigation tabs: About, Characteristics, Price plans, Charges.
- Characteristics** section:
 - Charts number:** The number of charts that can be included in the widget.
 - ☒ 5 charts
 - ☐ 10 charts
 - Asset type:** Type of the digital asset described in this product specification.
 - ☒ Wirecloud Component
 - Media type:** Media type of the digital asset described in this product specification.
 - ☒ widget



Additionally, you can see your charges related to the product accessing to the *Charges* tab



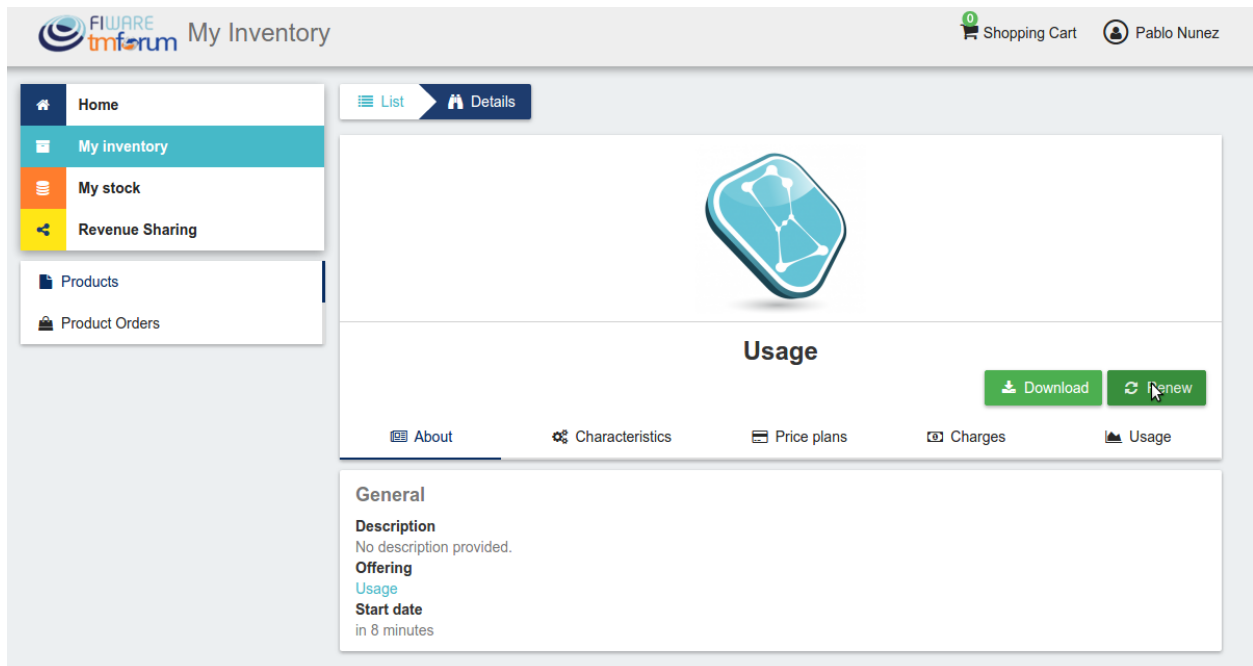
In this tab, you will find detailed information of the different charges and you will be able to download the related invoice clicking on *Download Invoice*



Moreover, this product view allows to download the related assets when the product is digital. To do that click on *Download*

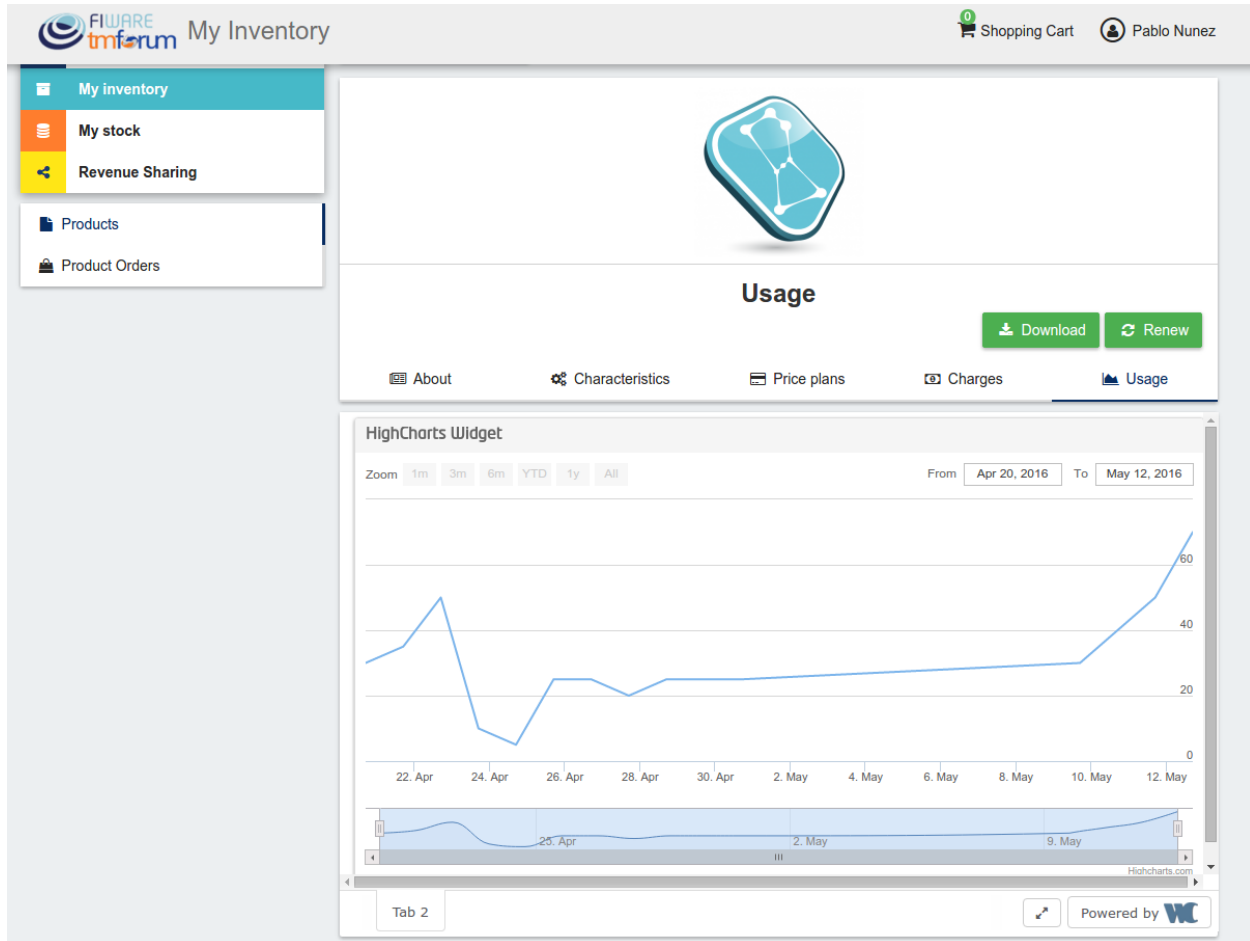
./images/user/inv12.png

In case the chosen pricing model defines a recurring payment or a usage payment, you will be able to renew your product clicking on *Renew*. After clicking, you will be redirected to PayPal to pay the related amount.



