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DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE

DIM

Data Ingestion Manager: user manual

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version 0.1, of this document

date 13-07-2015

Table of Contents

DIM 0

Data Ingestion Manager: user manual 0

1 Overview 2

2 Getting started 2

2.1 Application setup 2

2.2 Open Data Description 3

2.3 Tasks description 5

3 Application Layout 6

3.1 Menu Bar 6

3.2 Tab Panels 6

3.2.1 Explorer 7

3.2.2 Scheduler 8

3.2.3 Properties 9

4 Edit an Open Data 9

4.1 Create a new Open Data 9

4.2 Data validation 10

4.3 Update Metadata of Open Data 10

4.3.1 Inline Editing 11

4.4 Selecting Open Data 11

5 Working with tasks 12

5.1 Controlling tasks 12

5.1.1 Activate/Executing 12

5.1.2 Pause/Resume 12

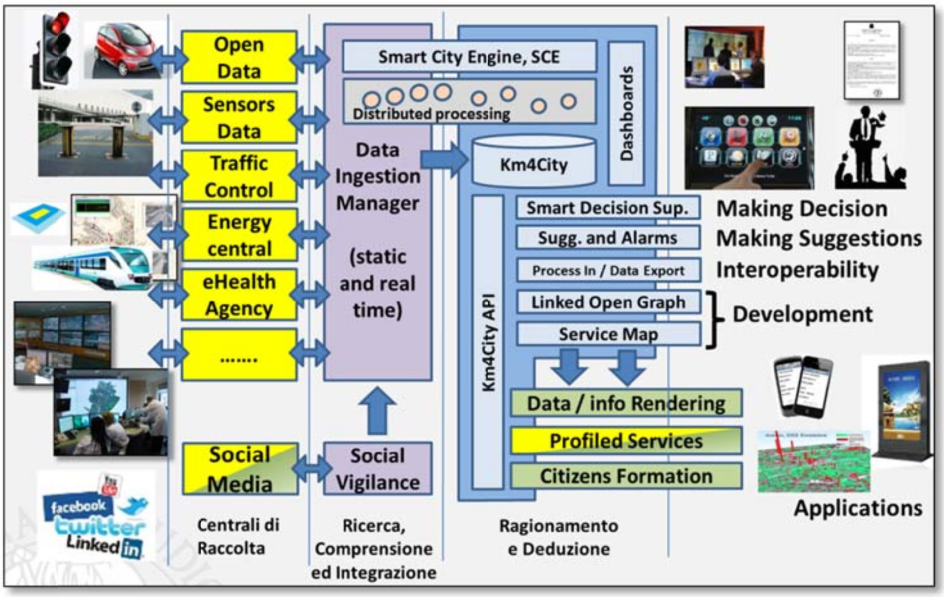
5.1.3 Delete 13

5.1.4 Concatenate Tasks 13

Data Ingestion Manager: User Manual

1 Overview

Data Ingestion Manager allows the creation of Open Data records, setup and management of the ingestion process. The ingestion process starts by collecting raw Open Data and ends with the generation of RDF Triples according to the domain ontology model adopted. The creation of Open Data record and properties allows the insertion and editing of an Open Data in the repository. Open Data are described by a set of properties to be set like: Name, Category, Resource, Source, Format, Type (real-time or static) and more (see section 2.2 for a full list).



The setup and management of ingestion process allows selecting tasks to execute both in the creation step and during the life of data for update purposes. The following tasks are available and could be executed singularly or joined ("concatenate"):

- **Ingestion (I)** of the data instances performs the raw data retrieval from the source where the Open Data is stored.
- **Quality Improvement (QI)** task is focused on enriching the Open Data by adding for instance links to external Linked Open Data (LOD) or refining possible inconsistences.
- **Triples Generation (T)** performs the generation of RDF Triples by mapping static, dynamic data on the basis of the domain ontology model.
- **Validation (V)** of the Open Data detects possible inconsistencies, incompleteness, correctness of relationships, etc…
- **Reconciliation (R)** task tries to solve the lack of coherence among indexed entities referring to the same concept but coming from different data sets.

2 Getting started

2.1 Application setup

The Open Data Manager Application has to be configured to work with a Database (MySQL) where Open Data description and Scheduled Tasks are stored and the Task Scheduler and Manager Application (*Smart*

Cloud Engine). The configuration properties are accessible in the "Preferences" tab panel (Section 3.2.3). Settings are:

MySQL Settings

Parameter	**Description**
Data Source Database User Name	The MySQL user entitled to access to the database.
Data Source Database Password	The MySQL user password.
Data Source Database URL	The MySQL location URL.
Data Source Database Name #1	The database schema name where Open Data are stored.
Task Scheduler Database Name #2	The database schema name where Scheduled Tasks are stored.

Scheduler Settings

Parameter	**Description**
Open Data Manager Scheduler URL to use	The endpoint of API interface provided by the Smart Cloud Engine.
Open Data Manager Scheduler Web Page URL	The web URL of the Smart Cloud Engine Front End.

2.2 Open Data Description

The following table reports and describes all properties associated with an Open Data. They are divided by groups: *Description (D)*, *Ingestion (I)*, *Quality Improvement (QI)*, *Triples Generation (T)*, *Validation (V)*, *Reconciliation (R)*, and *General (G)*. For each property the description and type-value are provided.

