

# Process Loader User Manual

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## 1. Introduction

The Process Loader (<http://processloader.snap4city.org>) is a platform created to share a set of Resources/Processes capable to manage data and information in a smart City context, e.g. processes to extract data in a periodic or real time modality related to aspects as: mobility (how many free parking spaces there are in a car park, at what time a bus passes from a specific road/stop), culture (what are the city events scheduled for today or what museums are open), services (where are the hospitals and what is the first aid occupancy?), IoT (what temperature/humidity/level of rain measures a weather sensors?), data analytics, city dashboards, etc. The Process Loader main activities are: i) Share Resources/Processes (e.g. to reuse them in different cities and contexts); ii) Test the Processes' validity (is the process created capable to do its work?); iii) Apply the processes in a real context.

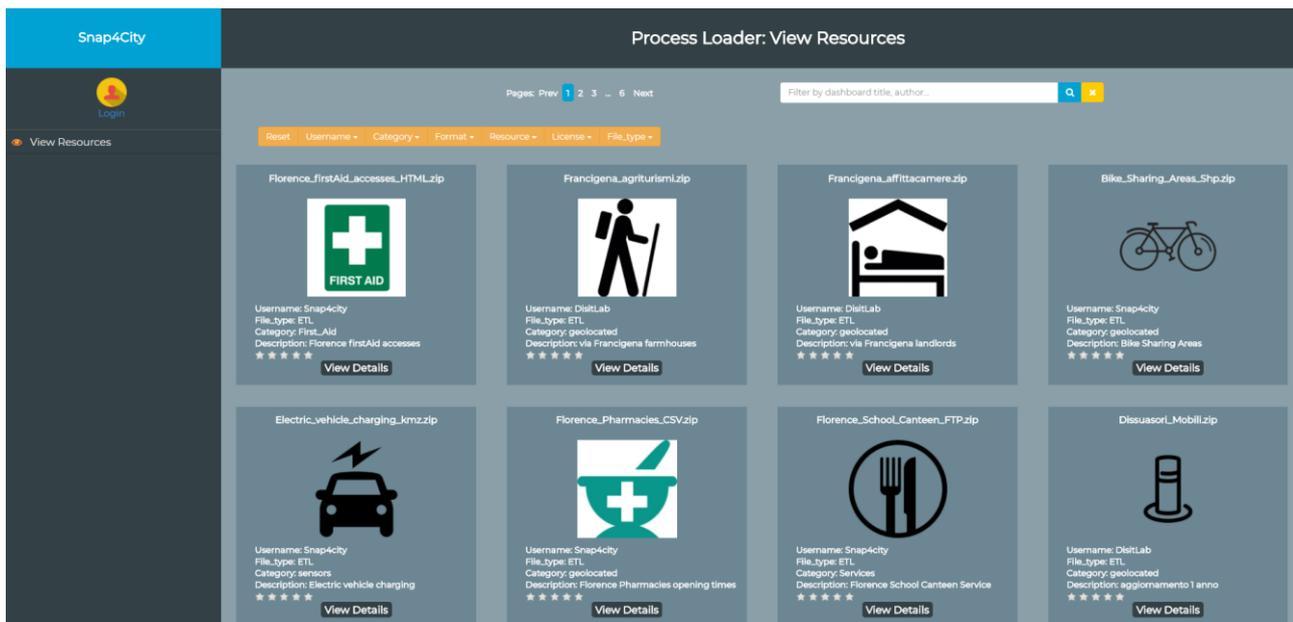
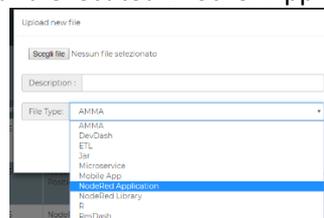


Fig: Process Loader Home Page (<http://processloader.snap4city.org>).

### 1.1. Glossary

- **Resource:** is the 'file' uploaded by the users in the platform (in different formats: zip, rar, json, xml, etc.). Each resource is uploaded in the portal together with its metadata (Resource title and context, logo, etc.). The platform is capable to manage the following different type of resources: ETL, AMMA<sup>1</sup>, R, NodeRed<sup>2</sup> Applications, Dashboards, mobile App, microservices, etc. Some of them (e.g. the ETL and resources) can be executed through a scheduler (DISCES) directly in the Process Loader, other Resources need to be downloaded and executed in other Applications (e.g. a NodeRed, AMMA).



- **Process Model:** is a template. Each Resource can have a set of different Process Models associated.
- **Process Instance:** is a concrete process that can be executed in a scheduler. Each Process Model can be connected to a set of different process instances. Each instance for example has: name, Scheduler in which must be executed, execution frequency, starting date, etc.

<sup>1</sup> Amma (<http://amma.snap4city.org>) is a tool built on the visualization tool banana (connected with Solr, <https://github.com/lucidworks/banana>)

<sup>2</sup> NodeRed: <https://nodered.org> , Flow-based programming for the Internet of Things: <https://flows.nodered.org>

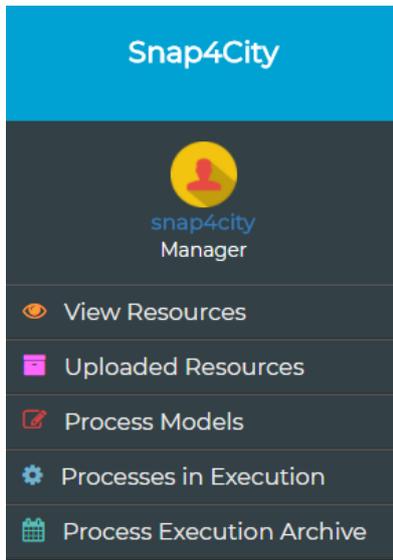
- **Scheduler (DISCES):** once the processes are created, they can be executed in a set of available schedulers (tools to run to the process instances one a time or in a real time or periodic modality, specified in a trigger). The scheduler IP is specified at the time of creation of each process instance, choosing it from a list of available values. Schedulers are of two types: i) test schedulers, used to verify the validity of the process instances; ii) production schedulers, used to work in a real context.

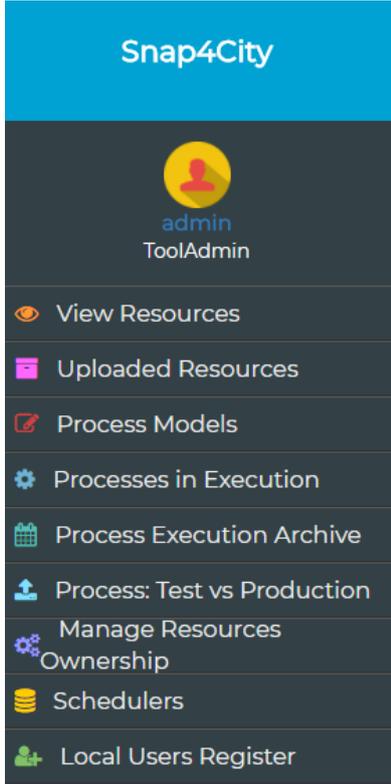
## 2. Type of Users

Type of users:

- Public User: is a Not registered
- Manager: is a Registered user
- ToolAdmin: is the Portal Administrator

## 3. Process Loader Functionalities

User	Available Functionalities	Process Loader Menu
Public User	<ul style="list-style-type: none"> <li>• View public Resources</li> </ul>	
Manager	<ul style="list-style-type: none"> <li>• View public Resources</li> <li>• Make the Login/Logout</li> <li>• Public a Resource and view/modify all the own Uploaded Resources</li> <li>• View/modify the Process Models associated to their Resources</li> <li>• Create a set of Process Instances from the Process Models and execute them in a scheduler (DISCES) in a periodic or real time modality</li> <li>• View Processes in execution on the DISCES</li> <li>• View the Processes Execution Archive</li> </ul>	

<p>ToolAdmin (Administrator)</p>	<ul style="list-style-type: none"> <li>• All the functionalities available for the managers</li> <li>• Set the available schedulers</li> <li>• Transfer a process execution from a test to a production Scheduler</li> <li>• Manage Resources ownership</li> <li>• Make new local user registration</li> </ul>	 <p>The dashboard menu includes: View Resources, Uploaded Resources, Process Models, Processes in Execution, Process Execution Archive, Process: Test vs Production, Manage Resources Ownership, Schedulers, and Local Users Register.</p>
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#### 4. Process Loader Flows (use cases)

The typical flows of actions carried out on the portal by the different users, are in the following figures.