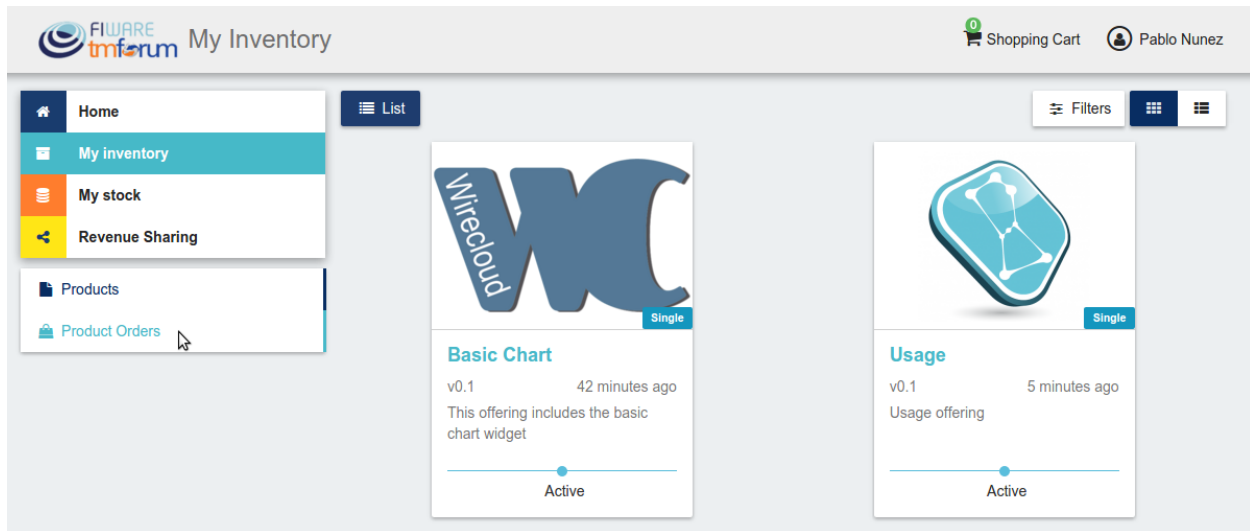
Note: If your product has expired and you do not renew it, it will be suspended, which means you will not have access to the acquired service until you pay

If the acquired product has a usage based price plan, you will be able to see your current consumption accessing the *Usage* tab

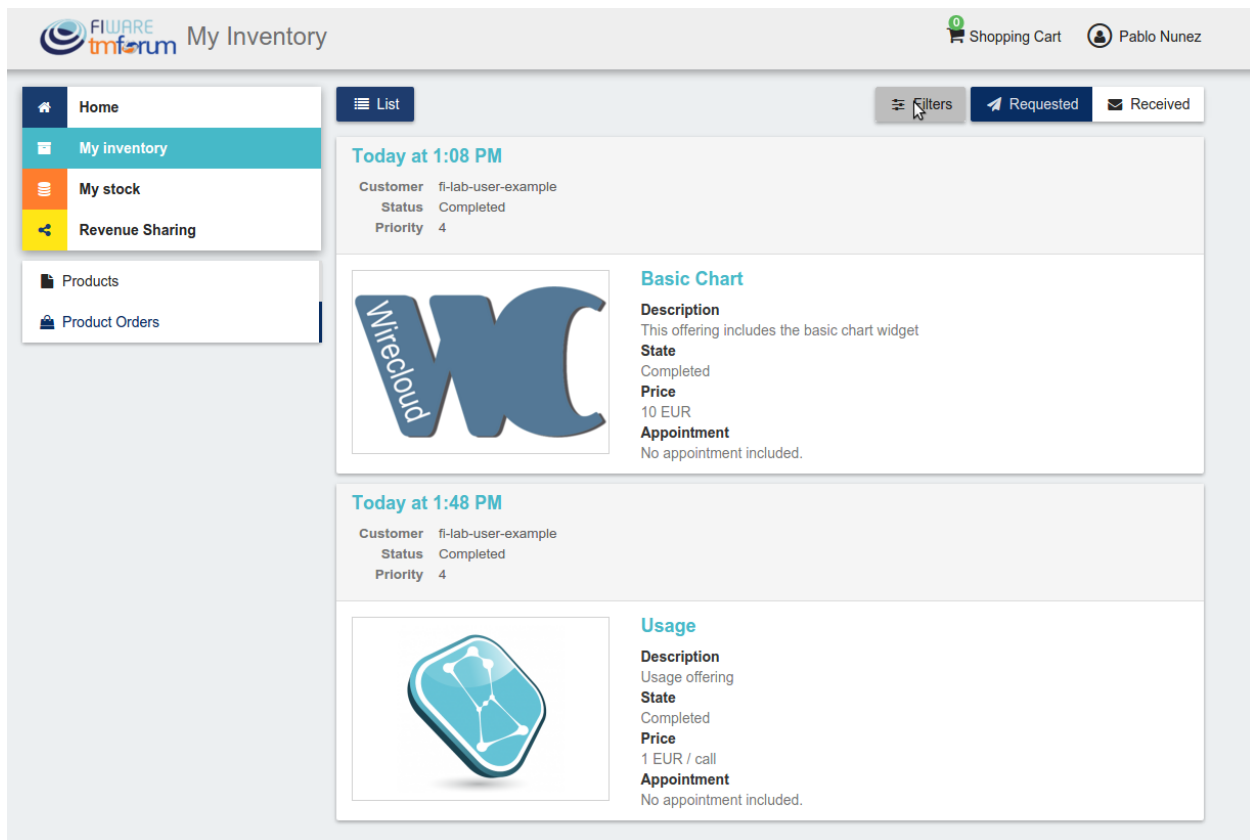


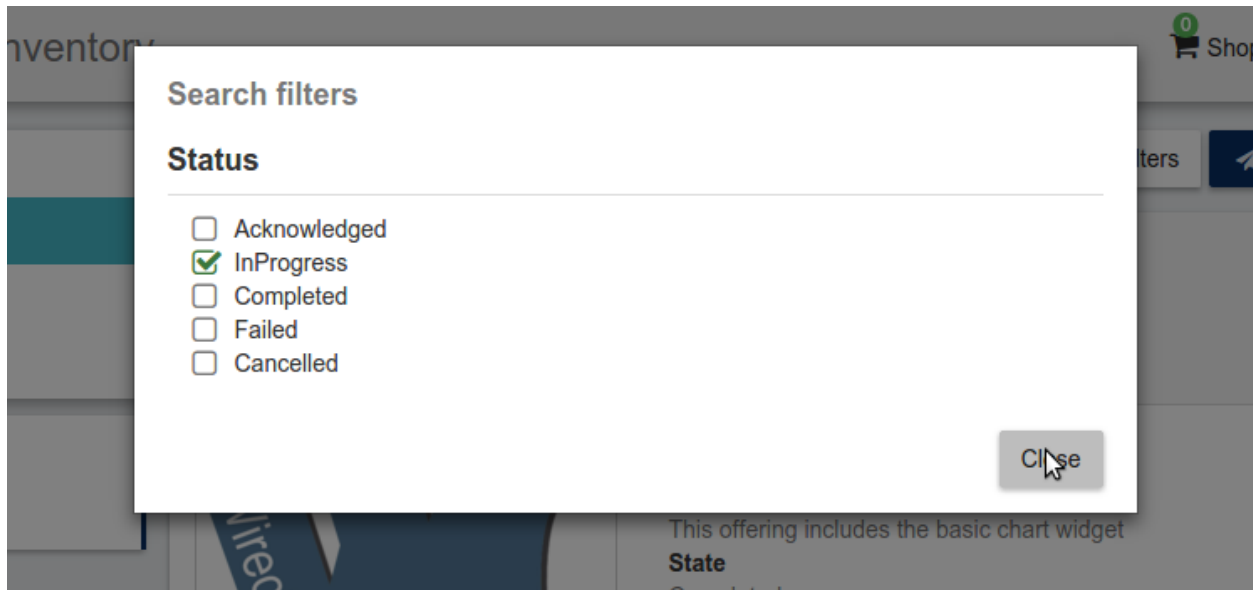
Manage Requested Orders

Customers can manage some aspects of the orders they have created. To see your requested orders, go to *My Inventory* and click on *Product Orders*