Group	**Parameter**	**Description**	**Type & Value**
Description	Name (*)	Name of data set	Alphanumeric String
	Resource (*)	Data descriptor	Alphanumeric String
	Resource class (*)	Classification of data	Alphanumeric String
	Category (*)	Data category	Alphanumeric String
	Source (*)	Information on the source of the data, i.e. from where the data was obtained.	Alphanumeric String
	Format (*)	Format of data source	Selection with the following option: • csv • json • kmz • shp • xml • pdf • rdf • sparql • kml • grid esri
	Automaticity (*)	Set data processing	Selection with the

		mode: manually or automatically	following option: *yes* or *no*.
	Process type (*)	Set the process mode adopted i.e. by using ETL process	Selection with the following option: ETL or Other
	Access (*)	Channel/Protocol to use for getting data	Selection with the following option: • HTTP • WebService • Script • Manual Request • Access • Other
	Real time (*)	Set the nature of data: real-time or static	Selection with the following option: *yes* or *no*.
Ingestion	Ing path (*)	Path where is located the ETL job related to Ingestion phase.	Alphanumeric String
	Ing status	Status of last Ingestion execution.	Alphanumeric String
	Ing time	Time processing of last ingestion running	Alphanumeric String
	Last update	Date of last Ingestion execution.	Alphanumeric String
	Ing Error	Ingestion Error description	Alphanumeric String
Quality Improvement	QI path	Path where is located the ETL job related to QI phase.	Alphanumeric String
	QI status	Status of execution.	Alphanumeric String
	QI time	Time processing of last run	Alphanumeric String
	QI error	Error description	Alphanumeric String
Triples Generation	T path (*)	Path where is located the ETL job related to Triple Generation phase.	Alphanumeric String
	T status	Status of execution.	Alphanumeric String
	T time	Time processing of last run	Alphanumeric String
	Last triples date	Production Date of last triples	Date
	T error	Error description	Alphanumeric String
Validation	V path	Path where is located the ETL job related to Validation phase.	Alphanumeric String
	V status	Status of execution.	Alphanumeric String
	V time	Time processing of last run	Alphanumeric String
	Triples Count	Number of triples to be	Alphanumeric String

		uploaded into RDF repository.	
	V error	Error description	Alphanumeric String
Reconciliation	R path	Path where is located the ETL job related to Reconciliation phase.	Alphanumeric String
	R status	Status of execution.	Alphanumeric String
	R time	Time processing of last run	Alphanumeric String
	Triples count rep	Number of triples to uploaded into RDF repository.	Alphanumeric String
	R error	Error description	Alphanumeric String
General	Period (*)	Repeat time of process execution (in ms).	Positive Number. (Default value 0 for static data)
	Overtime (*)	Waiting time before stopping process execution (in ms).	Positive Number (Default value 0)
	Param (*)	Optional parameters for ETL job.	Alphanumeric String (Default value “”)
	Description	Textual description of the data	Alphanumeric String

2.3 Tasks description

Ingestion, *Quality Improvement*, *Triples Generation*, *Validation*, *Reconciliation* and *General* data are used to set up related tasks to be run in the scheduler. The minimal set of data for a task is the path where is located the ETL job to execute. The path is the command line to run the process In case of ingestion process we can have for example the following path definition:

```
/usr/lib/jvm/java-7-oracle/bin/java -Xmx512m -classpath :/home/ubuntu/programs/data-integration/lib/*
-DDI_HOME=/home/ubuntu/programs/data-integration/ org.pentaho.di.kitchen.Kitchen -
file=/media/Trasformazioni/TrasformazioneAVM_new/JobAVM.kjb -level=Nothing -param:line=17 -
param:processName=avm_linea17
```

For periodical processing (i.e. real time Open Data), the value of *Period* has to be provided and it has to be expressed in milliseconds.

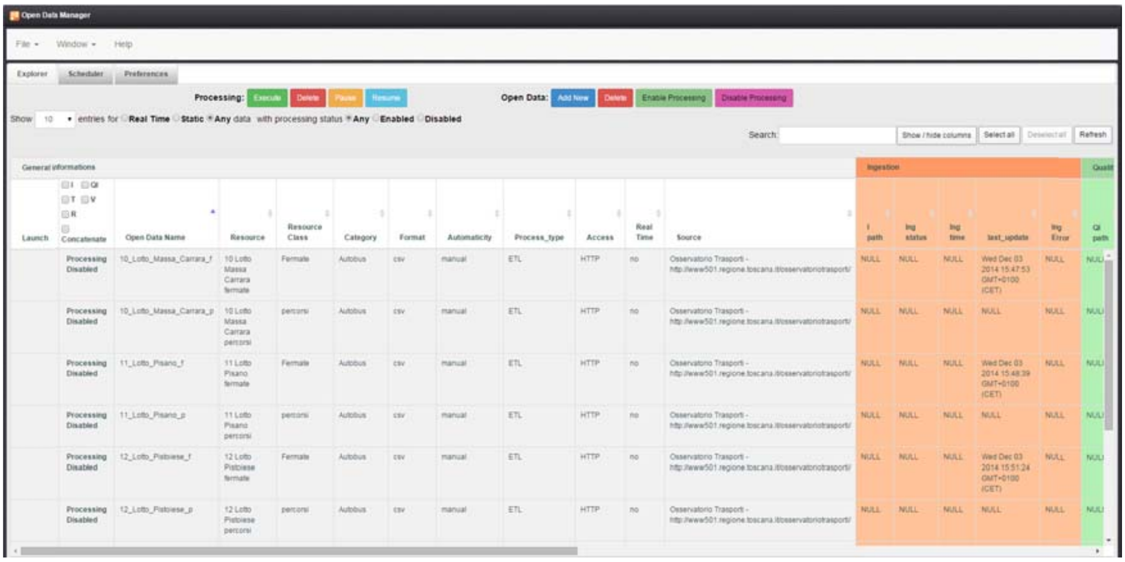
Param is required for the task as extra parameters.

Overtime is the time the scheduler has to wait before stopping the process.

