DCF

Data Collection Framework

User Manual

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Contents

INTRODUCTION

The purpose of this manual is to introduce the architecture of DCF as well as steps to install DCF and test the functionalities, the manual also guides the users on how to navigate the web GUI and correctly define the input accordingly to the data formats.

Requirement:

- PC
- Docker
- DCF image
- Web browser (Edge, Firefox, etc)

For testing (optional):

- Either one of: Postman or programming IDE for performing CRUD operations
- Scripts for importing data from csv files to Mongodb for testing

DCF ARCHITECTURE

DCF role is to collect data from shopfloor through data adapter for example MQTT, OPC-UA, Fiware/orion or legacy system and data stored in legacy systems and database for example mongodb, after that the data is transmitted through Fiware/orion.

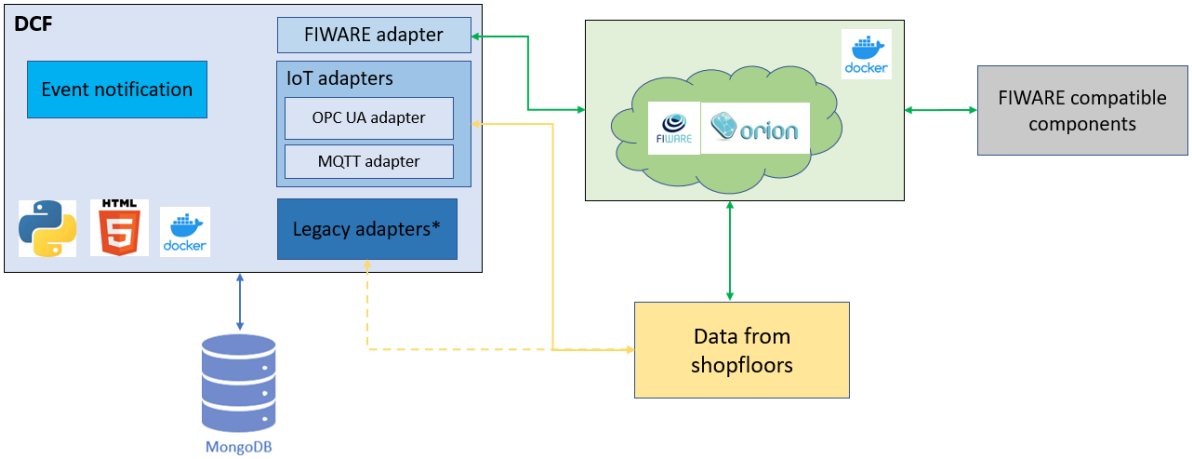


Figure 1: DCF architecture

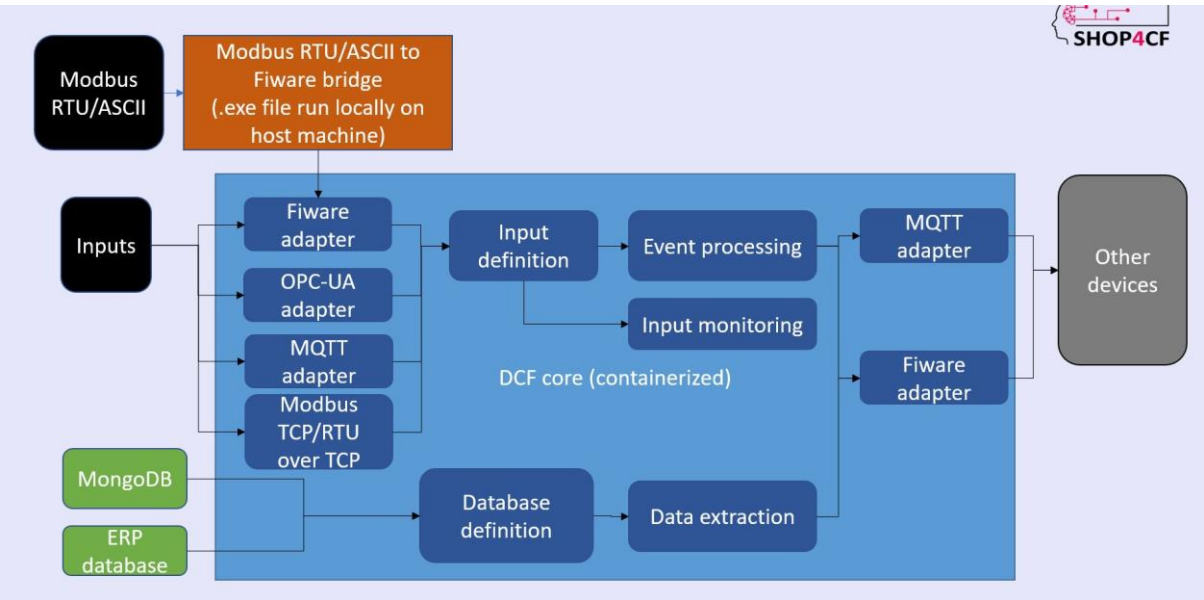


Figure 2: DCF supported communication protocols

To interact with other components, FIWARE is needed, although, DCF can be configurated to communicated by using other brokers/adapters for example OPC-UA and MQTT as well.

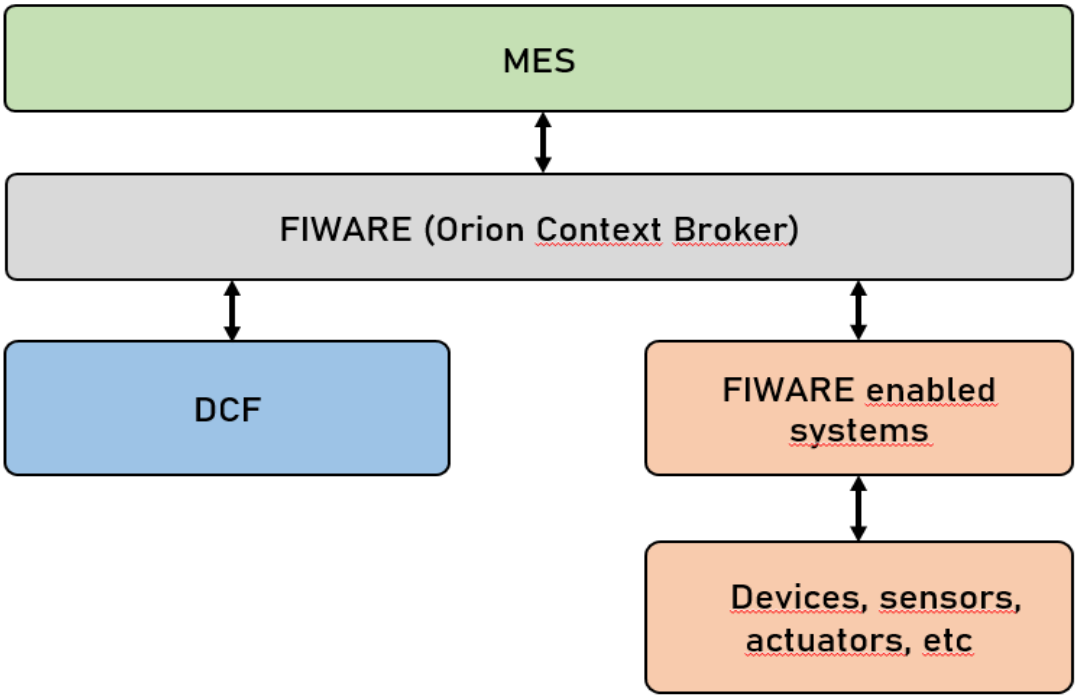


Figure 3: DCF communication with other components

DOWNLOADS ADDITIONAL FILES AND INSTALLATION

Beside DCF image, only docker-compose file is needed to compose the image into container. To get the docker-compose.yml file, download the file from https://github.com/TAU-FASTLab/DCF. Version of DCF can be changed to compose the suitable version. The latest version is 1.9.1. The sample docker-compose file can be seen below, the version of component can be changed by changing the tag number of image.

docker-compose.yml - Notepad

File Edit Format View Help

```
version: "3.9"
services:

    dcf:
        image: docker.ramp.eu/shop4cf/dcf-data-processing:1.8
        container_name: dcf
        hostname: dcf
        ports:
          - "1028:1028"
        expose:
        - "1028"
```

If users use dockerized fiware and MongoDB server or other applications, when referring to these servers for data retrieving and publishing, the host name will be “host.docker.internal” instead of “localhost”, the ports will be the same ports of these applications.