Fig: Actions that can be done by all the Process Loader different type of users (public users, managers, ToolAdminister)

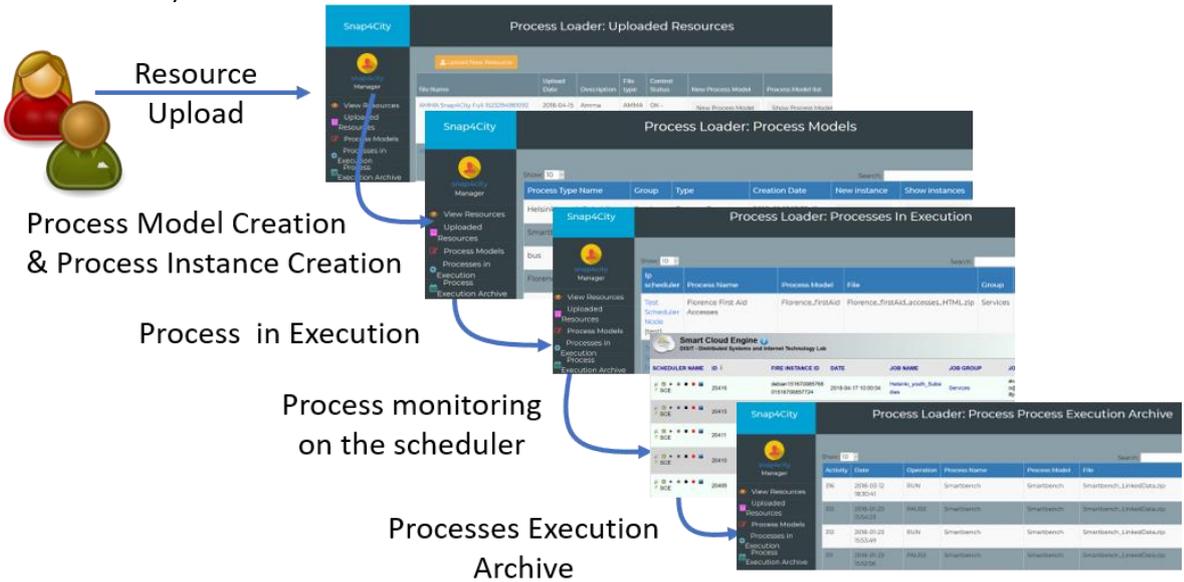


Fig: Actions that can be done by managers and ToolAdminister.

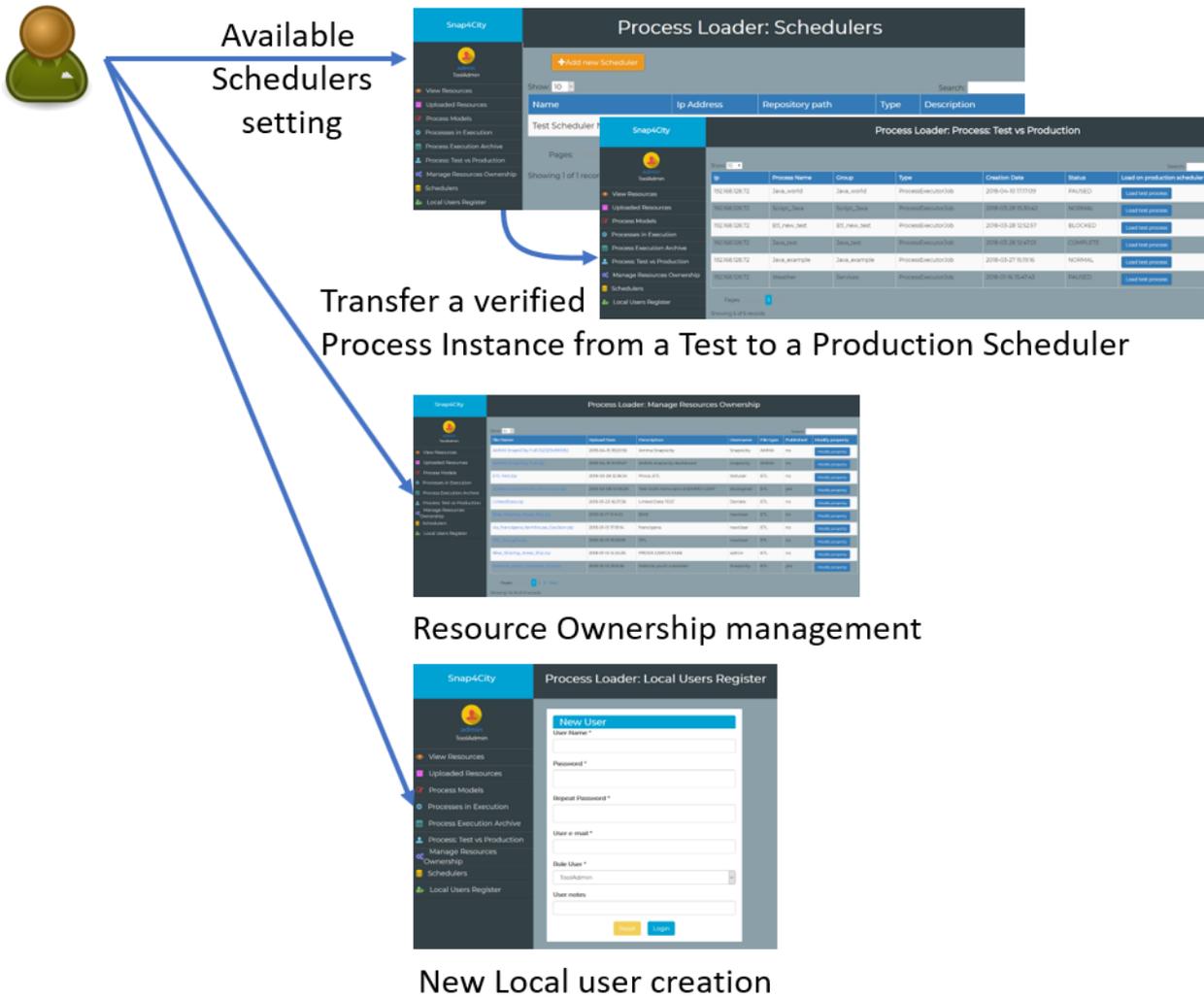


Fig: Actions that can be done only by the ToolAdministrator.

## 5. Functionalities in details

This chapter describes in detail all the Process Loader Functionalities.