Note: Since *Ingestion* and *Triples Generations* are the minimal chain for Open Data processing, their definition is mandatory. By default, tasks of all new Open Data are not scheduled and the Open Data are disabled for processing. This allows verifying the data before starting. After that Open Data has been enabled for processing and all tasks can be put in execution in the scheduler (see Section 5.).

3 Application Layout

The application provides a menu bar and tab panels as depicted in Figure 1.



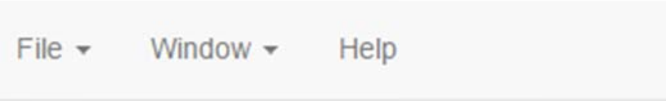
Show 10 ▾ entries for ○ **Real Time** ○ **Static** ● **Any** data with processing status ● **Any** ○ **Enabled** ○ **Disabled**

General informations												Ingestion					Qualit
Launch	☐ I ☐ QI ☐ T ☐ V ☐ R ☐ Concatenate	Open Data Name	Resource	Resource Class	Category	Format	Automaticity	Process_type	Access	Real Time	Source	I path	Ing status	Ing time	last_update	Ing Error	QI path
	Processing Disabled	10_Lotto_Massa_Carrara_f	10 Lotto Massa Carrara fermate	Fermate	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	Wed Dec 03 2014 15:47:53 GMT+0100 (CET)	NULL	NUL
	Processing Disabled	10_Lotto_Massa_Carrara_p	10 Lotto Massa Carrara percorsi	percorsi	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	NULL	NULL	NUL
	Processing Disabled	11_Lotto_Pisano_f	11 Lotto Pisano fermate	Fermate	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	Wed Dec 03 2014 15:48:39 GMT+0100 (CET)	NULL	NUL
	Processing Disabled	11_Lotto_Pisano_p	11 Lotto Pisano percorsi	percorsi	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	NULL	NULL	NUL
	Processing Disabled	12_Lotto_Pistoiese_f	12 Lotto Pistoiese fermate	Fermate	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	Wed Dec 03 2014 15:51:24 GMT+0100 (CET)	NULL	NUL
	Processing Disabled	12_Lotto_Pistoiese_p	12 Lotto Pistoiese percorsi	percorsi	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	NULL	NULL	NUL

Figure 1 - Application Layout

3.1 Menu Bar

The application provides a drop-down menu in the Menu Bar:



The menu is structured as follows:

- **File**
  - **New** – Create a new Open Data
  - **Close** – Close current activity
- **Window**
  - **Explorer** – Switch to the corresponding panel for managing Open Data
  - **Scheduler** – Switch to the corresponding panel to access at the Open Data Process Scheduler View
  - **Preferences** – Switch to the corresponding panel for editing the setup & configuration parameters
- **Help** – Open the Help

3.2 Tab Panels

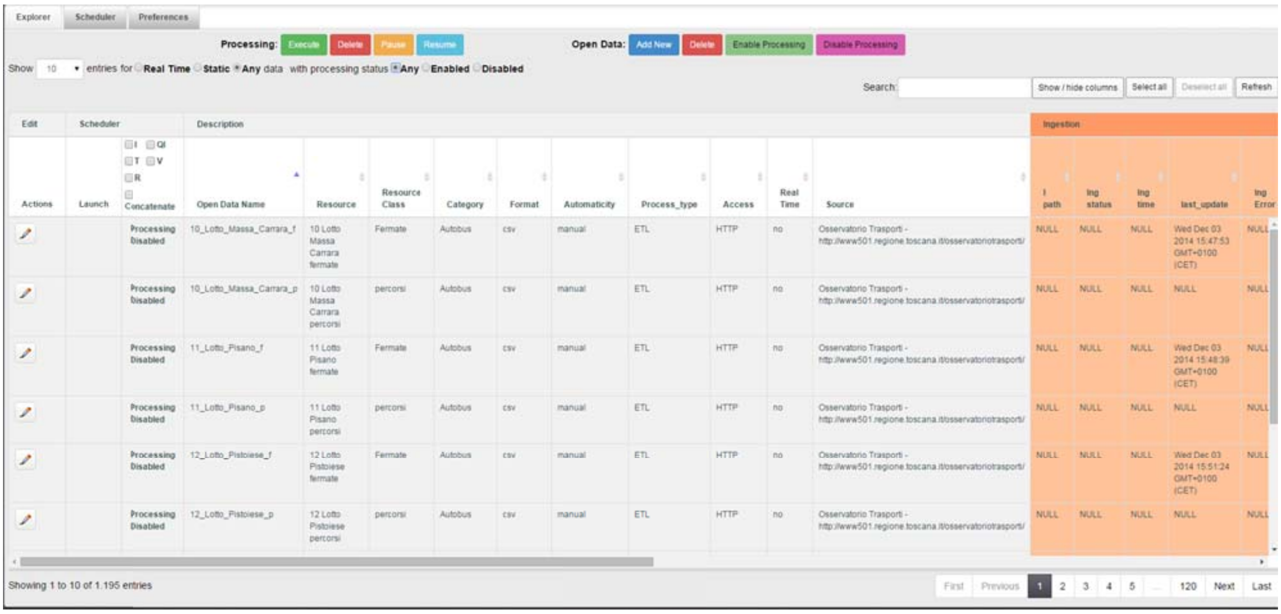
They provide the view panels for:

3.2.1 Explorer

This is the view on the database of Open Data. It provides a table data view with pagination system, a command bar, search and help tools.

Table data view

Data are listed in a table data view. Columns are sortable and grouped according to the section 2.2. Two additional set of columns are added on the left. Such columns are: *Edit* and *Scheduler*. The former provides actions for the corresponding Open Data (i.e. Edit) whereas the latter allows defining and controlling tasks allocated in the scheduler.