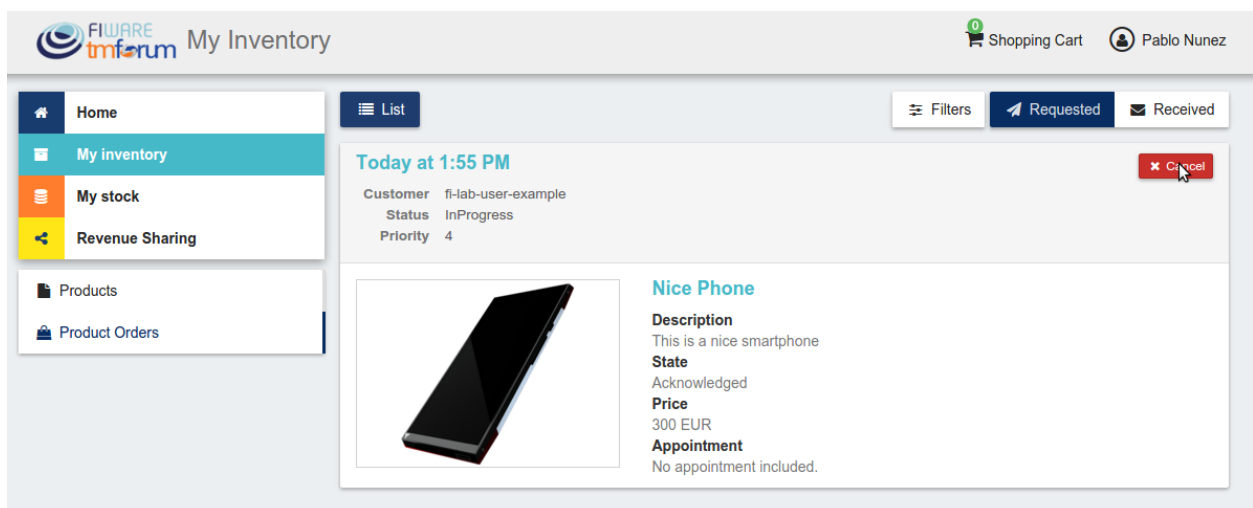


In the displayed view, you can see the orders you have created, which can be filtered by its status. To do that, click on *Filters*, select the wanted statuses, and click on *Close*





For those orders that include offerings of non digital products, you will be able to cancel them if the seller has not yet started the process. To do that, locate the order to be canceled and click on *Cancel*



Moreover, you can review the details of the order. To do that click on the date of the order.

The screenshot shows the 'My Inventory' application interface. On the left is a sidebar with navigation links: Home, My inventory (selected), My stock, Revenue Sharing, Products, and Product Orders. The main content area displays a product detail for 'Nice Phone'. At the top, it shows 'Today at 1:55 PM' and a timestamp 'Tuesday, September 13th 2016, 1:55 pm'. Below this, the status is 'InProgress' and priority is '4'. A 'Cancel' button is visible. The product image is shown on the left, and on the right, the following details are listed:

- Description:** This is a nice smartphone
- State:** Acknowledged
- Price:** 300 EUR
- Appointment:** No appointment included.

In the displayed view, you can see all the details of the order, as well as the included products. In addition, you can leave a note for the seller in the *Notes* tab

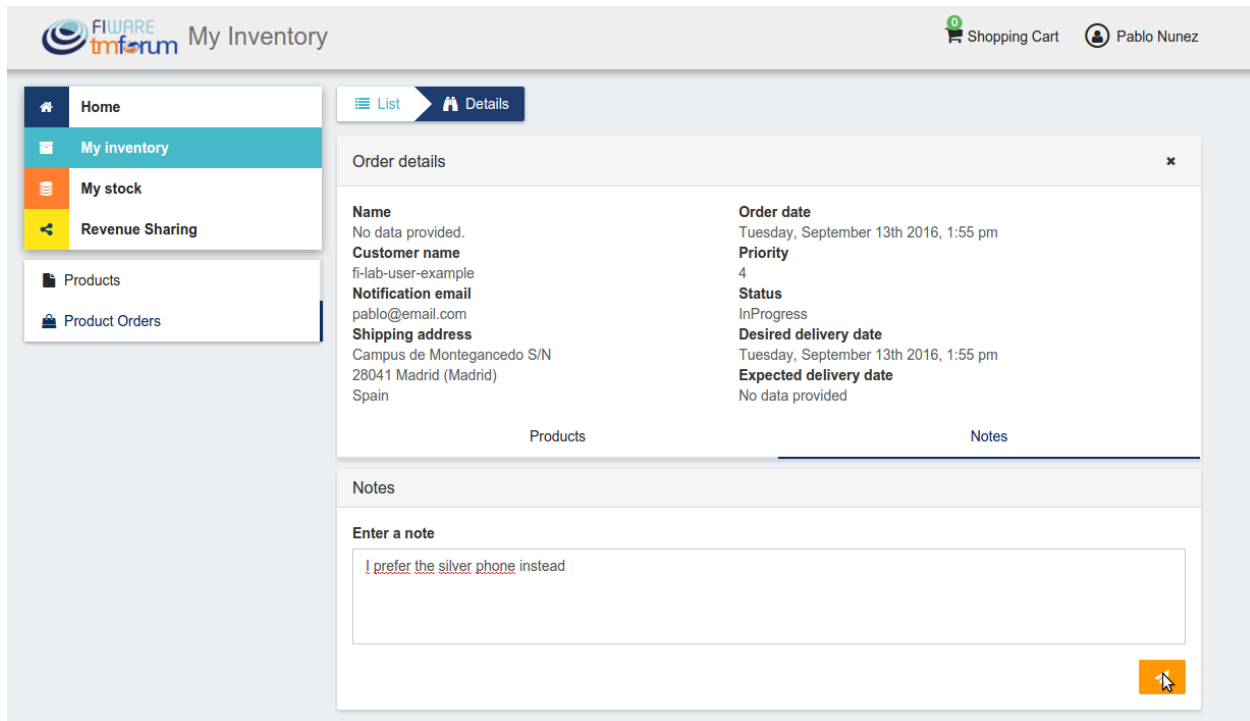
The screenshot shows the 'My Inventory' application interface with the 'Order details' view selected. The sidebar is the same as in the previous screenshot. The main content area has a 'List' and 'Details' (selected) tab. Below the tabs, the 'Order details' section is displayed with the following information:

- Name:** No data provided.
- Customer name:** fi-lab-user-example
- Notification email:** pablo@email.com
- Shipping address:** Campus de Montegancedo S/N, 28041 Madrid (Madrid), Spain
- Order date:** Tuesday, September 13th 2016, 1:55 pm
- Priority:** 4
- Status:** InProgress
- Desired delivery date:** Tuesday, September 13th 2016, 1:55 pm
- Expected delivery date:** No data provided

Below the order details, there are two tabs: 'Products' (selected) and 'Notes'. The 'Products' tab shows 'Product 1' with the following details:

- Offering:** Nice Phone
- Status:** Acknowledged
- Vendor name:** fdelavega
- Characteristics:** Color white
- Price:** 300 EUR

To leave a note, write it in the provided text area and click on the send button



1.3 Programmer Guide

1.3.1 Introduction

This programmer guide covers the Business API Ecosystem version 6.4.0, corresponding to FIWARE release 6. Any feedback on this document is highly welcomed, including bugs, typos or things you think should be included but aren't. Please send them to the “Contact Person” email that appears in the [Catalogue page for this GEi](#). Or create an issue at [GitHub Issues](#)

The Business API Ecosystem allows to offer any kind of digital asset. In this regard, some kind of digital assets may require to perform specific actions and validations that require to know the format of the asset. To deal with this issue the Business API Ecosystem allows to register types of assets by creating plugins. This section explains how these plugins are created.

Additionally, the Business API Ecosystem exposes an API that can be used by developers in order to integrate the monetization features offered with their own solutions. The complete description of this API can be found in:

- [Apiary](#)
- [GitHub Pages](#)

1.3.2 Plugin Package

Business API Ecosystem plugins must be packaged in a zip. This file will contain all the sources of the plugin and a configuration file called *package.json* in the root of the zip. This configuration file allows to specify some aspects of the behaviour of the plugin and contains the following fields:

- **name:** Name given to the resource type. This is the field that will be shown to providers
- **author:** Author of the plugin.

- **formats:** List that specify the different allowed formats for providing an asset of the given type. This list can contain the values “URL” and “FILE”.
- **module:** This field is used to specify the main class of the Plugin.
- **version:** Current version of the plugin.
- **media_types:** List of allowed media types that can be selected when providing an asset of the given type
- **pull_accounting (optional):** This flag is used to indicate that the service defined by the plugin is not pushing accounting information to the usage API of the Business API Ecosystem, but exposing an API that must be queried to retrieve this information.
- **form (optional):** This field is used to define a custom form that will be displayed for retrieving asset-specific meta data. This field is defined as an object where keys are the name of the metadata property and values define the following information:
 - **type:** Type of the particular metadata property. Allowed values are *text*, *textarea*, *checkbox* and *select* mapping the form input types to be displayed for retrieving the data.
 - **label:** Label to be displayed jointly with the form input.
 - **default:** Default value to be used if no value provided for the property
 - **placeholder (text and textarea):** Placeholder to be included within the form input
 - **options (select):** List of valid options when the input is a select. It includes *text* and *value* for each entry.

Following you can find an example of a *package.json* file:

```
{
  "name": "Test Resource",
  "author": "fdelavega",
  "formats": ["FILE"],
  "module": "plugin.TestPlugin",
  "version": "1.0",
  "media_types": ["application/zip"],
  "form": {
    "auth_type": {
      "type": "select",
      "label": "Auth type",
      "options": [{
        "text": "OAuth2",
        "value": "oauth2"
      }, {
        "text": "API Key",
        "value": "key"
      }]
    },
    "token_required": {
      "type": "checkbox",
      "label": "Token required?",
      "default": true
    },
    "auth_server": {
      "type": "text",
      "label": "Auth Server",
      "placeholder": "https://authservice.com/auth"
    }
  }
}
```

The source code of the plugin must be written in Python and must contain a main class that must be a child class of the Plugin class defined in the Charging Backend of the Business API Ecosystem. Following you can find an example of a plugin main class.

```
from wstore.asset_manager.resource_plugins.plugin import Plugin

class TestPlugin(Plugin):
    def on_pre_product_spec_validation(self, provider, asset_t, media_type, url):
        pass

    def on_post_product_spec_validation(self, provider, asset):
        pass

    def on_pre_product_spec_attachment(self, asset, asset_t, product_spec):
        pass

    def on_post_product_spec_attachment(self, asset, asset_t, product_spec):
        pass

    def on_pre_product_spec_upgrade(self, asset, asset_t, product_spec):
        pass

    def on_post_product_spec_upgrade(self, asset, asset_t, product_spec):
        pass

    def on_pre_product_offering_validation(self, asset, product_offering):
        pass

    def on_post_product_offering_validation(self, asset, product_offering):
        pass

    def on_product_acquisition(self, asset, contract, order):
        pass

    def on_product_suspension(self, asset, contract, order):
        pass

    def get_usage_specs(self):
        return []

    def get_pending_accounting(self, asset, contract, order):
        return [], Date()
```

1.3.3 Implementing Event Handlers

It can be seen in the previous section that the main class of a plugin can implement some methods that are inherited from the Charging Backend Plugin class. These methods can be used to implement handlers of the different events of the life cycle of a product containing the asset. Concretely, the following events have been defined:

- **on_pre_product_spec_validation:** This method is executed when creating a new digital product containing an asset of the given type, before validating the product spec contents and saving the asset info in the database. This method can be used for validating the asset format or the seller permissions to sell the asset.
- **on_post_product_spec_validation:** This method is executed when creating a new digital product containing an asset of the given type, after validating the product spec and saving the asset info in the database. This method can be used if the plugin requires to know some specific info of the asset model

- **on_pre_product_spec_attachment:** This method is executed when creating a new digital product containing an asset of the given type, after saving the product spec in the catalog API database but before attaching the product spec id to the asset model. This method can be used if the plugin require to know the id in the catalog of the product spec
- **on_post_product_spec_attachment:** This method is executed when creating a new digital product containing an asset of the given type, after saving the product spec in the catalog API database and after attaching the product spec id to the asset model. This method can be used if the plugin require to know the id in the catalog of the product spec
- **on_pre_product_spec_upgrade:** This method is executed when a digital product is being upgraded (a new version of the asset has been provided). This method can be used in order to validate the new digital asset before saving the upgrade
- **on_post_product_spec_upgrade:** This method is executed when a digital product have been upgraded. This method can be used to send notifications or retrieve new information of the product specification.
- **on_pre_product_offering_validation:** This method is executed when creating a new product offering containing an asset of the given type, before validating its pricing model. This method can be used to make extra validations on the pricing model, for example check if the unit of an usage model is supported by the given asset
- **on_post_product_offering_validation:** This method is executed when creating a new product offering containing an asset of the given type, after validating its pricing model. This method can be used to make extra validations on the pricing model, for example check if the unit of an usage model is supported by the given asset
- **on_product_acquisition:** This method is called when a product containing an asset of the given type has been acquired. This method can be used to activate the service for the customer and give him access rights.
- **on_product_suspension:** This method is called when a product containing an asset of the given type has been suspended for a customer (e.g he has not paid). Tjis method can be used to suspend the service for the customer and remove his access rights
- **get_usage_specs:** This method must be implemented when the flag *pull_accounting* is set to true and must return the list of usage specifications the service is able to monitor. For each usage specification a *name* and a *description* must be provided (e.g name: API Call, description: Number of calls made to. . .)
- **get_pending_accounting:** This method must be implemented when the flag *pull_accounting* is set to true. This method must implement the client able to access to the service the plugin is defining in order to retrieve pending accounting information for a giving contract. It must return the list of pending accounting including:
 - *date*: Timestamp of the accounting record
 - *unit*: Monitored unit
 - *value*: Actual usage made by the customer