SETTING UP DOCKERIZED VERSION OF FIWARE/ORION-LD BROKER EXAMPLE

To setup Fiware/Orion-LD broker running on docker, the following docker-compose file is tested and recommended:

docker-compose.yml - Notepad

File Edit Format View Help

```
version: "3.5"
services:
  orion:
    image: fiware/orion-ld
    hostname: orion
    container_name: fiware-orion
    expose:
      - "1026"
    ports:
      - "1026:1026"
    depends_on:
      - mongo-db
    command: -dbhost mongo-db -logLevel DEBUG
    environment:
      - ORIONLD_CONN_MEMORY=1024


  mongo-db:
    image: mongo:3.6
    hostname: mongo-db
    container_name: db-mongo
    ports:
      - "27017:27017"
    networks:
      - default
    command: --nojournal
    volumes:
      - mongo-db:/data

volumes:
  mongo-db: ~
```

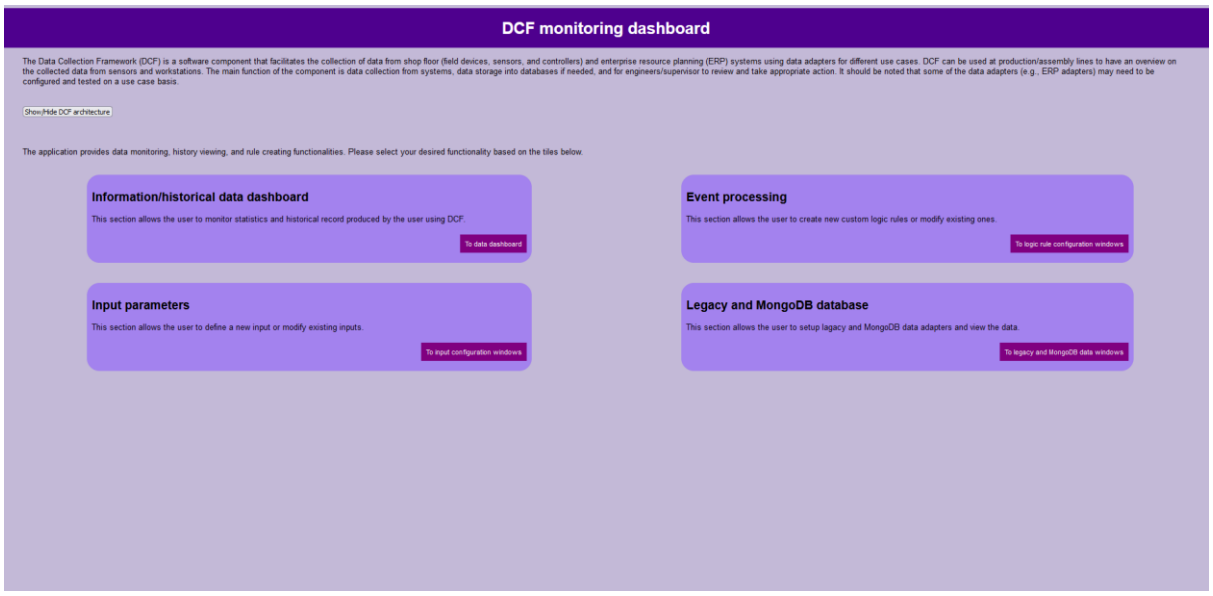
Ln 20, Col 23 | 100% | Windows (CRLF) | UTF-8

Environment parameters are entirely optional. Additional info can be found on docker hub page. https://hub.docker.com/r/fiware/orion-ld/

USER INTERFACE

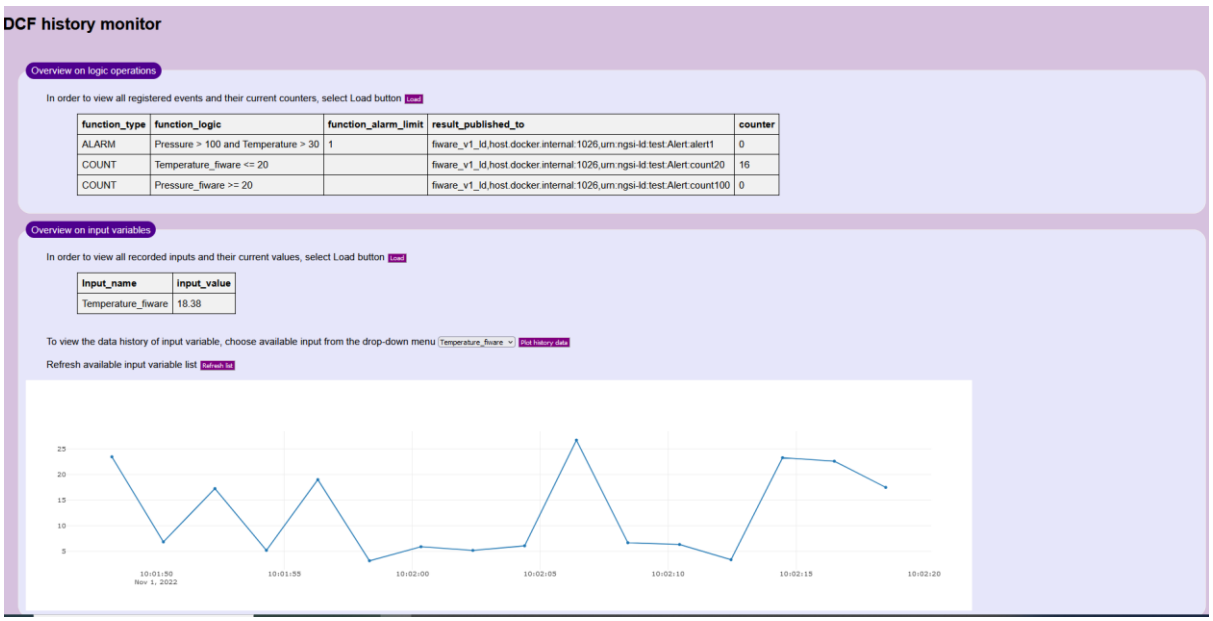
DCF also provides a GUI where users can monitor events and define new operations.

First, the dashboard is used as navigation panel to different functionalities of DCF



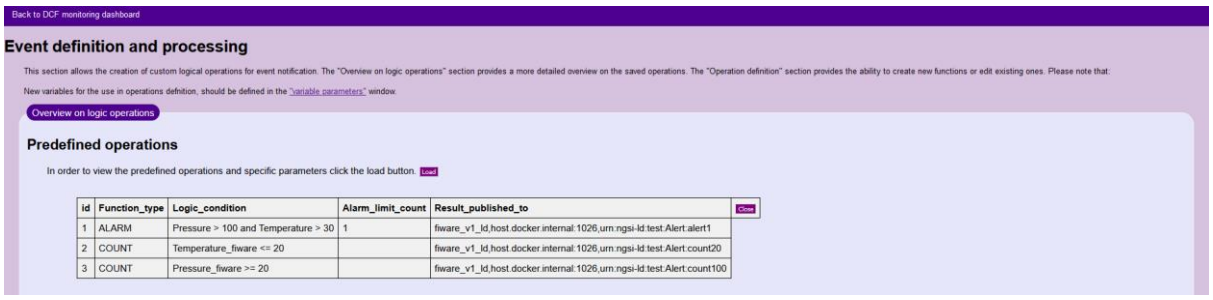
Information/historical data dashboard

This dashboard allows users to monitor output counters of defined logic operations and their parameters such as logic conditions and output publish endpoint, as well as recorded input variable data which can be turned into a graph. The UI also has experimental feature to transfer the data from OPC-UA and MQTT to Fiware v1 NGSI-LD, documentation for the function will be completed once the feature is fully developed, but for now, the feature can be seen on the UI