Show 10 ▾ entries for ○ Real Time ○ Static ● Any data with processing status ● Any ○ Enabled ○ Disabled

Search: Show / hide columns Select all Deselect all Refresh

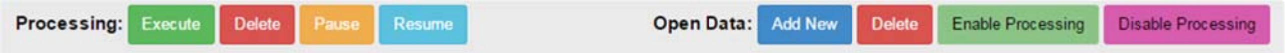
Edit	Scheduler		Description										Ingestion				
Actions	Launch	□I □QI □T □V □R □ Concatenate	Open Data Name	Resource	Resource Class	Category	Format	Automaticity	Process_type	Access	Real Time	Source	I path	Ing status	Ing time	last_update	Ing Error
✎		Processing Disabled	10_Lotto_Massa_Carrara_f	10 Lotto Massa Carrara fermate	Fermate	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	Wed Dec 03 2014 15:47:53 GMT+0100 (CET)	NULL
✎		Processing Disabled	10_Lotto_Massa_Carrara_p	10 Lotto Massa Carrara percorsi	percorsi	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	NULL	NULL
✎		Processing Disabled	11_Lotto_Pisano_f	11 Lotto Pisano fermate	Fermate	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	Wed Dec 03 2014 15:48:39 GMT+0100 (CET)	NULL
✎		Processing Disabled	11_Lotto_Pisano_p	11 Lotto Pisano percorsi	percorsi	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	NULL	NULL
✎		Processing Disabled	12_Lotto_Pistoiese_f	12 Lotto Pistoiese fermate	Fermate	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	Wed Dec 03 2014 15:51:24 GMT+0100 (CET)	NULL
✎		Processing Disabled	12_Lotto_Pistoiese_p	12 Lotto Pistoiese percorsi	percorsi	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	NULL	NULL

Showing 1 to 10 of 1.195 entries

First Previous 1 2 3 4 5 ... 120 Next Last

Command Bar

It provides a set of commands for **Processing** control and **Open Data** management.



The first allows interacting with the Task Scheduler Application and are executed on a selection of tasks associated with Open Data.

- *Execute* – it allows running tasks associated with Open Data
- *Delete* - it allows deleting tasks associated with Open Data
- *Pause* - it allows pausing tasks associated with Open Data
- *Resume* - it allows resuming tasks associated with Open Data

Commands can be invoked if a selection of Tasks is available otherwise the following message is popped up: "*No data selected! Select data and activities before execute*"

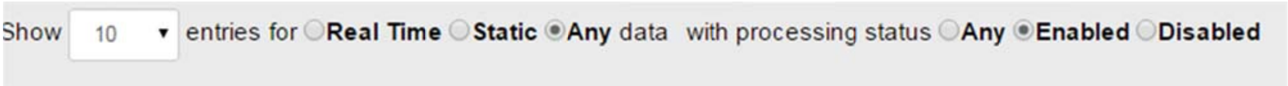
The second set provides commands to interact with Open Data:

- *Add New* - A shortcut to add a new Open Data
- *Delete* - Delete a selection of Open Data.
- *Enable Processing* – Enable a selection of Open Data to include them in processing activities.
- *Disable Processing* – Disable a selection of Open Data to exclude them from processing.

Search and Help Tools

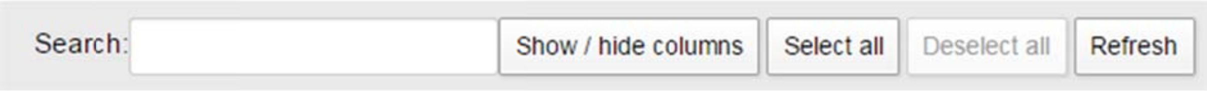
It provides some facilities to refine search and browsing data in the table view.

- Show – Set the number of results per page
- Filtering data – It is possible to filter Open Data by:
    - Type: *Real time*, *Static* or *Any*.
    - Processing status: *Enabled*, *Disabled* or *Any*.



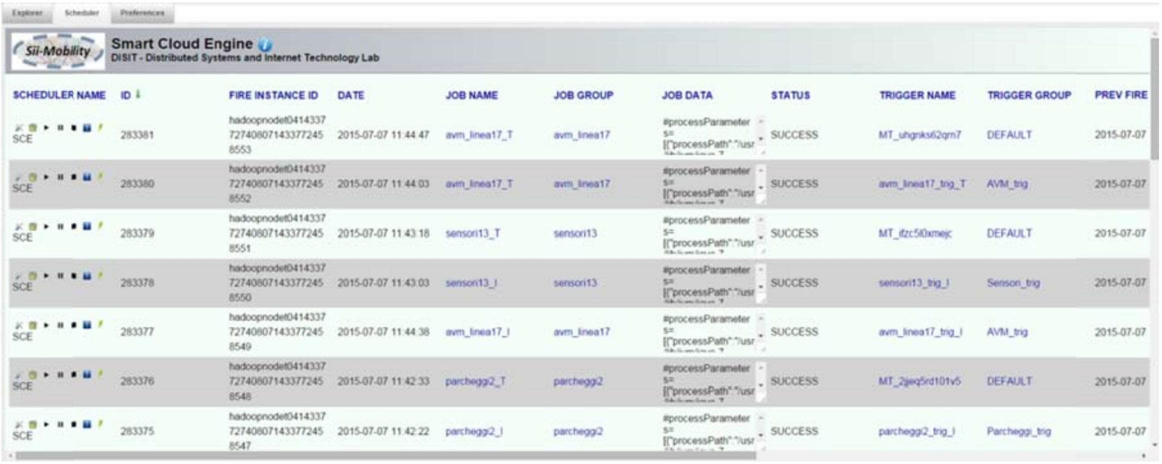
Show 10 ▾ entries for ○ **Real Time** ○ **Static** ● **Any** data with processing status ○ **Any** ● **Enabled** ○ **Disabled**

- Search – Search input allows a textual searching.
- Select / Deselect All – It allows multiple selections of Open Data on the current page of results.
- Manual Selection – Clicking an Open Data row allows selecting or deselecting it.
- Refresh – It allows refreshing the current page of results
- Show / Hide columns – It allows hiding (showing) the following groups of column: *Ingestion*, *Quality Improvement*, *Triples Generation*, *Validation and Reconciliation*.