As can be seen in the Plugin example, the different handler methods receive some parameters with relevant information and objects. In particular:

on_pre_product_spec_validation

- **provider:** User object containing the user who is creating the product specification (The User object is described later)
- **asset_t:** String containing the asset type, it must be equal to the one defined in package.json
- **media_type:** String containing the media type of the asset included in the product being created
- **url:** String containing the url of the asset included in the product being created

on_post_product_spec_validation

- **provider:** User object containing the user who is creating the product specification (The User object is described later)
- **asset:** Asset object with the recently created asset (The Asset object is described later)

on_pre_product_spec_attachment

- **asset:** Asset object where the created product specification id is going to be attached
- **asset_t:** String containing the asset type, it must be equal to the one defined in package.json
- **product_spec:** JSON with the raw product specification information that is going to be used for the attachment. (The structure of this JSON object can be found in the Open Api documentation)

on_post_product_spec_attachment

- **asset:** Asset object where the created product specification id has been attached
- **asset_t:** String containing the asset type, it must be equal to the one defined in package.json
- **product_spec:** JSON with the raw product specification information that has been used for the attachment. (The structure of this JSON object can be found in the Open Api documentation)

on_pre_product_spec_upgrade

- **asset:** Asset object that have been upgraded
- **asset_t:** String containing the asset type, it must be equal to the one defined in package.json
- **product_spec:** JSON with the raw product specification information that is going to be used for the upgrade. (The structure of this JSON object can be found in the Open Api documentation)

on_post_product_spec_upgrade

- **asset:** Asset object that have been upgraded
- **asset_t:** String containing the asset type, it must be equal to the one defined in package.json
- **product_spec:** JSON with the raw product specification information that has been used for the upgrade. (The structure of this JSON object can be found in the Open Api documentation)

on_pre_product_offering_validation

- **asset:** Asset object included in the offering being created
- **product_offering:** JSON with the raw product offering information that is going to be validated. (The structure of this JSON object can be found in the Open Api documentation)

on_post_product_offering_validation

- **asset:** Asset object included in the offering being created
- **product_offering:** JSON with the raw product offering information that has been validated. (The structure of this JSON object can be found in the Open Api documentation)

on_product_acquisition

- **asset:** Asset object that has been acquired
- **contract:** Contract object including the information of the acquired offering which contains the asset. (The Contract object is described later)
- **order:** Order object including the information of the order where the asset was acquired. (The Order object is described later)

on_product_suspension

- **asset:** Asset object that has been suspended
- **contract:** Contract object including the information of the acquired offering which contains the asset
- **order:** Order object including the information of the order where the asset was acquired

get_pending_accounting

- **asset:** Asset object whose usage information has to be retrieved
- **contract:** Contract object including the information of the acquired offering which contains the asset
- **order:** Order object including the information of the order where the asset was acquired

Handler Objects

Following you can find the information regarding the different objects used in plugin handlers

- **User: Django model object with the following fields**
 - **username:** Username of the user
 - **email:** Email of the user
 - **complete_name:** Complete name of the user
- **Asset: Django model object with the following fields**
 - **product_id:** Id of the product specification which includes the asset
 - **version:** Version of the product specification which includes the asset
 - **provider:** User object of the user that created the asset
 - **content_type:** media type of the asset
 - **download_link:** URL of the asset if it is a service in an external server
 - **resource_path:** Path to the asset file if it is uploaded in the server
 - **resource_type:** Type of the asset as defined in the package.json file of the related plug-in

- **is_public**: If true the asset can be downloaded by any user without the need of acquiring it
- **meta_info**: JSON with any related information. This field is useful to include specific info from the plugin code

Additionally, it includes the following methods:

- **get_url**: Returns the URL where the asset can be accessed
- **get_uri**: Returns the url where the asset info can be accessed
- **Contract: Django model with the following fields**
 - **item_id**: Id of the order item which generated the current contract
 - **offering**: Offering object with the information of the offering acquired in the current contract (The offering object is described later)
 - **product_id**: Id of the inventory product created as a result if the acquisition of the specified offering
 - **pricing_model**: JSON with the pricing model that is used in the current contract for charging the customer who acquired the included offering
 - **last_charge**: Datetime object with the date and time of the last charge to the customer
 - **charges**: List of Charge objects containing the info of the different times the customer has been charged in the context of the current contract
 - **correlation_number**: Next expected correlation number for usage documents. This field is only used when the pricing model is usage
 - **last_usage**: Datetime object with the date and time of the last usage document received. This field is only used when the pricing model is usage
 - **revenue_class**: Product class of the involved offering for revenue sharing
 - **terminated**: Specified whether the contract has been terminated (the customer has no longer access to the acquired asset)
- **Offering: Django model with the following fields**
 - **off_id**: Id of the product offering
 - **name**: Name of the offering
 - **version**: Version of the offering
 - **description**: Description of the offering
 - **asset**: Asset offered in the offering
- **Charge Django model with the following fields**
 - **date**: Datetime object with the date and time of the charge
 - **cost**: Total amount charged
 - **duty_free**: Amount charged without taxes
 - **currency**: Currency of the charge
 - **concept**: Concept of the charge (initial, renovation, usage)
 - **invoice**: Path to the PDF file containing the invoice of the charge
- **Order: Django model with the following fields**
 - **order_id**: Id of the product order

- **customer:** User object of the customer of the order
- **date:** Datetime object with the date and time of the order creation
- **tax_address:** JSON with the billing address used by the customer in the order
- **contracts:** List of Contract objects, one for each offering acquired in the order

Additionally, it includes the following methods:

- **get_item_contract:** Returns a contract given an item_id
- **get_product_contract:** Returns a contract given a product_id

1.3.4 Managing Plugins

Once the plugin has been packaged in a zip file, the Charging Backend of the Business API Ecosystem offers some management command that can be used to manage the plugins.

When a new plugin is registered, The Business API Ecosystem automatically generates an id for the plugin that is used for managing it. To register a new plugin the following command is used:

```
python manage.py loadplugin TestPlugin.zip
```

It is also possible to list the existing plugins in order to retrieve the generated ids:

```
python manage.py listplugins
```

To remove a plugin it is needed to provide the plugin id. This can be done using the following command:

```
python manage.py removeplugin test-plugin
```

1.4 Plugins Guide

1.4.1 Introduction

This plugins guide covers the available plugins (defining digital asset types) for the Business API Ecosystem v6.4.0. Any feedback on this document is highly welcomed, including bugs, typos or things you think should be included but aren't. Please send them to the "Contact Person" email that appears in the [Catalogue page for this GEi](#). Or create an issue at [GitHub Issues](#)

1.4.2 Basic File and Basic URL

The *Basic File* and *Basic URL* plugins are available at [GitHub](#). These plugins are intended to enable the creation of digital products in the Business API Ecosystem without the need of specifying a particular type or validation process. In this regard, these plugins allow the publication of any file or any URL as digital asset respectively, and can be used for the creation of simple file catalogs or for testing the Business API Ecosystem.

These plugins do not implement any event handler.