### 5.1. View Public Resources

The Public Resources can be retrieved directly from the Process Loader home page <https://processloader.snap4city.org>. It is possible to make searches on them, view the Resource details and download the resources. This service is available for all the users, so no Login is needed.

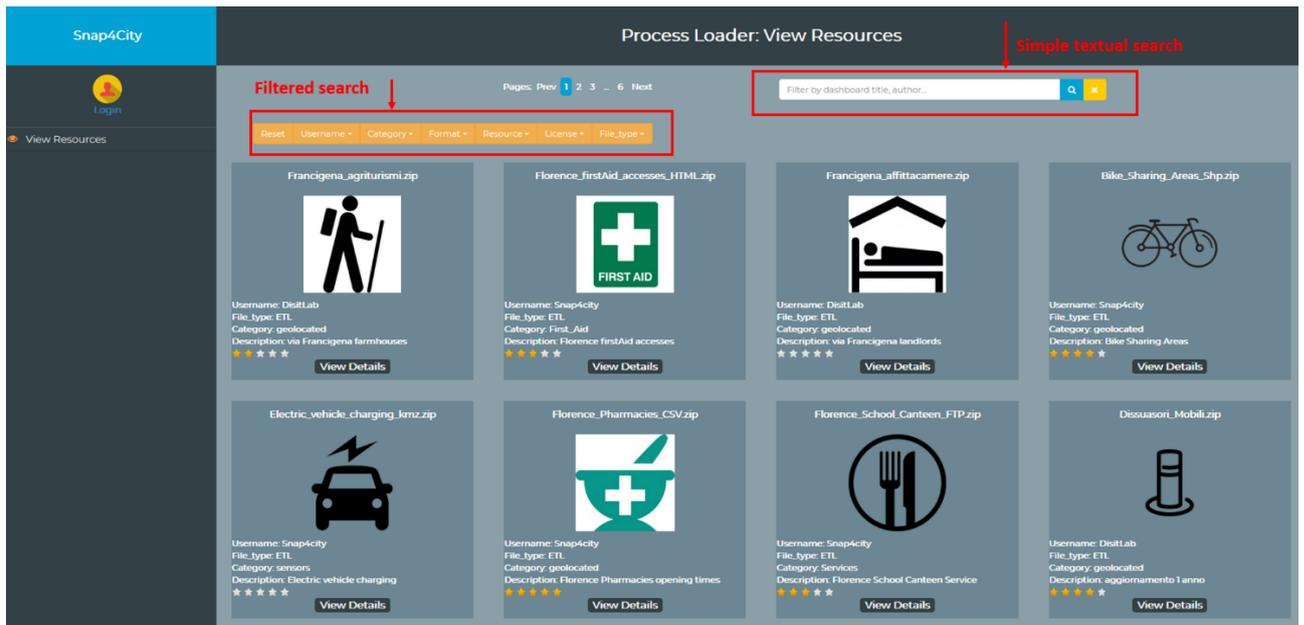


Fig: Process Loader home page.

The Resource search can be done in two different modalities:

- o Simple textual search

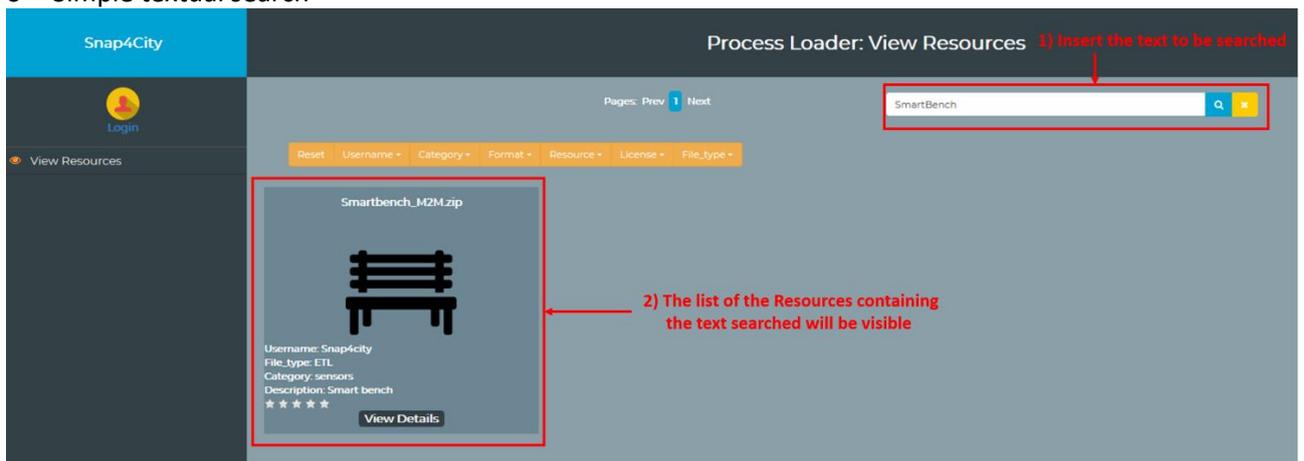


Fig: Resource textual search.

- o Filtered search. It is possible to use a set of multiple filters, so a user can select (in the following order):

- Username (from who has been downloaded and published the Resource, e.g. 'snap4city' user)
- Category (the Category of the data managed by the Resource, e.g.: 'Services')
- Format (e.g. 'json')
- Resource (a more detailed Resource description, e.g. 'Pharmacies')
- Licence (the license of use associated to the Resource)
- File type (type of resources managed. Possible types: ETL, AMMA, DevDash (Developer Dashboards), ResDash (Resource Dashboards), Microservices, Mobile Apps, NodeRed Application, NodeRed Library, Jar, R)

In the following figure it is visible the list of the resources available if the user puts the specific following search:

- Username: 'snap4city'
- Category: 'Geolocated' AND 'Services'

- Format: All
- Resource: 'Bike' AND 'Bus' AND 'youth\_substudies' AND school\_canteen AND 'pharmacies' AND 'weather' AND 'Linked Data'
- Licence: All
- File type: ETL