3.2.2 Scheduler

This view embeds the Scheduler Front End and allows browsing and monitoring the current status of tasks.



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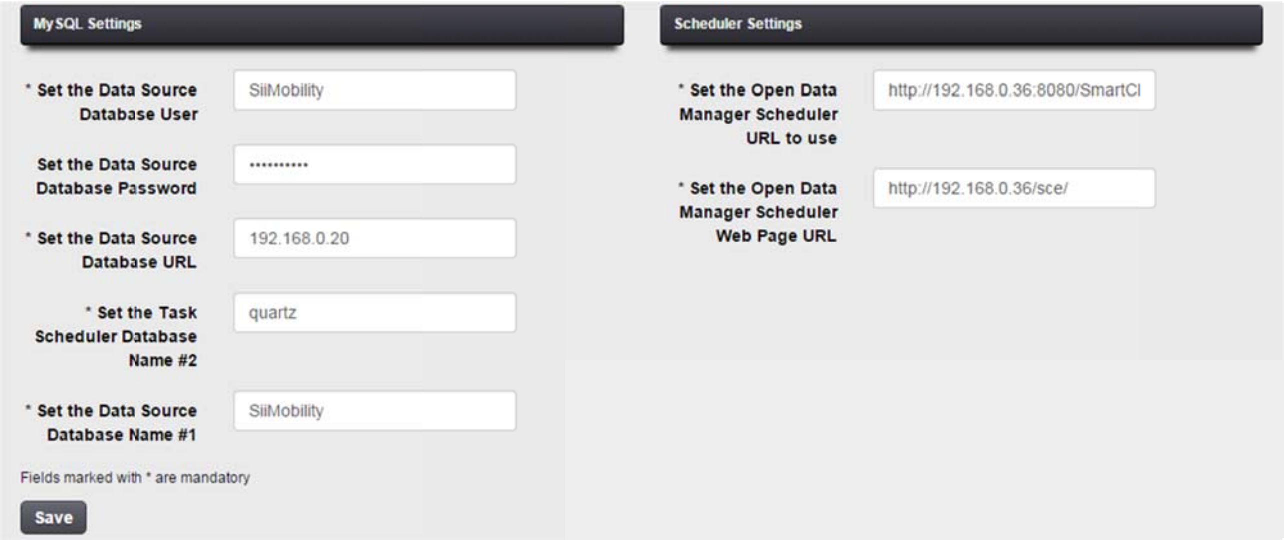
SCHEDULER NAME	ID	FIRE INSTANCE ID	DATE	JOB NAME	JOB GROUP	JOB DATA	STATUS	TRIGGER NAME	TRIGGER GROUP	PREV FIRE
SCE	283381	hadoopnodet0414337727408071433772458553	2015-07-07 11:44:47	avm_linea17_T	avm_linea17	#processParameters= [{"processPath":"/usr	SUCCESS	MT_uhgnks62qm7	DEFAULT	2015-07-07
SCE	283380	hadoopnodet0414337727408071433772458552	2015-07-07 11:44:03	avm_linea17_T	avm_linea17	#processParameters= [{"processPath":"/usr	SUCCESS	avm_linea17_trig_T	AVM_trig	2015-07-07
SCE	283379	hadoopnodet0414337727408071433772458551	2015-07-07 11:43:18	sensori13_T	sensori13	#processParameters= [{"processPath":"/usr	SUCCESS	MT_ifzc5l0xmejc	DEFAULT	2015-07-07
SCE	283378	hadoopnodet0414337727408071433772458550	2015-07-07 11:43:03	sensori13_I	sensori13	#processParameters= [{"processPath":"/usr	SUCCESS	sensori13_trig_I	Sensori_trig	2015-07-07
SCE	283377	hadoopnodet0414337727408071433772458549	2015-07-07 11:44:38	avm_linea17_I	avm_linea17	#processParameters= [{"processPath":"/usr	SUCCESS	avm_linea17_trig_I	AVM_trig	2015-07-07
SCE	283376	hadoopnodet0414337727408071433772458548	2015-07-07 11:42:33	parcheggi2_T	parcheggi2	#processParameters= [{"processPath":"/usr	SUCCESS	MT_2jjeq5rd101v5	DEFAULT	2015-07-07
SCE	283375	hadoopnodet0414337727408071433772458547	2015-07-07 11:42:22	parcheggi2_I	parcheggi2	#processParameters= [{"processPath":"/usr	SUCCESS	parcheggi2_trig_I	Parcheggi_trig	2015-07-07

Figure 2 - Smart Cloud Engine

Please refers to the guide available at the link http://www.disit.org/drupal/?q=en-US/home&axoid=urn%3Aaxmedis%3A00000%3Aobj%3A0a4cdfa0-135a-4b5d-837b-5cf1b3507089

3.2.3 Properties

This view provides the form for configuring the application. The following form asks for settings as described in section 2.1