1.4.3 WireCloud Component

The *WireCloud Component* plugin is available in [GitHub](#). This plugin defines an asset type intended to manage and monetize the different WireCloud components (Widgets, Operators, and Mashups) in particular by enabling the creation of product specifications providing the WGT file of the specific component. (For more details on the WireCloud platform see its documentation in [ReadTheDocs](#))

The WireCloud component plugin allows to provide the WGT file in the two ways supported by the Business API Ecosystem, that is, uploading the WGT file when creating the product and providing a URL where the platform can download the file.

In addition, the plugin only allows the media type *Mashable application component*. Nevertheless, the plugin code uses the WGT metainfo to determine the type of the WireCloud component (Widget, Operator, or Mashup) and overrides the media type with the proper one understood by the WireCloud platform (*wirecloud/widget*, *wirecloud/operator* or *wirecloud/mashup*).

The screenshot shows the 'New product' form in the 'My Stock' section. The left sidebar contains navigation links: Home, My inventory, My stock (selected), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main content area is titled 'New product' and shows 'Step 3: Assets'. The form includes a list of steps on the left: 1 General, 2 Bundle, 3 Assets (selected), 4 Characteristics, 5 Attachments, 6 Relationships, 7 Terms & Conditions, and 8 Finish. The 'Step 3: Assets' section contains the following fields: 'Is a digital product?' (checked), 'Digital Asset Type' (WireCloud Component), 'How to provide?' (FILE), 'Asset File' (empty), and 'Media Type' (Mashable application component). A 'Next' button is at the bottom right.

The screenshot shows the 'New product' form in the 'My Stock' section. The left sidebar contains navigation links: Home, My inventory, My stock (selected), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main content area is titled 'New product' and shows 'Step 3: Assets'. The form includes a list of steps on the left: 1 General, 2 Bundle, 3 Assets (selected), 4 Characteristics, 5 Attachments, 6 Relationships, 7 Terms & Conditions, and 8 Finish. The 'Step 3: Assets' section contains the following fields: 'Is a digital product?' (checked), 'Digital Asset Type' (WireCloud Component), 'How to provide?' (URL), 'Asset URL' (http://myserver.com/files/widget.wgt), and 'Media Type' (Mashable application component). A 'Next' button is at the bottom right.

This plugin implements the following event handlers:

- **on_post_product_spec_validation:** In this handler the plugin validates the WGT file to ensure that it is a valid WireCloud Component
- **on_post_product_spec_attachment:** In this handler the plugin determines the media type of the WGT file and overrides the media type value in the specific product specification

1.4.4 CKAN Dataset and CKAN API Dataset

The *CKAN Dataset* and *CKAN API Dataset* plugins are available in [GitHub](#). These plugins define an asset type intended to manage and monetize datasets offered in a CKAN instance. In particular, these plugins are able to validate the dataset, validate the rights of the seller creating a product specification to sell the provided dataset, and manage the access to the dataset of those customers who acquire it.

The difference between both plugins is the type of data included as a resource in the CKAN dataset. In particular, *CKAN API Dataset* expects the data to be served by an external API secured with the FIWARE security framework. In this regard, the *CKAN API Dataset* also validates the permissions of the seller in the data service and grants customers access to it using the FIWARE IdM roles and permissions.

Is important to notice that by default CKAN does not provide a mechanism to publish protected datasets or an API for managing the access rights to the published datasets. In this regard, the CKAN instance to be monetized has to be extended with the following CKAN plugins:

- **ckanext-oauth2:** This extension allows to use an external OAuth2 Identity Manager for managing CKAN users. In particular, this extension must be used, in this context, to authenticate users using the same FIWARE IdM instance as the specific Business API Ecosystem instance, so both systems (CKAN and Business API Ecosystem) share their users.
- **ckanext-privatedatasets:** This extension allows to create protected datasets in CKAN which can only be accessed by a set of users selected by the dataset owner. Moreover, this extension exposes an API that can be used to add or remove authorized users from a dataset.

In addition, if the **ckanext-storepublisher** plugin is installed in CKAN, the *CKAN dataset* or *CKAN API Dataset* plugin must be installed in the Business API Ecosystem, since the aforementioned CKAN extension uses the *CKAN Dataset* or *CKAN API Dataset* asset type (depending on the dataset resource) for creating product specifications.

The *CKAN Dataset* plugin only allows to provide the asset with a URL that must match the dataset URL in CKAN.

The screenshot shows the 'New product' form in the Business API Ecosystem interface. The sidebar on the left contains navigation links: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main form area is titled 'New product' and shows 'Step 3: Assets'. The 'Is a digital product?' toggle is checked. The 'Digital Asset Type' dropdown is set to 'CKAN Dataset'. The 'How to provide?' dropdown is set to 'URL'. The 'Asset URL' field contains the URL 'https://data.lab.fiware.org/dataset/transport-pass-prices-evolution'. The 'Media Type' field is set to 'csv'. A 'Next' button is located at the bottom right of the form.

This plugin implements the following event handlers:

- **on_pre_product_spec_validation:** In this handler the plugin validates that the provided URL is a valid CKAN dataset and that the user creating the product specification is its owner.
- **on_product_acquisition:** In this handler the plugin uses the CKAN instance API in order to grant access to the user who has acquired a dataset.
- **on_product_suspension:** In this handler the plugin uses the CKAN instance API in order to revoke access to a dataset when a user has not paid or when the user cancels a subscription.

On the other hand, the *CKAN API Dataset* also requires an *Acquisition role* to be provided. This role is the one that will be granted to customers in the IdM in order to enable their access to the backend service, so the role must exist and define a proper set of permissions for accessing the data.

The screenshot shows the 'New product' form, specifically 'Step 3: Assets'. On the left, a sidebar lists steps from 1 to 8, with '3 Assets' highlighted. The main content area is titled 'Step 3: Assets' and contains the following fields:

- Is a digital product?**: A toggle switch that is turned on (green).
- Digital Asset Type**: A dropdown menu with 'CKAN API Dataset' selected.
- How to provide?**: A dropdown menu with 'URL' selected.
- Asset URL**: A text input field containing 'https://data.lab.fiware.org/dataset/air-quality-madrid'.
- Media Type**: A text input field containing 'fiware-ngsi'.
- Acquisition Role**: A text input field containing 'air_customer'.

A 'Next' button is located at the bottom right of the form.

This plugins implements the following event handlers:

- **on_pre_product_spec_validation:** In this handler the plugin validates that the provided URL is a valid CKAN dataset and that the user creating the product specification is its owner.
- **on_post_product_spec_validation:** In this handler, the plugin validates that the API resources included in the CKAN dataset are valid, the permissions of the seller to offer that services, and that the provided acquisition role exist and is valid.
- **on_post_product_offering_validation:** In this handler the plugin validates that pricing models are supported when creating a pay-per-use offering
- **on_product_acquisition:** In this handler the plugin uses the CKAN instance API in order to grant access to the user who has acquired a dataset.
- **on_product_suspension:** In this handler the plugin uses the CKAN instance API in order to revoke access to a dataset when a user has not paid or when the user cancels a subscription.
- **get_pending_accounting:** In this handler, the plugins retrieves pending accounting information when the access to the data has been acquired under a pay-per-use pricing model.