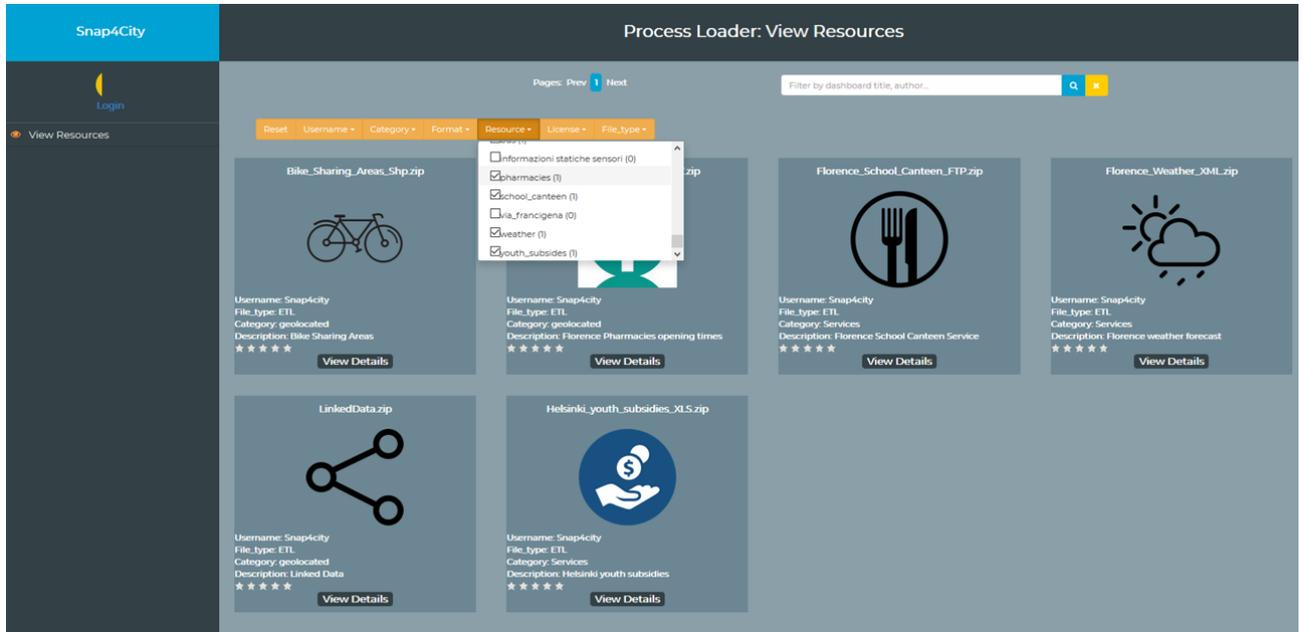


Fig: Resource filtered search.

## 5.2. Make the Login/Logout

- A user, to make the Login, must: go to the home page, click on the 'Login' button and insert his/her credentials (the User Registration is directly made by the ToolAdministrator).

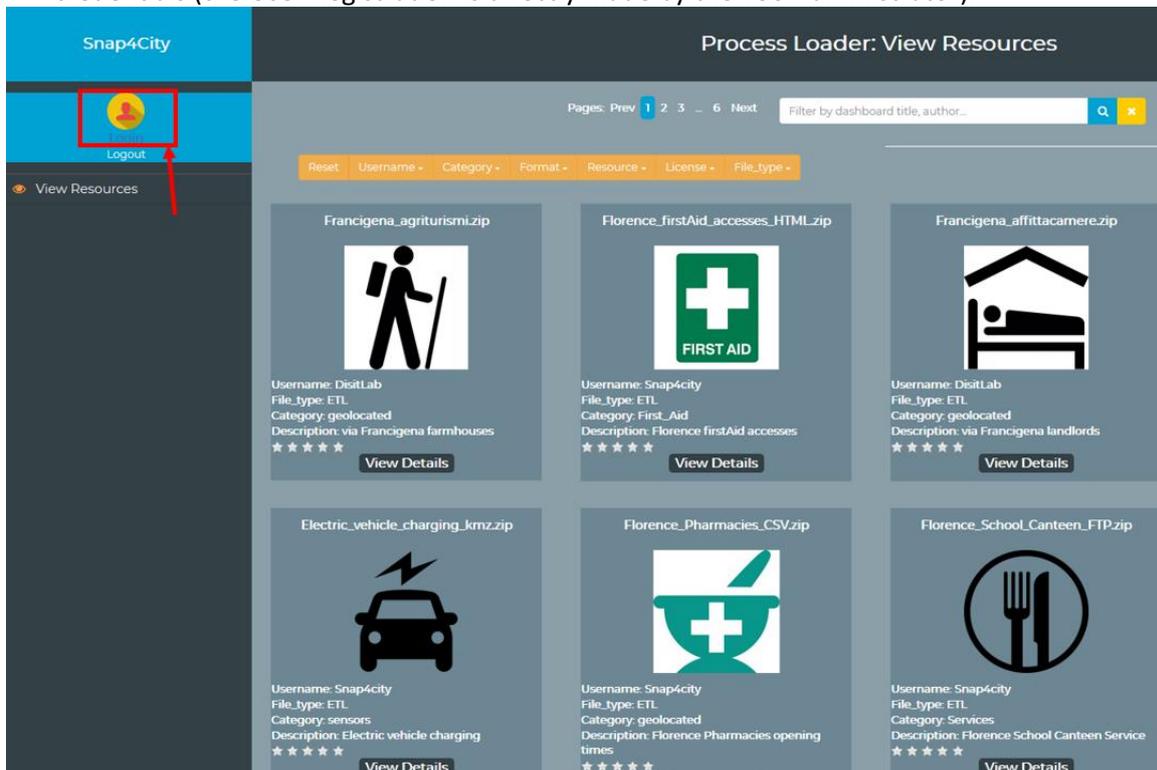


Fig: Login button in the home page.

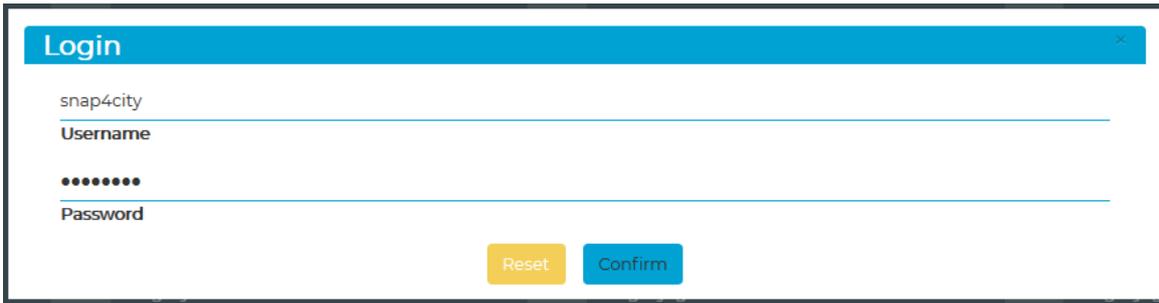


Fig: Login popup: insert credentials.

- To make the Logout, go to the user Icon (on top left of the web page) and click on the 'Logout' button.

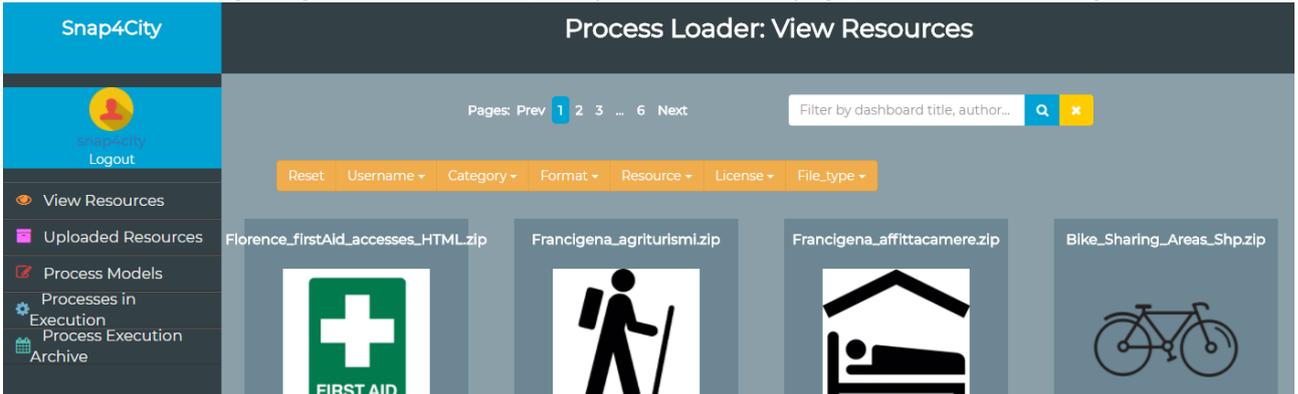


Fig: Logout button.