MySQL Settings

* Set the Data Source Database User	SiiMobility
Set the Data Source Database Password	••••••••••
* Set the Data Source Database URL	192.168.0.20
* Set the Task Scheduler Database Name #2	quartz
* Set the Data Source Database Name #1	SiiMobility

Fields marked with * are mandatory

Save

Scheduler Settings

* Set the Open Data Manager Scheduler URL to use	http://192.168.0.36:8080/SmartCl
* Set the Open Data Manager Scheduler Web Page URL	http://192.168.0.36/sce/

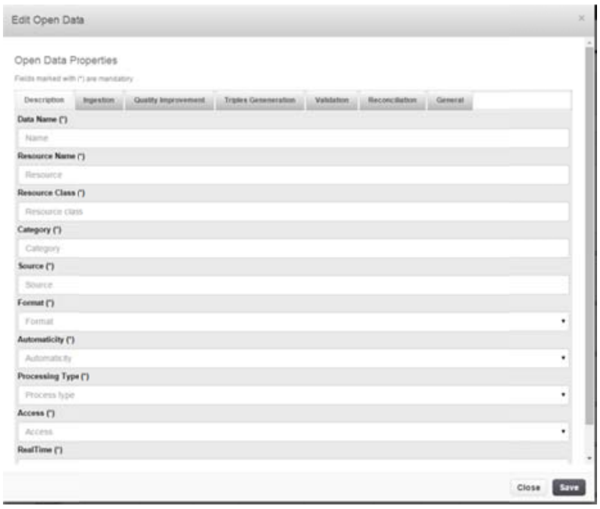
Figure 3 - Configuration Settings

4 Edit an Open Data

In this section is described how to insert a new Open Data or update an existing one.

4.1 Create a new Open Data

To add a new Open Data click **File->New** in the menu bar or "**Add New**" in the Explorer Panel. The form depicted in Figure 4 is displayed. The Open Data Properties are divided by groups (tabs) as described in section 2.2. Mandatory fields are marked with (*).



Edit Open Data

Open Data Properties

Fields marked with (*) are mandatory

Data Name (*)
Name

Resource Name (*)
Resource

Resource Class (*)
Resource class

Category (*)
Category

Source (*)
Source

Format (*)
Format

Automaticity (*)
Automaticity

Processing Type (*)
Process type

Access (*)
Access

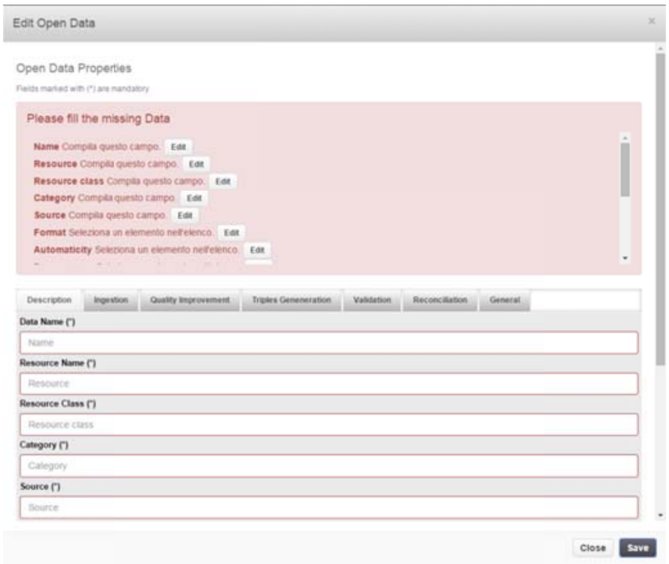
RealTime (*)

Figure 4 - Open Data Edit Dialog

Click *Save* to send data or *Close* to abort the editing.

4.2 Data validation

Before sending data, the form is validated against required data. In event of missing data, a list is displayed with a button "*Edit*"; by clicking on the button the form displays the tab containing the missing field highlighted in red.



Edit Open Data

Open Data Properties

Fields marked with (*) are mandatory

Please fill the missing Data

Name Compila questo campo.
Resource Compila questo campo.
Resource class Compila questo campo.
Category Compila questo campo.
Source Compila questo campo.
Format Seleziona un elemento nell'elenco.
Automaticity Seleziona un elemento nell'elenco.

Data Name (*)
Name

Resource Name (*)
Resource

Resource Class (*)
Resource class

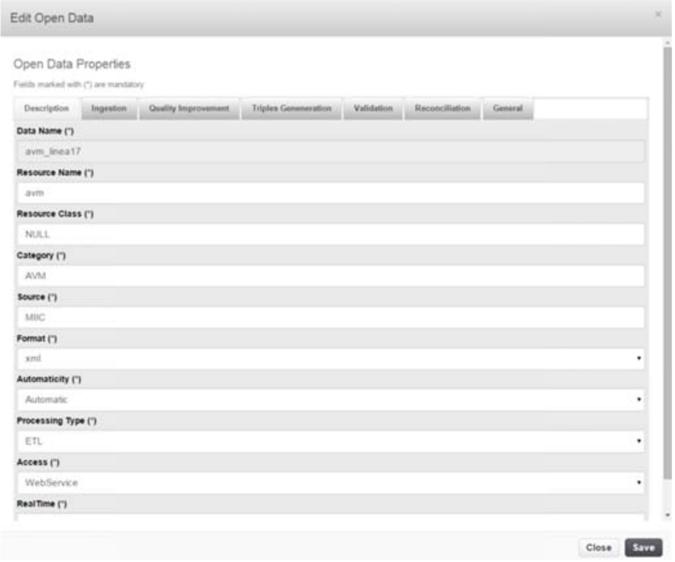
Category (*)
Category

Source (*)
Source

Figure 5 - Open Data Edit Dialog after validation

4.3 Update Metadata of Open Data

Click on the button ✏ in *Actions* column to update an Open Data. The form described in section 4.1 will be displayed. In this case, the Open Data *Name* attribute is disabled and cannot be modified.