Event processing interface

This interface allows users to define new logic operations or modify existing operations.



id	Function_type	Logic_condition	Alarm_limit_count	Result_published_to
1	ALARM	Pressure > 100 and Temperature > 30	1	fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:alert1
2	COUNT	Temperature_fiware <= 20		fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:count20
3	COUNT	Pressure_fiware >= 20		fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:count100

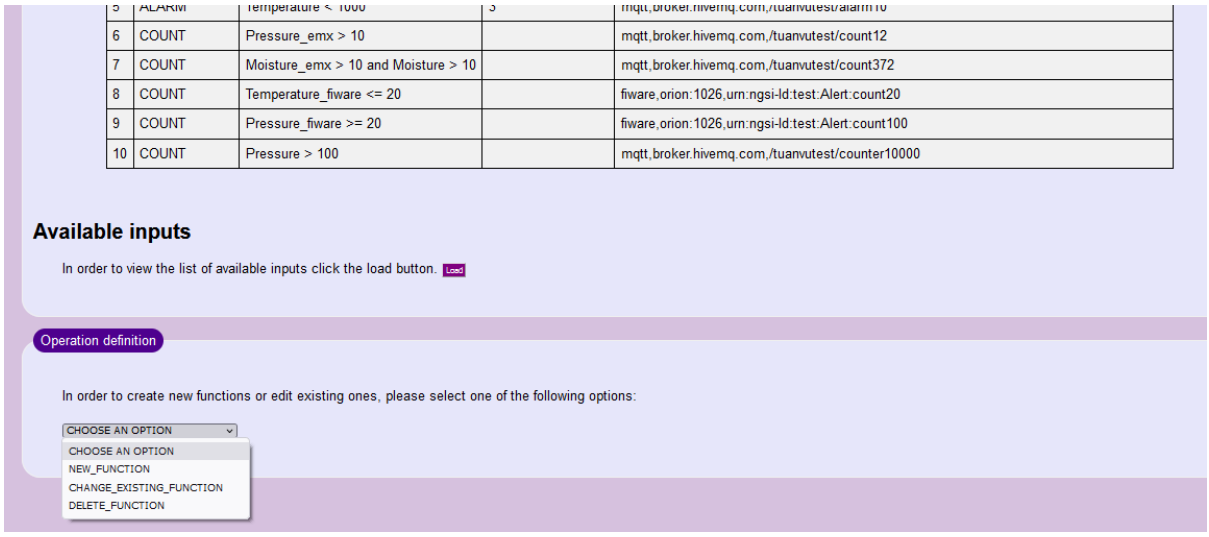
To assist users in these tasks, list of defined variables is also provided in the interface.

Available inputs

In order to view the list of available inputs click the load button. Load

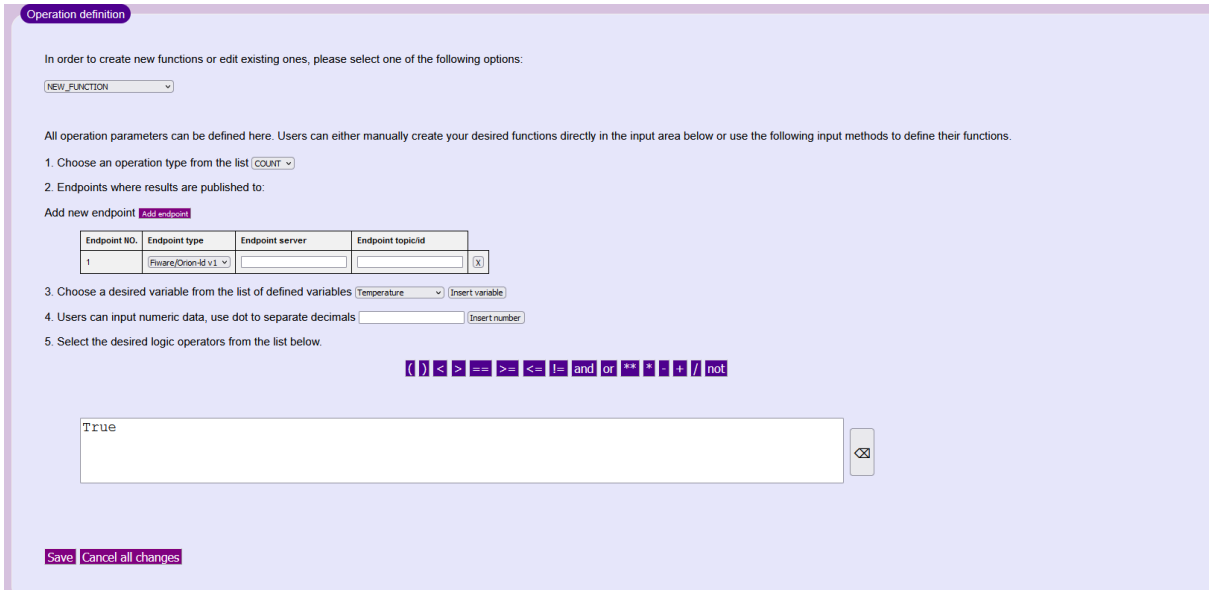
Id	Name	Topic to data cluster/ Fiware id/ Opc-ua data node	Path to variable data	Server	Close
1	Temperature	/tuanvutest/Temperature	Temperature	broker.hivemq.com	
2	Pressure	/tuanvutest/Pressure	Pressure	broker.hivemq.com	
3	Temperature_emx	/tuanvutest/Temperature	Temperature_emx	broker.emqx.io	
4	Pressure_emx	/tuanvutest/Pressure	Pressure_emx	broker.emqx.io	
5	Moisture	/tuanvutest/Moisture	Moisture	broker.hivemq.com	
6	Temperature_opc	ns=2;i=3		opc.tcp://127.0.0.1:12345	
7	Pressure_opc	ns=2;i=2		opc.tcp://127.0.0.1:12345	
8	Temperature_fiware	urn:ngsi-ld:test:Device:Temperature	value/value	host.docker.internal:1026	
9	Pressure_fiware	urn:ngsi-ld:test:Device:Pressure	value/value	host.docker.internal:1026	
10	Moisture_emx	/tuanvutest/Moisture	Moisture_emx	broker.emqx.io	
11	Moisture_opc	ns=2;i=4		opc.tcp://127.0.0.1:12345	
12	datapoint1	test_entity	value/value	host.docker.internal:1026	

To create/modify/delete operation, select the dropdown menu and select one of the functionalities



5	ALARM	Temperature < 1000	5	mqtt,broker.hivemq.com,/tuanvutest/alarm10
6	COUNT	Pressure_emx > 10		mqtt,broker.hivemq.com,/tuanvutest/count12
7	COUNT	Moisture_emx > 10 and Moisture > 10		mqtt,broker.hivemq.com,/tuanvutest/count372
8	COUNT	Temperature_fiware <= 20		fiware,orion:1026,urn:ngsi-ld:test:Alert:count20
9	COUNT	Pressure_fiware >= 20		fiware,orion:1026,urn:ngsi-ld:test:Alert:count100
10	COUNT	Pressure > 100		mqtt,broker.hivemq.com,/tuanvutest/counter10000

Creating new operation



In this section, users can choose which type of operation, ALARM type generate an output only when the counter of number of times the logic condition has been triggered exceeds or reaches the Alarm count limit parameter, while COUNT type constantly presents how many times the logic condition has been triggered.