### 5.3. Public a Resource and view/modify all the own uploaded Resources

To upload a finalized ETL, a Data Analytics process or other resource type, the users must follow these steps:

- select the 'Uploaded Resources' menu
- Click on the 'Upload New Resource' button. The resource types admitted are: ETL, AMMA, DevDash (Developer Dashboards), ResDash (Resource Dashboards), Microservices, Mobile Apps, NodeRed Application, Nodered Library, Jar, R.

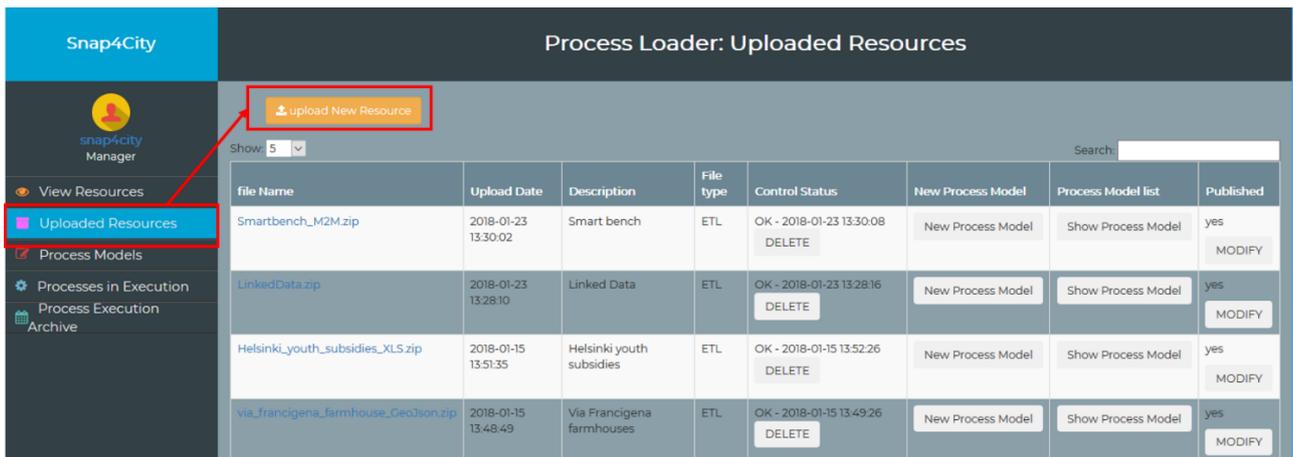


Fig: Upload a new Resource.

- Select the file (from the filesystem) and add the metadata to describe the process:
  - File upload: select the file from your file system (a .zip file in for ETL processes)
  - Description: a short description of your process
  - File type: you can choose it from a dropdown menu: ETL, AMMA, DevDash (Developer Dashboards), ResDash (Resource Dashboards), Microservices, Mobile Apps, NodeRed Application, NodeRed Library, Jar, R

- Click on the 'Send File' button to finalize the upload

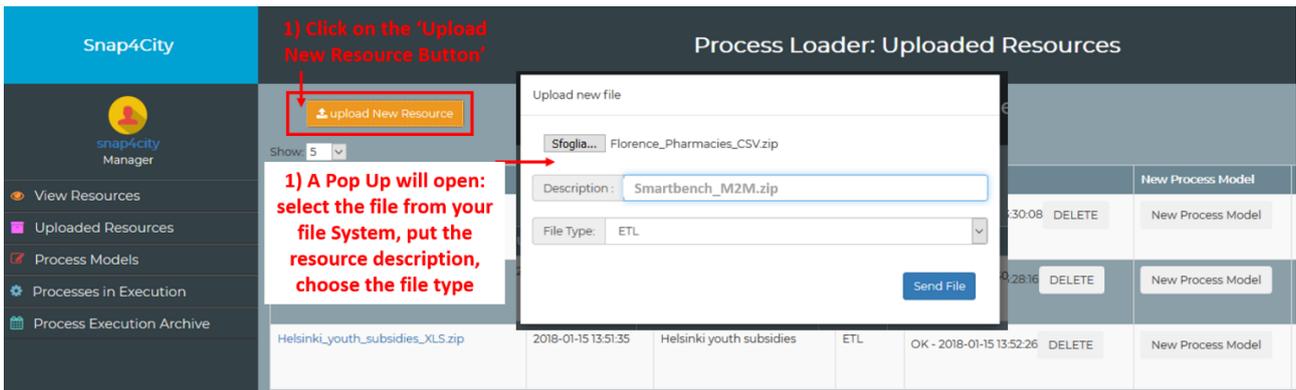


Fig: Uploaded Resource - Upload a new Resource: choose you file and put the Resource metadata.

When the resource has been correctly uploaded, it will be visible in the 'Uploaded Resources' list. It is possible to use the search filter on the right. (ex: search for 'Smartbench' and only the 'Smartbench\_M2M.zip' ETL will appear in the list).

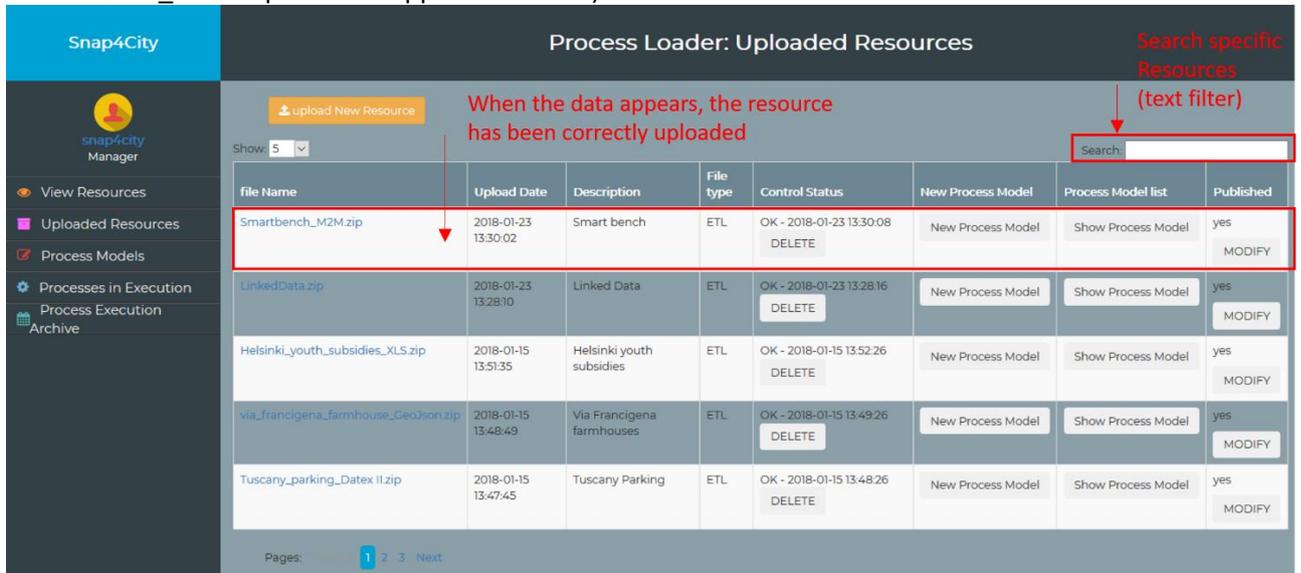


Fig: Uploaded Resources.