Edit Open Data

Open Data Properties

Fields marked with (*) are mandatory

Data Name (*): avm_linea17

Resource Name (*): avm

Resource Class (*): NULL

Category (*): AVM

Source (*): MIIC

Format (*): xml

Automaticity (*): Automatic

Processing Type (*): ETL

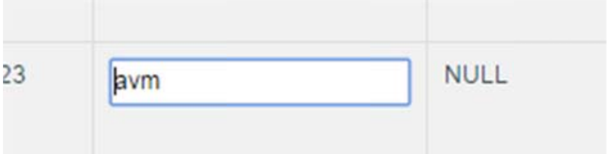
Access (*): WebService

RealTime (*):

Click *Save* to send data or *Close* to abort the editing.

4.3.1 Inline Editing

Double click on a data cell allows editing the value inline: a text control is displayed to edit the value. Click *Enter* key on keyboard to end and send changes. Press *ESC* key to abort.

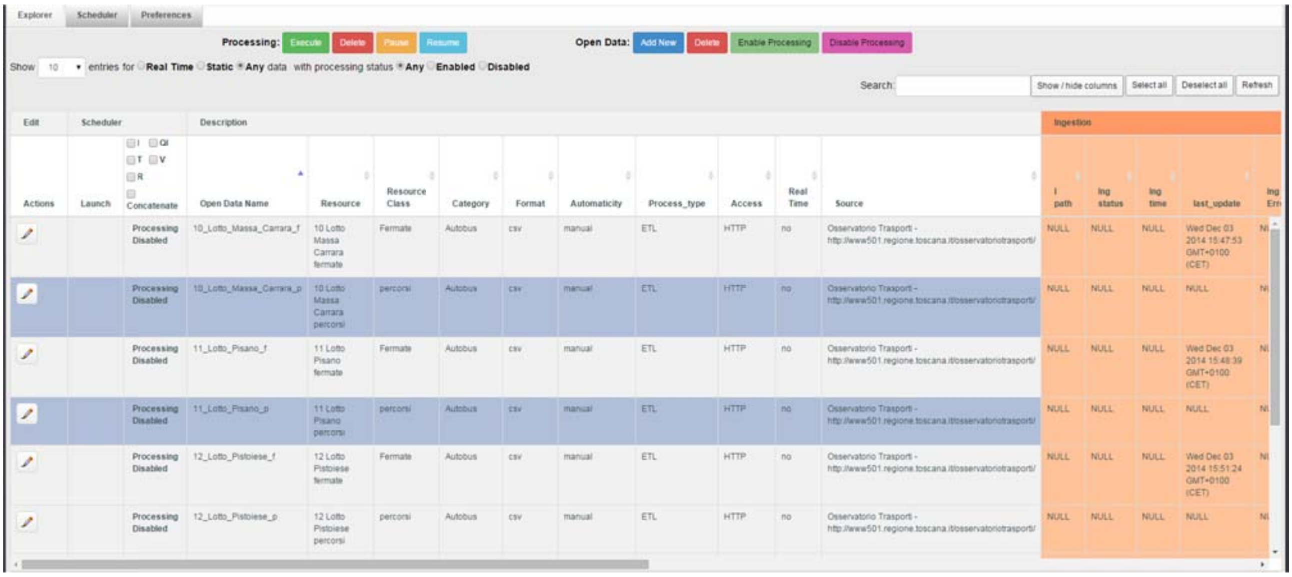


23	avm	NULL

Figure 6 - Inline Editing

4.4 Selecting Open Data

Click on the row to select the Open Data row in the table. To select all or deselect Open Data click on the button of **Search and Help Tools.** Selected rows will be highlighted as depicted in Figure 7.



Explorer
Scheduler
Preferences
Processing: Execute Delete Pause Resume
Open Data: Add New Delete Enable Processing Disable Processing

Show 10 entries for ○ Real Time ○ Static ● Any data with processing status ● Any ○ Enabled ○ Disabled

Search:

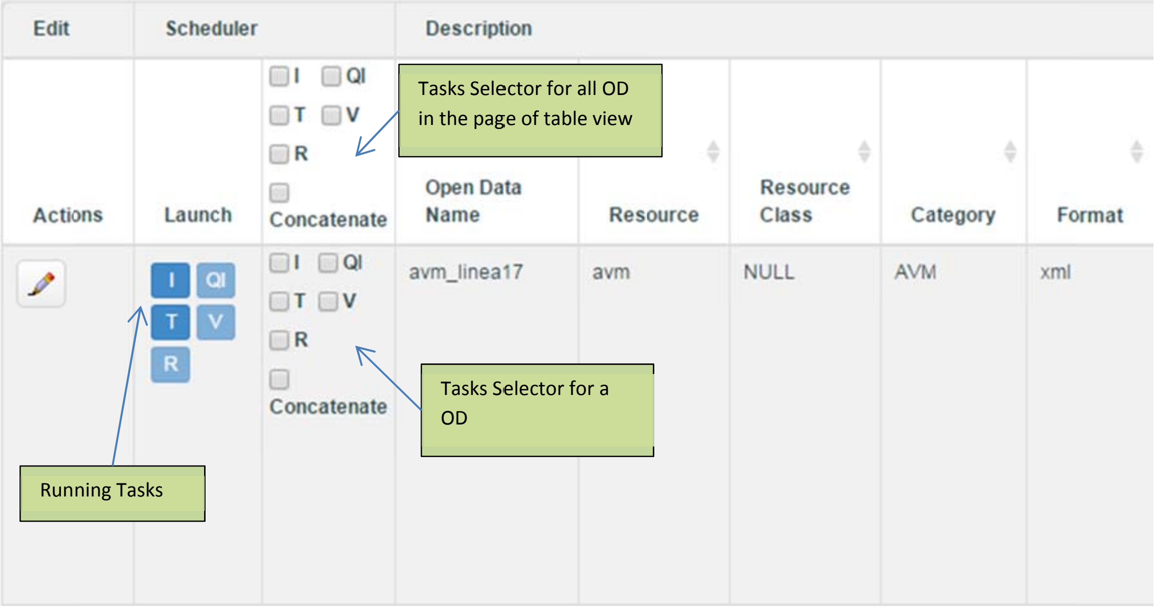
Show / hide columns
Select all
Deselect all
Refresh