In addition, the *CKAN API Dataset* requires some settings to be configured before being deployed. This settings are available in the *setting.py* file, and are:

- **AUTH_METHOD:** Authorization mechanism used by the backend service, *idm* or *umbrella*
- **UMBRELLA_KEY:** API Key used for accessing to the API Umbrella instance used to secure the backend service
- **UMBRELLA_ADMIN_TOKEN:** Admin token used for accessing to the API Umbrella instance used to secure the backend service
- **KEYSTONE_USER:** Keystone user used for authenticate requests to the FIWARE IdM
- **KEYSTONE_PASSWORD:** Keystone password used for authenticate requests to the FIWARE IdM
- **KEYSTONE_HOST:** Host of the Keystone service of the FIWARE IdM used for authorizing customers

1.4.5 Accountable Service

The *Accountable Service* plugin is available in [GitHub](#). This plugin defines a generic asset type which is used jointly with the *Accounting Proxy* in order to offer services under a pay-per-use model. In particular, this plugin is able to validate services URLs, validate sellers permissions, generate API keys for the Accounting Proxy, validate offering pricing models, and manage customers access rights to the offered services.

Taking into account that this plugin is intended to work coordinately with an instance of the Accounting Proxy, all the assets to be registered using the *Accountable Service* type must be registered in the proxy as described in the Accounting Proxy section.

The *Accountable Service* plugin only allows to provide the assets with a URL that must match the service one.

This plugin implements the following event handlers:

- **on_post_product_spec_validation:** In this event handler the plugin validates that the provided URL belongs to a valid service registered in an instance of the Accounting Proxy, and that the user creating the product specification is its owner. In addition, this handler generates an API key for the Accounting Proxy to be used when it feeds the Business API Ecosystem with accounting information.
- **on_post_product_offering_validation:** In this event handler the plugin validates the pricing model of a product offering where the service is going to be sold. Specifically, it validates that all the price plans which can be selected by a customer are usage models and that the units (calls, seconds, mb, etc) are supported by the Accounting Proxy.

- **on_product_acquisition:** This event handler is used to grant access to a user who has acquired a service by sending a notification to the proxy, including also the unit to be accounted (price plan selected).
- **on_product_suspension:** This event handler is used to in order to revoke access to a service when a user has not paid or when the user cancels a subscription.

Accounting Proxy

The *Accounting Proxy* can be found in [GitHub](#). This software is a NodeJs server intended to manage services offered in the Business API Ecosystem. In particular, it is able to authenticate users, authorize or deny users to access to a particular service depending on the acquisition, the URL, or the HTTP method used, and account the usage made of the service so users can be charged on pay-per-use basis.

Having this software deployed allows service owners to protect their services and offer them in the Business API Ecosystem without the need of making any modification in the specific service.

Installation

This software is a pure NodeJS server, to install basic dependencies execute the following command:

```
$ npm install
```

Configuration

All the Accounting Proxy configuration is saved in the *config.js* file in the root of the project.

In order to have the accounting proxy running it is needed to fill the following information:

- **config.accounting_proxy: Basic information of the accounting deployment.**
 - **https:** set this variable to undefined to start the service over HTTP.
 - * *enabled:* set this option to true to start the service over HTTPS and activate the certificate validation for some administration requests (see *Proxy API*).
 - * *certFile:* path to the server certificate in PEM format.
 - * *keyFile:* path to the private key of the server.
 - * *caFile:* path to the CA file.
 - **port:** port where the accounting proxy server is listening.

```
{
  https: {
    enabled: true,
    certFile: 'ssl/server1.pem',
    keyFile: 'ssl/server1.key',
    caFile: 'ssl/fake_ca.pem'
  },
  port: 9000
}
```

- **config.database: Database configuration used by the proxy.**
 - **type:** database type. Two possible options: *./db* (sqlite database) or *./db_Redis* (redis database).

- *name*: database name. If the database type select is redis, then this field selects the database number (0 to 14; 15 is reserved for testing).
- *redis_host*: redis database host.
- *redis_port*: redis database port.

```
{
  type: './db',
  name: 'accountingDB.sqlite',
  redis_host: 'localhost',
  redis_port: 6379
}
```

- ***config.modules***: An array of supported accounting modules for accounting in different ways. Possible options are:

- *call*: the accounting is incremented in one unit each time the user send a request.
- *megabyte*: counts the response amount of data (in megabytes).
- *millisecond*: counts the request duration (in milliseconds).

```
{
  accounting: [ 'call', 'megabyte', 'millisecond' ]
}
```

Other accounting modules can be implemented and included to the proxy (see *Accounting modules*).

- ***config.usageAPI***: the information of the usage management API where the usage specifications and the accounting inform

**host*: Business API Ecosystem host. **port*: Business API Ecosystem port. **path*: path of the usage management API. **schedule*: defines the daemon service schedule to notify the accounting information to the Business API Ecosystem. The format is similar to the cron tab format: “MINUTE HOUR DAY_OF_MONTH MONTH_OF_YEAR DAY_OF_WEEK YEAR (optional)”. By the default, the usage notifications will be sent every day at 00:00.

```
{
  host: 'localhost',
  port: 8080,
  path: '/DSUsageManagement/api/usageManagement/v2',
  schedule: '00 00 * * *'
}
```

- ***config.api.administration_paths***: configuration of the administration paths. Default accounting paths are:

```
{
  api: {
    administration_paths: {
      keys: '/accounting_proxy/keys',
      units: '/accounting_proxy/units',
      newBuy: '/accounting_proxy/newBuy',
      checkURL: '/accounting_proxy/urls',
      deleteBuy: '/accounting_proxy/deleteBuy'
    }
  }
}
```

The Accounting Proxy can be used to proxy an Orion Context Broker, supporting the accounting of subscriptions. To do that, the following configuration params are used:

- **config.resources:** configuration of the resources accounted by the proxy.

- *contextBroker*: set this option to *true* if the resource accounted is an Orion Context Broker. Otherwise set this option to *false* (default value).
- *notification_port*: port where the accounting proxy is listening to subscription notifications from the Orion Context Broker (port 9002 by default).

```
{
    contextBroker: true,
    notification_port: 9002
}
```

Administration

The Accounting Proxy is able to manage multiple services. In this regard, it has been provided a *cli* tool that can be used by admins in order to register, delete, and manage its services. The available commands are:

- `./cli addService [-c | -context-broker] <publicPath> <url> <appId> <httpMethod> [otherHttpMethods...]:`
This command is used to register a new service in the Accounting Proxy. It receives the following parameters

- *publicPath*: Path where the service will be made available to external users. There are two valid patterns for the public path: (1) Providing a path with a single component (*/publicpath*) will make the Accounting Proxy accept requests to sub-paths of the specified one (i.e having a public path */publicpath* requests to */publicpath/more/path* are accepted). This pattern is typically used when you are offering the access to an API with multiple resources. (2) Providing a complete path (*/this/is/the/final/resource/path?color=Blue&shape=rectangular*) will make the Accounting Proxy to accept only requests to the exact registered path including query strings. This pattern is typically used when you are offering a single URL, like a Context Broker query.
- *url*: URL where your service is actually running and where requests to the proxy will be redirected. Note that in this case all the URL is provided (including the host) since the accounting proxy allows the management of services running in different servers.
- *appId*: ID of the service given by the FIWARE IdM. This id is used in order to ensure that the access tokens provided by users are valid for the accessed service
- *HTTP methods*: List of HTTP methods that are allowed to access to the registered service
- **Options:**
 - * *-c, -context-broker*: the service is an Orion Context broker service (*config.contextBroker* must be set to *true* in *config.js*).