#### 5.4. Create/ Modify/View the Process Models associated to the Resources

Some Resource types (e.g. ETL, jar, R files) can be executed and tested on the schedulers directly available from the Process Loader tool. To put them in execution it is necessary to: i) Create a Process Model associated to a Resource; ii) Create a Process Instance, connected to the Process Model, iii) Execute the Process instance on an available scheduler.

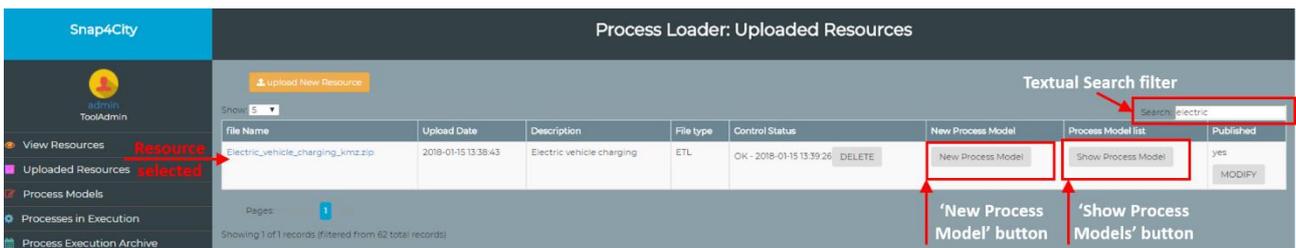


Fig: electric vehicle charging Process Model creation.

- If a Manager wants to Create a Process Model for a specific downloaded Resource (e.g. 'Electric

vehicle charging'), must follow the steps:

- Click on the left menu: 'uploaded files list' (to search the 'Electric vehicle charging', use the filter in the right top of the web page)
- Select a Resource (for example: 'Electric vehicle charging')
- Click on the 'New Process Model' button and put the metadata. For the 'Electric vehicle charging' ETL, it is possible to put:
  - 'Process Parameters' tab:
    - Name= 'Electric vehicle charging'
    - Description = 'info on Electric vehicle charging in Florence'
    - Group = 'Services'
  - 'Trigger' tab:
    - Name= 'Electric vehicle charging\_trigger'
    - Description = 'description...'
    - Group = 'Services\_trigger'
  - 'Advanced Parameters' tab:
    - Needed if it is necessary to execute two different process instances in series (typically is void).

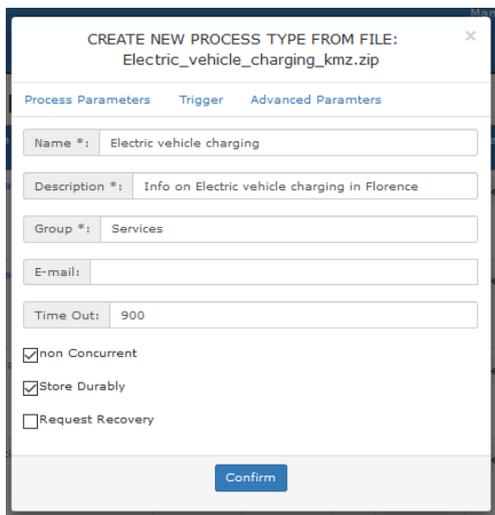


Fig: New Process Model: Parameters

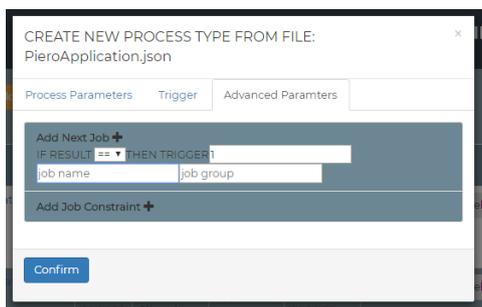


Fig: New Process Model: Advanced parameters

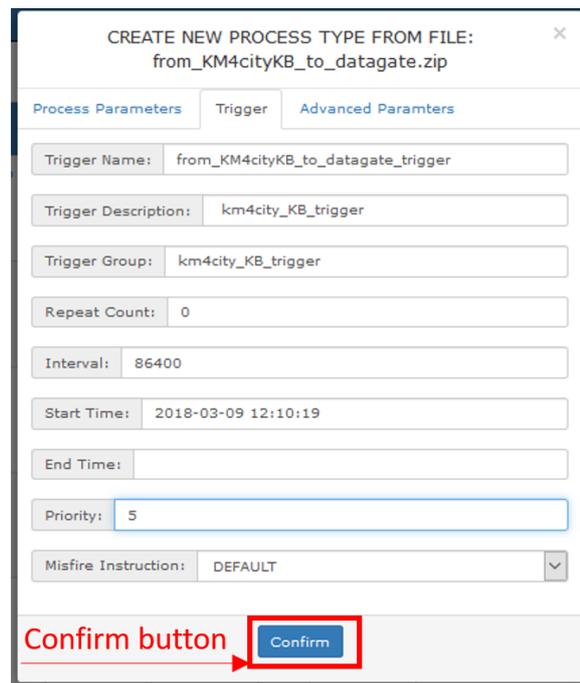


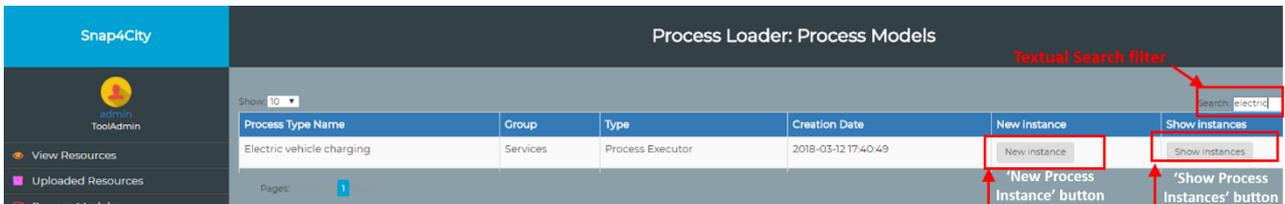
Fig: New Process Model: Trigger

- Click on the 'Confirm' button.
- Click on the

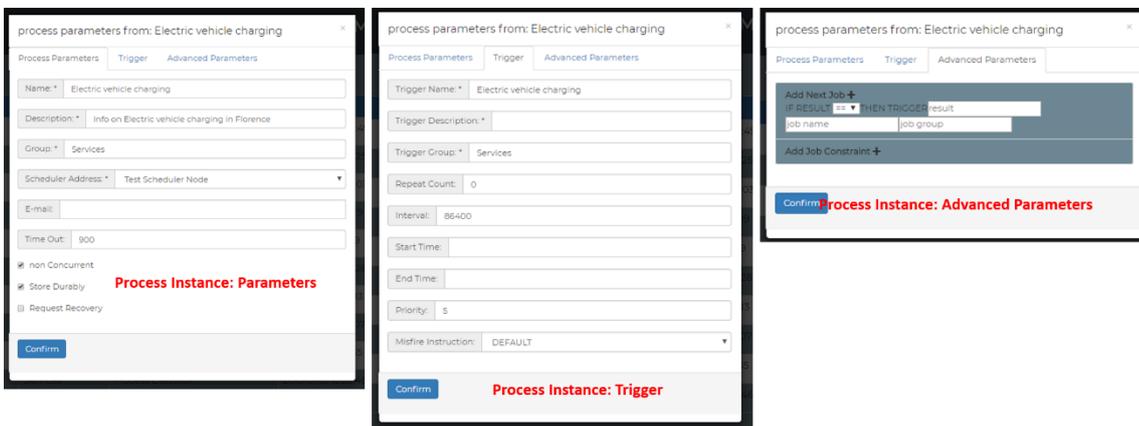
## 5.5. Process Instances creation and their execution in a scheduler (DISCES)

To put in execution a Process, at least one Process Instance (associated to the Process Model created in the previous Paragraph) must be created. The instance can then executed in a scheduler. To do this, follow the steps:

- Click on the 'Process Model' menu and search for a specific Process Model (e.g. the Process Model associated to the 'Electric vehicle charging' Resource).