Edit	Scheduler		Description										Ingestion				
Actions	Launch	□ I □ QI □ T □ V □ R □ Concatenate	Open Data Name	Resource	Resource Class	Category	Format	Automaticity	Process_type	Access	Real Time	Source	I path	Ing status	Ing time	last_update	Ing Err
✎		Processing Disabled	10_Lotto_Massa_Carrara_f	10 Lotto Massa Carrara fermate	Fermate	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	Wed Dec 03 2014 15:47:53 GMT+0100 (CET)	N
✎		Processing Disabled	10_Lotto_Massa_Carrara_p	10 Lotto Massa Carrara percorsi	percorsi	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	NULL	N
✎		Processing Disabled	11_Lotto_Pisano_f	11 Lotto Pisano fermate	Fermate	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	Wed Dec 03 2014 15:48:39 GMT+0100 (CET)	N
✎		Processing Disabled	11_Lotto_Pisano_p	11 Lotto Pisano percorsi	percorsi	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	NULL	N
✎		Processing Disabled	12_Lotto_Pistoiese_f	12 Lotto Pistoiese fermate	Fermate	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	Wed Dec 03 2014 15:51:24 GMT+0100 (CET)	N
✎		Processing Disabled	12_Lotto_Pistoiese_p	12 Lotto Pistoiese percorsi	percorsi	Autobus	csv	manual	ETL	HTTP	no	Osservatorio Trasporti - http://www501.regione.toscana.it/osservatoriotrasporti/	NULL	NULL	NULL	NULL	N

Figure 7 - Selection of rows

5 Working with tasks

All Open Data disabled for processing are marked as *Processing Disabled*. For all Open Data enabled for processing the Scheduler Column provides: the launch status of tasks (for I, QI etc…) in the sub-column Launch and a Tasks Selector panel (checkboxes) for choosing tasks to be controlled. Running tasks are highlighted and information about their activities is reported in the corresponding columns (sections) of the row in the table.



Edit	Scheduler		Description				
Actions	Launch	□ I □ QI □ T □ V □ R □ Concatenate	Open Data Name	Resource	Resource Class	Category	Format
✎	I QI T V R	□ I □ QI □ T □ V □ R □ Concatenate	avm_linea17	avm	NULL	AVM	xml

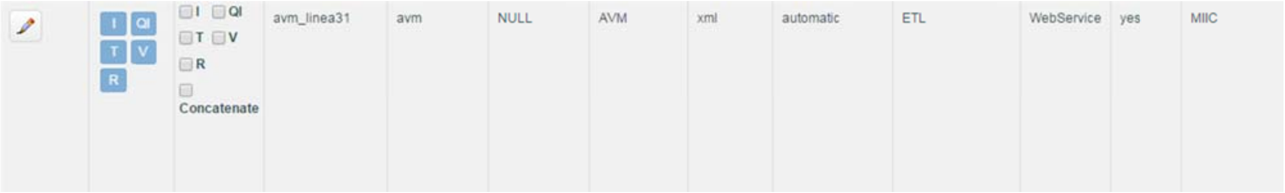
Tasks Selector for all OD in the page of table view

Tasks Selector for a OD

Running Tasks

5.1 Controlling tasks

Tasks can be controlled for Open Data enabled and ready for processing. The following commands are available.



✎	I QI T V R	□ I □ QI □ T □ V □ R □ Concatenate	avm_linea31	avm	NULL	AVM	xml	automatic	ETL	WebService	yes	MIIC

5.1.1 Activate/Executing

One or more tasks can be activated by clicking on the corresponding checkbox of Tasks Selector. To send to the scheduler (SCE) the execution command about the choice done it is necessary to click on the Execute command in the **Processing** command bar.

To execute tasks for a selection of Open Data, click on checkboxes in Scheduler header to apply the choice to all Open Data and then click on the Execute command in the **Processing** command bar.

5.1.2 Pause/Resume

If one or more tasks have to be paused/resumed, click on the corresponding checkbox of Tasks Selector. To send to the scheduler (SCE) the pause/resume command about the choice done it is necessary to click on the Pause/Resume command in the **Processing** command bar.

To pause/resume tasks for a selection of Open Data, click on checkboxes in Scheduler header to apply the choice to all Open Data and then click on the Pause/Resume command in the **Processing** command bar.

5.1.3 Delete

If one or more tasks have to be deleted, click on the corresponding checkbox of Tasks Selector. To send to the scheduler (SCE) the delete command about the choice done click on the Delete command in the **Processing** command bar.

To delete tasks for a selection of Open Data, click on checkboxes in Scheduler header to apply the choice to all Open Data and then click on the Delete command in the **Processing** command bar.

5.1.4 Concatenate Tasks

Selecting the “concatenate” option, all selected tasks are joined: they are executed as an ordered sequence of tasks