Section 2 is used to define the endpoints where processed results are published to

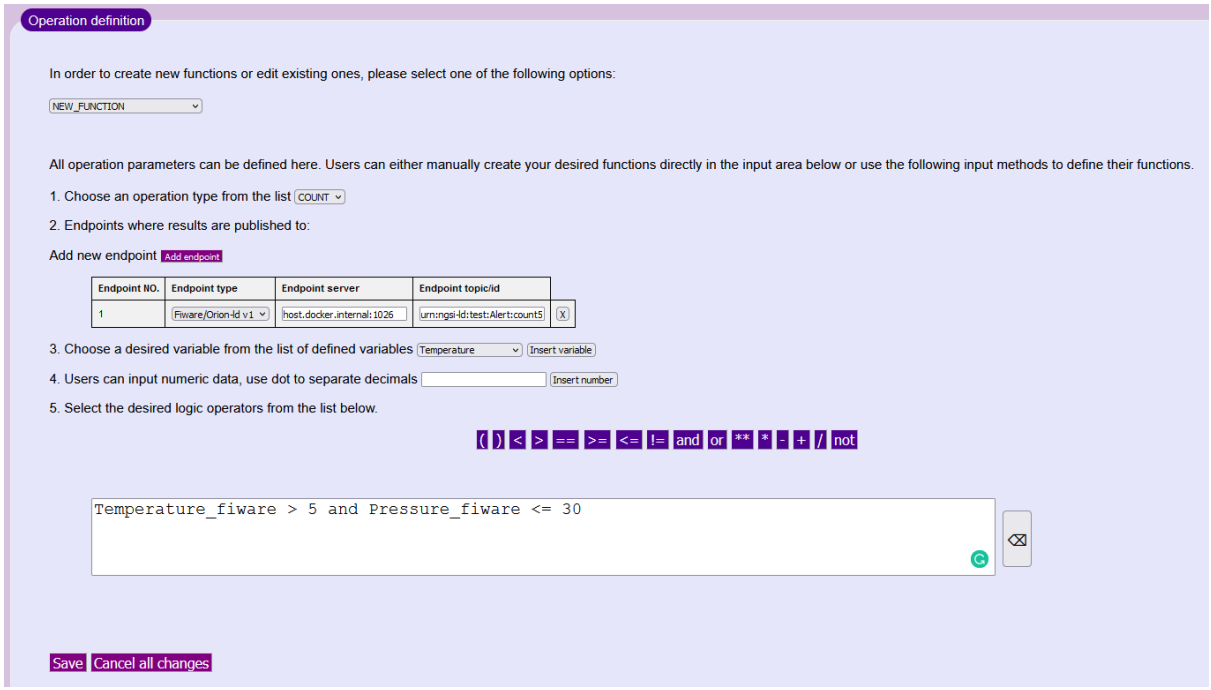
Section 5 is the place where logic arguments are created, the default condition for new operation is always “True”.

There are list of tools are created to assist users to create the logic condition, the list of defined variables dropdown menu contains all defined variables by users. After users has chosen a variable or given a numeric input (with “.” as decimal delimiter and no thousand separators), “insert variable”/ “insert number” need to be clicked respectively to insert the inputs. Users can also choose logic operators from the logic operator list. It is highly recommended to use these features to ensure

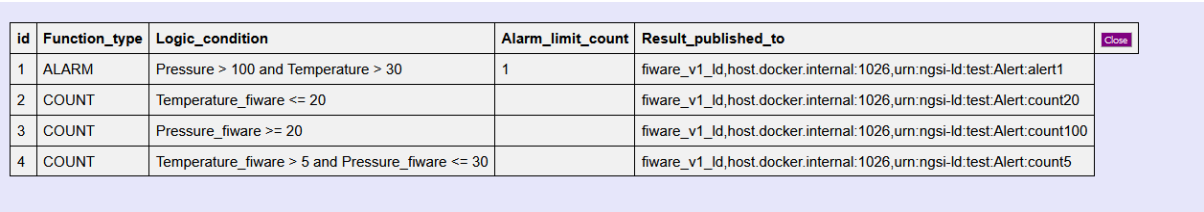
the data format is followed so the program can parse the data. To finalize, the “confirm logic change” button is also needed to be chosen.

For example, the logic condition “Temperature_fiware > 5 and Pressure_fiware <= 30” is defined.

To publish the data to MQTT or Fiware/orion-ld, users need to use section 2 to define the endpoints, topic/id is recommended to be unique, endpoint type is one of “Fiware/Orion-ld v1” or “mqtt” or “Fiware v2”. In this case, the result needs to be publish to Fiware/Orion-ld v1 with the entity id “urn:ngsi-ld:test:Alert:count5”, on my containerized fiware/orion-ld server so the server should be host.docker.internal:1026



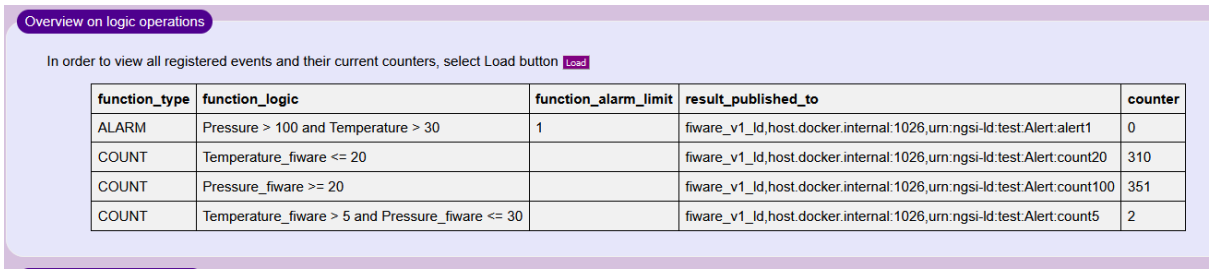
Push “Save” button to update the data.



id	Function_type	Logic_condition	Alarm_limit_count	Result_published_to
1	ALARM	Pressure > 100 and Temperature > 30	1	fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:alert1
2	COUNT	Temperature_fiware <= 20		fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:count20
3	COUNT	Pressure_fiware >= 20		fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:count100
4	COUNT	Temperature_fiware > 5 and Pressure_fiware <= 30		fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:count5

Close

To check whether the operation is operational, head to either the monitor dashboard or entity of the Alert in fiware/orion server using internet browsers or postman



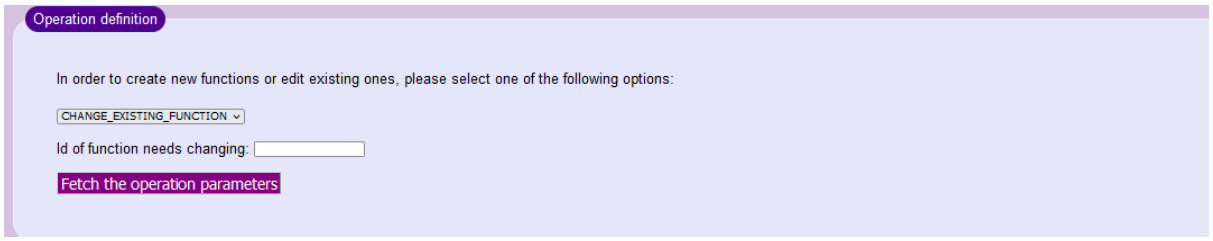
function_type	function_logic	function_alarm_limit	result_published_to	counter
ALARM	Pressure > 100 and Temperature > 30	1	fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:alert1	0
COUNT	Temperature_fiware <= 20		fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:count20	310
COUNT	Pressure_fiware >= 20		fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:count100	351
COUNT	Temperature_fiware > 5 and Pressure_fiware <= 30		fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:count5	2

```
JSON   Raw Data   Headers
Save   Copy   Collapse All   Expand All   Filter JSON
id:                                                                                  "urn:ngsi-ld:test:Alert:count5"
type:                                                                                "https://uri.fiware.org/ns/data-models#Alert"
https://smart-data-models.github.io/data-models/terms.jsonld#/definitions/category:
  type:                                                                              "Property"
  value:                                                                             "alert"
https://smart-data-models.github.io/data-models/terms.jsonld#/definitions/validTo:
  type:                                                                              "Property"
  value:
    @type:                                                                           "DateTime"
    @value:                                                                          "2022-11-01T10:18:25.67Z"
value:
  type:                                                                              "Property"
  value:                                                                             4
  observedAt:                                                                        "2022-11-01T10:18:25.670Z"
description:
  type:                                                                              "Property"
  value:
    function_type:                                                                   "COUNT"
    operation logic argument:                                                        "COUNT;Temperature_fiware > 5 and Pressure_fiware <= 30;;fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:count5"
https://smart-data-models.github.io/data-models/terms.jsonld#/definitions/dateIssued:
  type:                                                                              "Property"
  value:
    @type:                                                                           "DateTime"
    @value:                                                                          "2022-11-01T10:18:25.67Z"
https://smart-data-models.github.io/data-models/terms.jsonld#/definitions/alertSource:
  type:                                                                              "Relationship"
  object:                                                                            "urn:ngsi-ld:dcf-logic-engine"
https://smart-data-models.github.io/data-models/terms.jsonld#/definitions/validFrom:
  type:                                                                              "Property"
  value:
    @type:                                                                           "DateTime"
    @value:                                                                          "2022-11-01T10:18:25.67Z"
https://smart-data-models.github.io/data-models/terms.jsonld#/definitions/severity:
  type:                                                                              "Property"
  value:                                                                             "high"
humanVerified:
  type:                                                                              "Property"
  value:                                                                             "false"
```