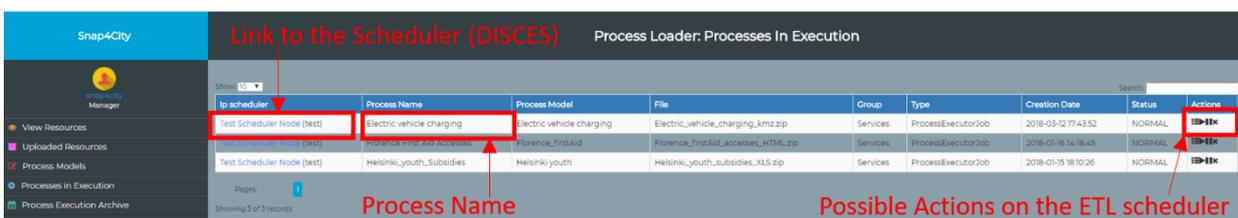


- Click on the 'New Process Instance' button put the necessary metadata and create it (Click the 'Confirm' button).



- Click on the 'Process Instances' button to verify its presence
- Now the process is in execution and you can find it in the list (menu 'Processes in Execution')

## 5.6. Processes in execution on the DISCES



- Once your process is in execution, you can monitor its status:
  - From the 'Process in execution List page', it possible (see the figure above):
    - Do actions on its execution:
      - See the executions log



Confirm

Process Details		
Are you sure you wish to obtain process execution details?		
Id	Date	Status
79859	2018-03-12 18:13:56	COMPLETE
79858	2018-03-12 18:13:56	SUCCESS
79857	2018-03-12 18:13:52	RUNNING
79856	2018-03-12 18:13:52	FIRE
79855	2018-03-12 17:58:56	COMPLETE
79854	2018-03-12 17:58:56	SUCCESS
79853	2018-03-12 17:58:52	RUNNING
79852	2018-03-12 17:58:52	FIRE
79851	2018-03-12 17:43:57	COMPLETE
79850	2018-03-12 17:43:57	SUCCESS

Details on the execution activity

- Start the (or restart) the process execution
- Stop the process execution
- Delete the process execution
- See the process execution from the scheduler (called DISCHES) view: click on the link 'Test Scheduler Node' and the following view will appear

SCHEDULER NAME	ID	FIRE INSTANCE ID	DATE	JOB NAME	JOB GROUP	JOB DATA	STATUS	PROGRESS	TRIGGER NAME	TRIGGER GROUP	PREV FIRE TIME	NEXT FIRE TIME
SCE	20077	debian1514970968333 1514970968399	2018-02-17 09:00:05	Helsinki_youth_Subside es	Services	#notificationEmail=info@disit.org; #processParameter	SUCCESS	100%	Helsinki_trigger	Trigger_Services	2018-02-17 09:00:00	2018-02-18 09:00:00
SCE	20076	debian1514970968333 1514970968398	2018-02-16 18:10:04	Electric vehicle charging	Services	#notificationEmail=info@disit.org; #processParameter	SUCCESS	100%	Electric_trigger	Trigger_Services	2018-02-16 18:10:00	2018-02-17 18:10:00
SCE	20075	debian1514970968333 1514970968397	2018-02-16 14:18:50	Florence First Aid Accesses	Services	#notificationEmail=info@disit.org; #processParameter	SUCCESS	100%	FirstAid_Accesses_Tri gger	FirstAid_Accesses_Tri gger	2018-02-16 14:18:45	2018-02-17 14:18:45

Others Details on the ETLs execution.

- It is possible to monitor the job from the home page:
  - Click on the Filter button (at the bottom of the page)
  - Make textual searches on each column

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Write text here and search it on the respective column

SCHEDULER NAME	ID	FIRE INSTANCE ID	DATE	JOB NAME	JOB GROUP	JOB DATA	STATUS	PROGRESS	TRIGGER NAME	TRIGGER GROUP
SCE	20157	debian1514970968333 1514970968478	2018-03-12 18:38:25	Helsinki_youth_Subside es	Services	#notificationEmail=info@disit.org; #processParameter	SUCCESS	100%	MT_tubct1vre4y0	DEFAULT
SCE	20156	misfred152087819820 0	2018-03-12 18:36:38	Electric vehicle charging	Services		MISFRED		Electric vehicle charging_trigger	Services_trigger
SCE	20155	debian1514970968333 1514970968477	2018-03-12 18:28:56	Electric vehicle charging	Services	#processParameter s=[{"processPath": }]	SUCCESS	100%	Electric vehicle charging_trigger	Services_trigger
SCE	20154	debian1514970968333 1514970968476	2018-03-12 18:13:56	Electric vehicle charging	Services	#processParameter s=[{"processPath": }]	SUCCESS	100%	Electric vehicle charging_trigger	Services_trigger

Currently executing jobs: 1  
JobStore Clustered: yes  
JobStore supports persistence: yes  
Number of jobs executed: 324  
Name of Scheduler: no  
Running since: Wed Jan 03 10:16:00 CET 2018  
Scheduler instance id: ceoam1514970968333  
Scheduler name: SCE  
Scheduler shutdown: no  
Scheduler started: yes  
Standby mode: no

CPU load: 5.09196781247926-1  
CPU load (VM): 7.708257018930668-4  
Committed virtual memory: 10744702920  
Free physical memory: 479166464  
Free swap space: 223045208  
Number of processors: 16  
Operating System architecture: amd64  
Operating System name: Linux  
Operating System version: 4.8.0-3-amd64  
Process CPU time: 206558000000  
System Load average: 0.05  
Total physical memory: 4146094289  
Total swap space: 42028650489

Jobs Triggers New Job New Job (dormant) New Trigger Start Scheduler Standby Scheduler Shutdown Scheduler Force Shutdown Scheduler Pause Triggers Resume Triggers Nodes Status Nodes Log Log Truncate Catalina Log

Import Job Sfogla... Nessun file selezionato.

Back Home Clear Scheduler

**Filter Button**

Note that "Status" value of a newly created job is set to "CREATED" and it is changed each time the user starts or stops running a job from the commands on the right side of the line. The content of the "status" column is continually updated by means of a function that every two minutes sends to the various schedulers in which requests processes are entered to know the execution state and depending on the response received, the value is updated accordingly.

The values that the Status can assume are:

- **CREATED:** is the value that defaults to a process right after it was created, before it is updated for the first time
- **NORMAL:** The process is running correctly.
- **NONE:** Trigger associated to the process still not exist (per example the execution time interval is ended)
- **BLOCKED:** The execution of the process was blocked by the user.
- **PAUSED:** The execution of the process has been paused.
- **ERROR SERVER COMMUNICATION:** The request was successfully sent, but internal issues for the scheduler server could not be received.
- **NOT FOUND:** The application sent a request to the scheduler for that process, but did not find any corresponding process to the information sent.
- **RUNNING:** The process assumes this value immediately after a start execution request has been sent.

### 5.7. Processes Execution Archive

To view the list of the Processes in execution, click on the menu 'Processes in execution'.