Following you can find two examples in order to clarify the options available for registering a service:

```
$ ./cli addService /apacheapp http://localhost:5000/ 1111 GET PUT POST
```

In this case, there is a service running in the port 5000 which is made available though the */apacheapp* path, allowing only GET, PUT, and POST HTTP request. Supposing that the Accounting Proxy is running in the host *accounting.proxy.com* in the port 8000, the following requests will be accepted by it:

```
GET http://accounting.proxy.com:8000/apacheapp
GET http://accounting.proxy.com:8000/apacheapp/resource1/
POST http://accounting.proxy.com:8000/apacheapp/resource1/resource2
```

Note: The Accounting Proxy does not care about the API or the semantics of the monitored service, so it may accept a request to a URL which does not exist in the service, resulting in a usual 404 error given by the later

Additionally, a complete path can be provided, as in the following example:

```
$ ./cli addService /broker/v1/contextEntities/Room2/attributes/temperature http://
↪localhost:1026/v1/contextEntities/Room2/attributes/temperature 1111 GET
```

In this example, there is a Context Broker running in the port 1026 and a specific query is made available through the Accounting proxy, so only the following request is accepted:

```
GET http://accounting.proxy.com:8000/broker/v1/contextEntities/Room2/attributes/
↪temperature
```

Note: For making the proxy transparent to final users is a good practice to use the same path in the external path and in the URL when providing a complete path. Nevertheless, this is not mandatory, so it is possible to create an alias for a query (i.e */room2/temperature* for the previous example)

- `./cli getService [-p <publicPath>]`: This command is used to retrieve the URL, the application ID and the type (Context Broker or not) of all registered services.

– **Options:**

* `-p, --publicPath <path>`: only displays the information of the specified service.

- `./cli deleteService <publicPath>`: This command is used to delete the service associated with the public path.
- `./cli addAdmin <userId>`: This command is used to add a new administrator.
- `./cli deleteAdmin <userId>`: This command is used to delete the specified admin.
- `./cli bindAdmin <userId> <publicPath>`: This command is used to add the specified administrator to the service specified by the public path.
- `./cli unbindAdmin <userId> <publicPath>`: This command is used to delete the specified administrator for the specified service by its public path.
- `./cli getAdmins <publicPath>`: This command is used to display all the administrators for the specified service.

To display a brief description of the *cli* tool you can use : `./cli -h` or `./cli --help`. In addition, to get information for a specific command you can use: `./cli help [cmd]`.

Authentication and Authorization

The Accounting Proxy relies on the FIWARE IdM for authenticating users. To do that, the proxy expects that all the requests include a header *Authorization: Bearer access_token* or *X-Auth-Token: access_token* with a valid access token given by the IdM.

Moreover, if the authentication process has succeed, the Accounting Proxy validates the permissions of the user to access to specific service. To do that, it checks if the user has been registered as an admin of the service or if the user has acquired the service.

Is important to notice, that the Business API Ecosystem allows sellers to offer a service in different offerings with different pricing models. In this regard, having just the access token is not enough to determine the accounting unit (pricing model) that has to be used to account the usage of the service. It may happen, that a valid user has acquired the access to a service in two different offerings with two different models (i.e calls and seconds), so the proxy needs extra

info to determine the unit to account (in this example calls or seconds). To deal with that problem, the Accounting Proxy generates an API Key which identifies the service, the user, and the accounting unit, so including it in a header *X-API-Key: api_key* when making requests, enables it to know what unit to account.

Note: The X-API-Key header is not intended to provide an extra level of security, but just to remove the possible incertitude around the request

Proxy API

The Accounting Proxy runs by default in the port 9000; nevertheless, this port can be configured as described in *Configuration* section. In this regard, the different services configured though the administration *cli* tool can be accessed directly in the root of the proxy using the public path defined for the service.

In addition, the Accounting Proxy has an administration API which can be accessed though the reserved path */accounting_proxy*. Following, you can find the different services exposed in the administration API:

POST .../newBuy

This service is used by the Business API Ecosystem to notify a new buy. If the accounting proxy has been started over HTTPS, these requests should be signed with the Business API Ecosystem key; otherwise, they will be rejected.

```
{
  "orderId": "...",
  "productId": "...",
  "customer": "...",
  "productSpecification": {
    "url": "...",
    "unit": "...",
    "recordType": "..."
  }
}
```

- *orderId*: order identifier.
- *productId*: product identifier.
- *customer*: customer id.
- *url*: base url of the service.
- *unit*: accounting unit (*megabyte*, *call*, etc).
- *recordType*: type of accounting.

POST .../deleteBuy

This service is used by the Business API Ecosystem to notify a terminated buy. If the accounting proxy has been started over HTTPS, these requests should be signed with the Business API Ecosystem key; otherwise, they will be rejected.

```
{
  "orderId": "...",
  "productId": "...",
  "customer": "...",
```



```

    "productSpecification": {
      "url": "..."
    }
  }
}

```

- *orderId*: order identifier.
- *productId*: product identifier.
- *customer*: customer id.
- *url*: base url of the service.

POST .../urls

This service is used by the Business API Ecosystem to check if an URL is a valid registered service. This requests require the “authorization” header with a valid access token from the IdM and the user must be an administrator of the service. If the accounting proxy has been started over HTTPS, these requests should be signed with the Business API Ecosystem key cert; otherwise, they will be rejected.

```

{
  "url": "..."
}

```

GET .../keys

Retrieve the user’s API_KEYS in a json. This request require the “authorization” header with a valid access token from the IdM.

```

[
  {
    "apiKey": "...",
    "productId": "...",
    "orderId": "...",
    "url": "..."
  },
  {
    "apiKey": "...",
    "productId": "...",
    "orderId": "...",
    "url": "..."
  }
]

```

GET .../units

Retrieve the supported accounting units by the accounting proxy in a JSON. This requests require the “authorization” header with a valid access token from the IdM.

```

{
  "units": ["..."]
}

```

Accounting modules

By default, the Accounting Proxy includes three different modules for accounting. Nevertheless, it is possible to extend the proxy with new modules by creating them in the *acc_modules* directory, those modules have to have the following structure:

```
/** Accounting module for unit: XXXXXX */

var count = function (countInfo, callback) {
  // Code to do the accounting goes here
  // .....

  return callback(error, amount);
}

var getSpecification = function () {
  return specification;
}
```

The function *count* receives two parameters: **countInfo*: object containing both, the request made by the user and the response returned by the service

```
{
  request: { // Request object used by the proxy to make the request to the service.
    headers: {

      },
    body: {

      },
    ...
  },
  response: { // Response object received from the service.
    headers: {

      },
    body: {

      },
    elapsedTime: , // Response time
    ...
  }
}
```

- **callback**: function, which is used to retrieve the accounting value or the error message. The callback expects 2 parameters
 - *error*: string with a description of the error if there is one. Otherwise, *null*.
 - *amount*: number with the amount to be added to the current accounting.

The function *getSpecification* should return a javascript object with the usage specification for the accounting unit according to the TMF635 usage management API ([TMF635 usage Management API](#)).

Finally, add the name of the developed accounting module to the *config.modules* array in the *config.js* file (the accounting module name is the name of the file, e.g. *megabyte* and *megabyte.js*) and restart the Accounting Proxy.