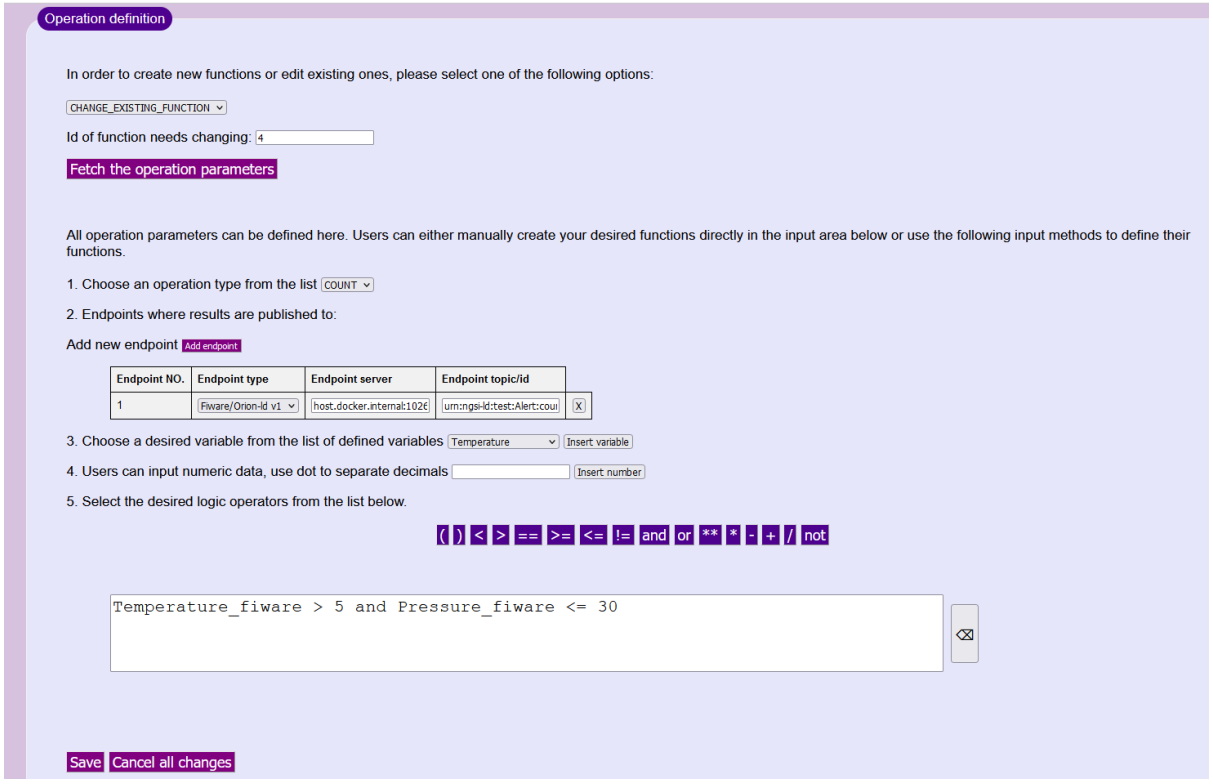

The operation is registered and output is published. Note: data shown on the 2 screenshots are made in different time mark, thus the different in the data.

Modifying existing operation

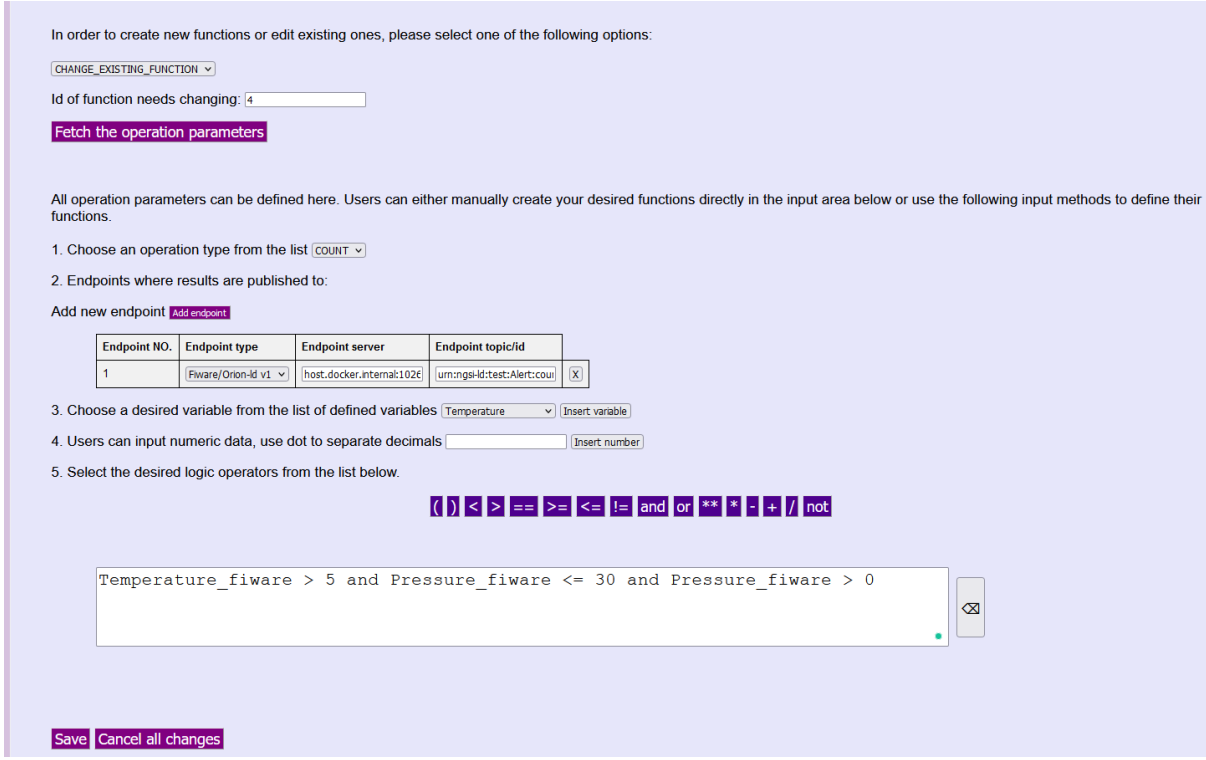
To modifying existing operation, select “CHANGE_EXISTING_FUNCTION” option



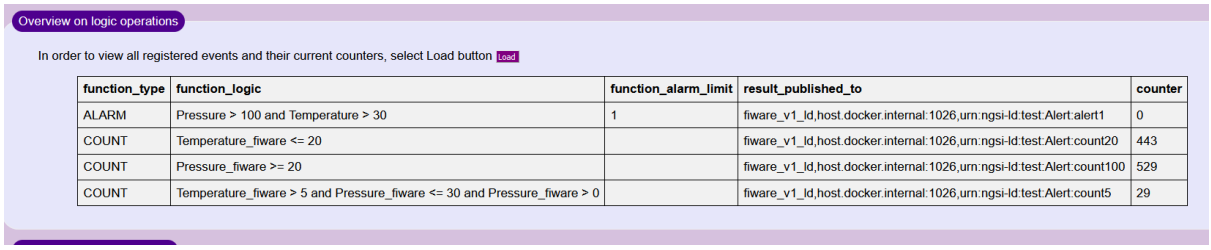
From here, users need to provide the id of the operation that needs to be modified, for example, the operation last created with id 4 needs to add new logic condition, after providing the id, “Fetch the operation parameters” button need to be clicked to retrieve the operation parameter



New condition is added



After modifying the logic condition, the change can be saved or cancelled. The new operation saved will inherit the counter data from the original function.