Ip scheduler	Process Name	Process Model	File	Group	Type	Creation Date	Status	Actions
Test Scheduler Node (test)	Electric vehicle charging	Electric vehicle charging	Electric_vehicle_charging_kmz.zip	Services	ProcessExecutorJob	2018-03-12 17:43:52	NORMAL	
Test Scheduler Node (test)	Florence First Aid Accesses	Florence_firstAid	Florence_firstAid_accesses_HTML.zip	Services	ProcessExecutorJob	2018-01-16 14:18:45	NORMAL	
Test Scheduler Node (test)	Helsinki_youth_Subsidies	Helsinki youth	Helsinki_youth_subsidies_XLS.zip	Services	ProcessExecutorJob	2018-01-15 18:10:26	NORMAL	

### 5.8. Set the available schedulers

From the menu 'Schedulers', the ToolAdmin can view and create the schedulers.

Name	Ip Address	Repository path	Type	Description
Production_local	192.168.128.72	media/data/jobs	production	prova spostamento di un job
Test Scheduler Node	192.168.0.167	jobs	test	Default test scheduler

Fig: Schedulers List (Test and Production), ToolAdmin menu.

As described in the Introduction, two types of schedulers are available:

- **Test Schedulers (accessible for the ToolAdmin and to the Managers):** applications used to verify that newly created jobs are working properly. All created jobs can at first be run in a test scheduler and afterwards a ToolAdmin user can move processes considered to be running on a production scheduler.
- **Production Schedulers (accessible only for the ToolAdmin):** definitive applications on which the correct processes can be performed. The list of scheduling applications is handled by ToolAdmin users who have the skills to add new applications between available ones (both testing and production), and to move processes from a test machine to a production. Each Scheduler is identified by an IP address of the machine on which is active.

To set a New scheduler:

- Click on the 'Add new Scheduler' button
- Complete the form

The screenshot shows a web form titled "Add New Scheduler". The form has the following fields and values:

- Name: \* Scheduler\_80
- Address: \* 192.168.0.8
- Description: Scheduler\_80
- Repository Name: \* /srv/share/jobs/
- Process Path: \* /usr/lib/jvm/java-8-openjdk-amd64/bin/java
- DDI HOME: \* -DDI\_HOME=/home/programs/data-integration/
- data integration path: \* :/home/programs/data-integration/lib/\*
- Type: \* A dropdown menu is open, showing "Test" and "Produciton" (highlighted in blue).

At the bottom right of the form, there are two buttons: "Close" and "Confirm".

Fig: New scheduler.

### 5.9. Transfer a process execution from a Test to a Production Scheduler

If a process has been tested by a Manager and also the ToolAdmin has verified its validity, it can be launched directly in a real context.

Process Loader: Process: Test vs Production

ip	Process Name	Group	Type	Creation Date	Status	Load on production scheduler
192.168.128.72	Java_world	Java_world	ProcessExecutorJob	2018-04-10 17:17:09	PAUSED	Load test process
192.168.128.72	Script_Java	Script_Java	ProcessExecutorJob	2018-03-28 15:30:42	NORMAL	Load test process
192.168.128.72	Etl_new_test	Etl_new_test	ProcessExecutorJob	2018-03-28 12:52:57	BLOCKED	Load test process
192.168.128.72	Java_test	Java_test	ProcessExecutorJob	2018-03-28 12:47:01	COMPLETE	Load test process
192.168.128.72	Java_example	Java_example	ProcessExecutorJob	2018-03-27 15:39:16	NORMAL	Load test process
192.168.128.72	Weather	Services	ProcessExecutorJob	2018-01-16 15:47:43	PAUSED	Load test process

Fig: Transfer a Process from a Test Scheduler to a Production Scheduler.

To do this the ToolAdmin can simply transfer the Process Instance from a Test scheduler to a Production scheduler, following the steps:

- Click on the 'Load test process' button
- Choose one of the Production schedulers to which associate the process (e.g.)

Load process Weather in a Production Scheduler

Process Name: Weather

Current Scheduler: 192.168 ...

Select Production Node Scheduler: Scheduler\_80

Scheduler\_80

Scheduler\_8

Close Confirm

## 5.10. Manage Resources ownership

- The ToolAdmin user can change the ownership of a Resource:
  - Click on the 'Manage Resource Ownership' menu
  - Choose the Resource
  - Click on the related 'Modify property' button

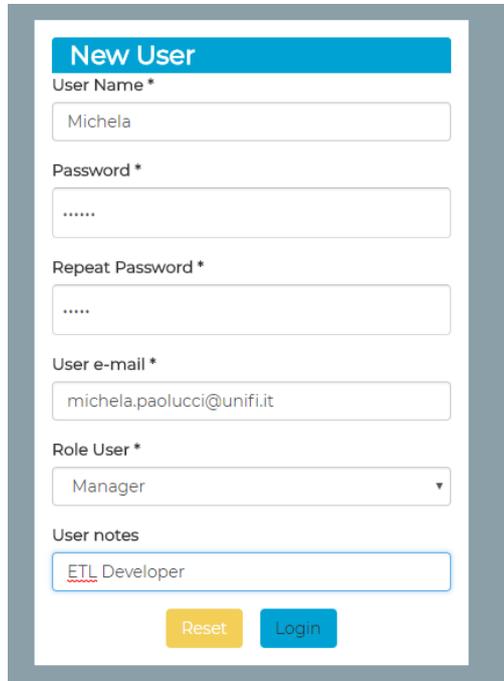
Process Loader: Manage Resources Ownership

file Name	Upload Date	Description	Username	File type	Published	Modify property
AMMA Snap4City Full-1523294981092	2018-04-15 18:20:56	Amma Snap4city	Snap4city	AMMA	no	Modify property
AMMA_Snap4City_Full.zip	2018-04-15 10:33:47	AMMA snap4city dashboard	snap4city	AMMA	no	Modify property
ETL-Test.zip	2018-03-28 12:36:34	Prova_ETL	testuser	ETL	no	Modify property
TrasformazioneCrafo_Ferroviano.zip	2018-03-08 10:06:30	Test Crafo Ferroviario ESEMPIO LDAP	tbologna0	ETL	yes	Modify property
LinkedData.zip	2018-01-23 16:27:36	Linked Data TEST	Daniele	ETL	no	Modify property
Bike_Sharing_Areas_Shp.zip	2018-01-17 11:14:12	BIKE	newUser	ETL	no	Modify property
via_francigena_farmhouse_Geo3son.zip	2018-01-15 17:19:14	francigena	newUser	ETL	no	Modify property
TPL_bua_g11c.zip	2018-01-15 15:53:09	TPL	newUser	ETL	no	Modify property
Bike_Sharing_Areas_Shp.zip	2018-01-15 14:34:35	PROVA CARICA FAKE	admin	ETL	no	Modify property
Helsinki_youth_subsidies_XLS.zip	2018-01-15 13:51:35	Helsinki youth subsidies	Snap4city	ETL	yes	Modify property

- Change the user (e.g. from snap4city to DisitLab)

### 5.11. Make a new Local user registration

Click on the 'Local Users Register' menu and complete the form.



The image shows a 'New User' registration form with the following fields and values:

- User Name \***: Michela
- Password \***: .....
- Repeat Password \***: .....
- User e-mail \***: michela.paolucci@unifi.it
- Role User \***: Manager (dropdown menu)
- User notes**: ETL Developer

At the bottom of the form, there are two buttons: 'Reset' (yellow) and 'Login' (blue).