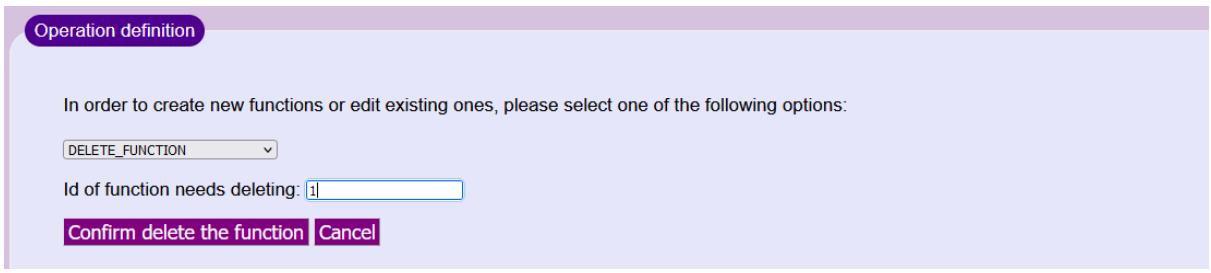


function_type	function_logic	function_alarm_limit	result_published_to	counter
ALARM	Pressure > 100 and Temperature > 30	1	fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:alert1	0
COUNT	Temperature_fiware <= 20		fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:count20	443
COUNT	Pressure_fiware >= 20		fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:count100	529
COUNT	Temperature_fiware > 5 and Pressure_fiware <= 30 and Pressure_fiware > 0		fiware_v1_ld,host.docker.internal:1026,urn:ngsi-ld:test:Alert:count5	29

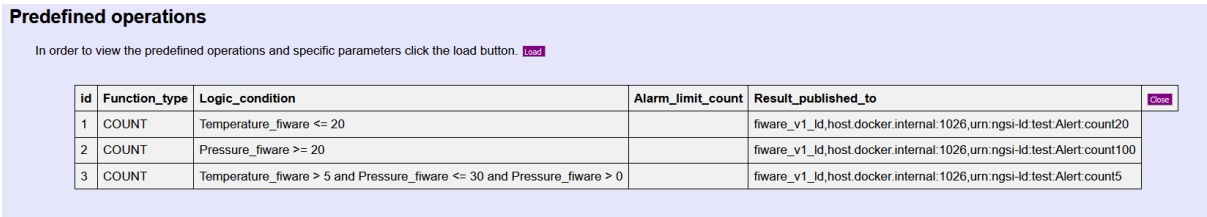
Deleting existing operation

To delete existing function, choose “DELETE_FUNCTION” option

In this section, users need to provide the id of the operation that needs to be deleted, for example in this case operation with id 1 with logic condition “Pressure > 100 and Temperature > 30”



Click “confirm delete the function” to delete the selection operation, once committed, the count record of the function is deleted as well, so this needs to be done carefully



Predefined operations

In order to view the predefined operations and specific parameters click the load button. Load

id	Function_type	Logic_condition	Alarm_limit_count	Result_published_to	Close
1	COUNT	Temperature_fiware <= 20		fiware_v1_Id,host.docker.internal:1026,urn:ngsi-ld:test:Alert:count20	
2	COUNT	Pressure_fiware >= 20		fiware_v1_Id,host.docker.internal:1026,urn:ngsi-ld:test:Alert:count100	
3	COUNT	Temperature_fiware > 5 and Pressure_fiware <= 30 and Pressure_fiware > 0		fiware_v1_Id,host.docker.internal:1026,urn:ngsi-ld:test:Alert:count5	

Input parameters interface

Input parameters interface is used to define, delete or modify the input variables that are used for logic operations

Input overview

In order to view all defined inputs, select load button Load

Id	Name	Topic to data cluster/ Fiware id/ Opc-ua data node	Path to variable data	Server	Adapter_type	Close
1	Temperature	/tuanvutest/Temperature	Temperature	broker.hivemq.com	mqtt	
2	Pressure	/tuanvutest/Pressure	Pressure	broker.hivemq.com	mqtt	
3	Temperature_emx	/tuanvutest/Temperature	Temperature_emx	broker.emqx.io	mqtt	
4	Pressure_emx	/tuanvutest/Pressure	Pressure_emx	broker.emqx.io	mqtt	
5	Moisture	/tuanvutest/Moisture	Moisture	broker.hivemq.com	mqtt	
6	Temperature_opc	ns=2;i=3		opc.tcp://127.0.0.1:12345	opc_ua	
7	Pressure_opc	ns=2;i=2		opc.tcp://127.0.0.1:12345	opc_ua	
8	Temperature_fiware	urn:ngsi-ld:test:Device:Temperature	value/value	host.docker.internal:1026	fiware_v1_ld	
9	Pressure_fiware	urn:ngsi-ld:test:Device:Pressure	value/value	host.docker.internal:1026	fiware_v1_ld	
10	Moisture_emx	/tuanvutest/Moisture	Moisture_emx	broker.emqx.io	mqtt	
11	Moisture_opc	ns=2;i=4		opc.tcp://127.0.0.1:12345	opc_ua	
12	datapoint1	test_entity	value/value	host.docker.internal:1026	fiware_v2	

Defining new input variables

Choose option “NEW_INPUT” to bring up new section

Input definition

In order to define new input or modify defined input, choose one of options below:

NEW_INPUT

1. Input name (users' choice)
2. Choose your adapter No adapter
3. Input topic to data cluster(MQTT)/ Entity ID/ OPC-UA node cluster location
4. Path to data for input assignment inside data cluster
5. Server where input data is stored (OPC-UA, MQTT) or url (Fiware)

Save Cancel change

List of parameters:

- Input name: the name of input variable to be assigned value to
- Adapter choice: the protocol that carries the input
- Input topic to data cluster (MQTT)/ Entity ID/ OPC-UA node cluster location: depends on the adapter type, this can be either topic (MQTT), entity id (fiware), node id (OPC-UA), where the data cluster (json file or data) is stored.
- Path to data for input assignment inside data cluster: path within the json file where relevant data can be extracted (if json is used), can be empty if data can be used directly
- Server where input data is stored (OPC-UA, MQTT) or url (Fiware): the server/link where the data is located.

For example, the value for Moisture_fiware variable is located in dockerized fiware orion-ld server with entity id urn:ngsi-ld:test:Device:Moisture, the json file has format:

```
JSON   Raw Data   Headers
Save  Copy  Collapse All  Expand All  Filter JSON
  id:                                                                   "urn:ngsi-ld:test:Device:Moisture"
  type:                                                                 "https://uri.fiware.org/ns/data-models#Device"
▾ https://smart-data-models.github.io/data-models/terms.jsonld#/definitions/source:
    type:                                                               "Relationship"
    object:                                                             "urn:ngsi-ld:Device:company-xyz:busbar-789"
▾ https://smart-data-models.github.io/data-models/terms.jsonld#/definitions/category:
    type:                                                               "Property"
    value:                                                              "sensor"
▾ https://smart-data-models.github.io/data-models/terms.jsonld#/definitions/serialNumber:
    type:                                                               "Property"
    value:                                                              "9845A"
▾ value:
    type:                                                               "Property"
    value:                                                              9.05
    observedAt:                                                         "2020-12-01T11:23:19.000Z"
▾ https://smart-data-models.github.io/data-models/terms.jsonld#/definitions/deviceState:
    type:                                                               "Property"
    value:                                                              "ok"
▾ isSpecifiedBy:
    type:                                                               "Property"
  ▾ value:
      type:                                                             "Relationship"
    ▾ object:                                                           "urn:ngsi-ld:ResourceSpecification:company-xyz:sensor"
```


And users want to extract only the numeric value of the entity, so the path to the value is “value/value”. Thus, the inputs for the variable is

Input name: Moisture_fiware

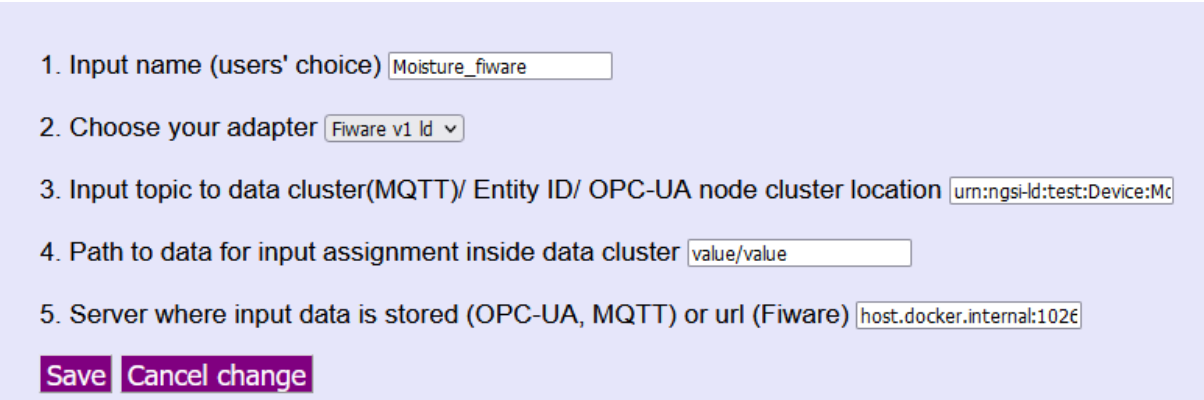
Choose your adapter: Fiware v1 ld

Input topic to data cluster(MQTT)/ Entity ID/ OPC-UA node cluster location: urn:ngsi-ld:test:Device:Moisture

Path to data for input assignment inside data cluster: value/value

Server where input data is stored (OPC-UA, MQTT) or url (Fiware): host.docker.internal:1026

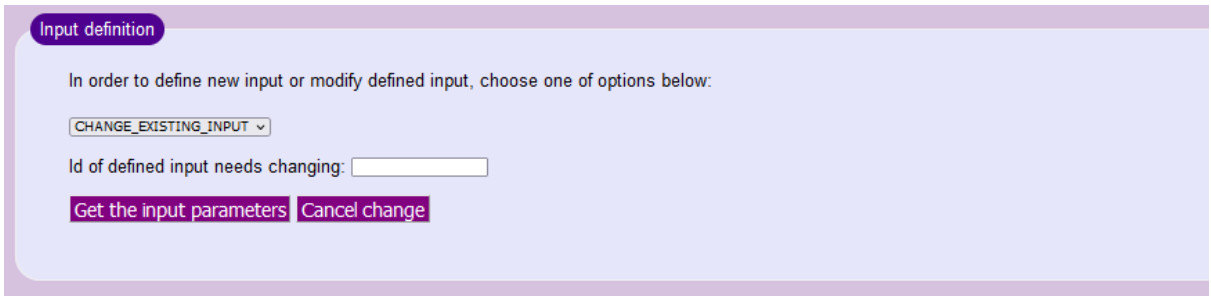
To save the variable, choose “Save”, or else, choose “Cancel change”



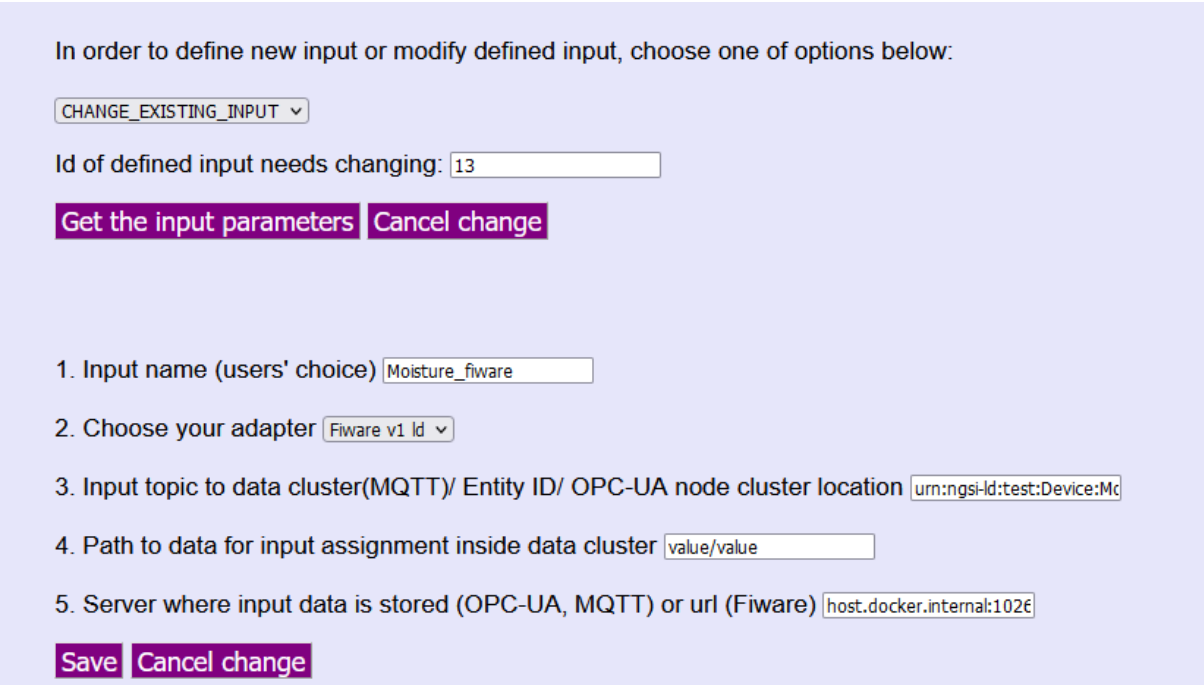
Id	Name	Topic to data cluster/ Fiware id/ Opc-ua data node	Path to variable data	Server	Adapter_type	Close
1	Temperature	/tuanvutest/Temperature	Temperature	broker.hivemq.com	mqtt	
2	Pressure	/tuanvutest/Pressure	Pressure	broker.hivemq.com	mqtt	
3	Temperature_emx	/tuanvutest/Temperature	Temperature_emx	broker.emqx.io	mqtt	
4	Pressure_emx	/tuanvutest/Pressure	Pressure_emx	broker.emqx.io	mqtt	
5	Moisture	/tuanvutest/Moisture	Moisture	broker.hivemq.com	mqtt	
6	Temperature_opc	ns=2;i=3		opc.tcp://127.0.0.1:12345	opc_ua	
7	Pressure_opc	ns=2;i=2		opc.tcp://127.0.0.1:12345	opc_ua	
8	Temperature_fiware	urn:ngsi-ld:test:Device:Temperature	value/value	host.docker.internal:1026	fiware_v1_ld	
9	Pressure_fiware	urn:ngsi-ld:test:Device:Pressure	value/value	host.docker.internal:1026	fiware_v1_ld	
10	Moisture_emx	/tuanvutest/Moisture	Moisture_emx	broker.emqx.io	mqtt	
11	Moisture_opc	ns=2;i=4		opc.tcp://127.0.0.1:12345	opc_ua	
12	datapoint1	test_entity	value/value	host.docker.internal:1026	fiware_v2	
13	Moisture_fiware	urn:ngsi-ld:test:Device:Moisture	value/value	host.docker.internal:1026	fiware_v1_ld	

Modify existing input

To modify existing variable, choose “CHANGE_EXISTING_INPUT”

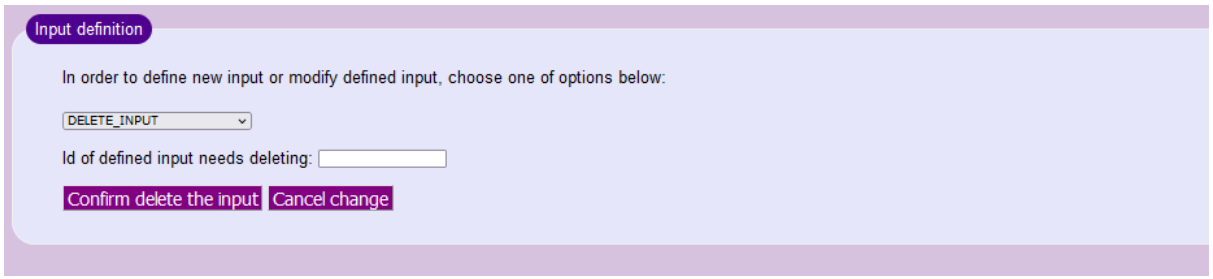


The id of the variable need to be provided, after confirming the id, the input variable detail is loaded in the windows



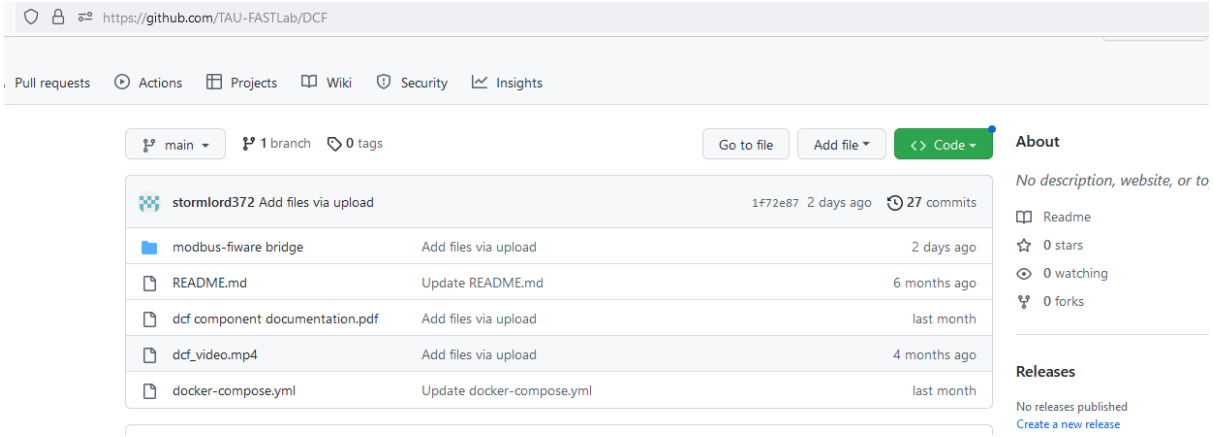
Delete existing input

To delete existing input variable, select “DELETE_VARIABLE” and provide the id of the input needing to be deleted



Note for inputs that are from Modbus RTU and Modbus ASCII

In order to receive data from Modbus RTU and Modbus ASCII, additional script is needed since dockerized application cannot access host serial COM ports.



modbus-fiware-bridge module can be downloaded from DCF repository.

_asyncio.pyd	17.5.2022 16.46	PYD File	66 KB
_bz2.pyd	17.5.2022 16.46	PYD File	86 KB
_ctypes.pyd	17.5.2022 16.46	PYD File	126 KB
_decimal.pyd	17.5.2022 16.46	PYD File	266 KB
_hashlib.pyd	17.5.2022 16.46	PYD File	65 KB
_lzma.pyd	17.5.2022 16.46	PYD File	161 KB
_multiprocessing.pyd	17.5.2022 16.46	PYD File	32 KB
_overlapped.pyd	17.5.2022 16.46	PYD File	47 KB
_queue.pyd	17.5.2022 16.46	PYD File	31 KB
_socket.pyd	17.5.2022 16.46	PYD File	80 KB
_ssl.pyd	17.5.2022 16.46	PYD File	154 KB
cacert.pem	27.9.2022 11.48	PEM File	280 KB
cryptography.hazmat.bindings._openssl....	27.9.2022 13.21	PYD File	3 872 KB
cryptography.hazmat.bindings._rust.pyd	27.9.2022 13.21	PYD File	1 597 KB
libcrypto-1_1.dll	17.5.2022 16.46	Application exten...	3 359 KB
libffi-7.dll	17.5.2022 16.46	Application exten...	33 KB
library.zip	18.1.2023 9.16	Compressed (zipp...	6 340 KB
libssl-1_1.dll	17.5.2022 16.46	Application exten...	683 KB
modbus_to_fiware.exe	18.1.2023 9.16	Application	44 KB
pyexpat.pyd	17.5.2022 16.46	PYD File	202 KB
python3.dll	17.5.2022 16.46	Application exten...	60 KB
python39.dll	17.5.2022 16.46	Application exten...	4 421 KB
select.pyd	17.5.2022 16.46	PYD File	30 KB
unicodedata.pyd	17.5.2022 16.46	PYD File	1 098 KB

Once the module is downloaded, run modbus_to_fiware.exe. The program will receive input details, gather the data from modbus system and transfer the collected data to Fiware where DCF can read the data.

Legacy data interface

The interface allows users to

- Define database entry with parameters for saving the data within DCF (applies for oracle and sap hana)
- Define fiware entities for data extraction from saved database (the same functionality is shared with mongoDB interface)

Database entry section

Displaying db table info and content

Allows users to monitor/add new/ delete existing database information and view table content if data is retrieved, if the data is not retrieved, the old entry needs to be deleted and defined again.

For example, saved data with table_id ORACLE_IRISDATA1 is displayed

legacy GUI

load all saved db info

Entry_NO.	table_id	type	server	port	table	target_column	Close
1	ORACLE_TIMEDATA1	Oracle	localhost	1521	TIMEDATA	*	get this db
2	ORACLE_IRISDATA1	Oracle	localhost	1521	IRISDATA	*	get this db

ORACLE_IRISDATA1

SEPAL_LENGTH	SEPAL_WIDTH	PETAL_LENGTH	PETAL_WIDTH	SPECIES	Close
0.01	0.01	1.01	2.01	dawawd	
1.01	1.01	2.01	3.01	dads	
2.01	2.01	3.01	4.01	dsdaw	
3.01	3.01	4.01	5.01	dwafs	
4.01	4.01	5.01	6.01	caw	

choose an action

Adding new database entry and deleting existing entry

Adding new entry

To add new database entry, select “new database entry” to bring up new input section

load all saved db info

Entry_NO.	table_id	type	server	port	table	target_column	Close
1	ORACLE_TIMEDATA1	Oracle	localhost	1521	TIMEDATA	*	get this db
2	ORACLE_IRISDATA1	Oracle	localhost	1521	IRISDATA	*	get this db

new database entry

Oracle

server address

server port

Username

Password

Table name

Get column, put "*" if users want to get entire table

Assign table id for data extraction

save database info cancel

For example, data from column SPECIES and SEPAL_WIDTH of IRISDATA table from oracle database needs to be stored, to log in and retrieve data, username and password are also needed, the retrieved data is assigned to unique table_id ORACLE_IRISDATA2, the columns to be retrieved need to be separated by “,” (comma).

load all saved db info

Entry_NO.	table_id	type	server	port	table	target_column	Close
1	ORACLE_TIMEDATA1	Oracle	localhost	1521	TIMEDATA	*	get this db
2	ORACLE_IRISDATA1	Oracle	localhost	1521	IRISDATA	*	get this db

new database entry

Oracle

server address localhost

server port 1521

Username system

Password Test_372

Table name IRISDATA

Get column, put "*" if users want to get entire table SPECIES,SEPAL_WIDTH

Assign table id for data extraction ORACLE_IRISDATA2

save database info cancel

Click “save database info” and retrieve the data

load all saved db info

Entry_NO.	table_id	type	server	port	table	target_column	Close
1	ORACLE_TIMEDATA1	Oracle	localhost	1521	TIMEDATA	*	get this db
2	ORACLE_IRISDATA1	Oracle	localhost	1521	IRISDATA	*	get this db
3	ORACLE_IRISDATA2	Oracle	localhost	1521	IRISDATA	SPECIES,SEPAL_WIDTH	get this db

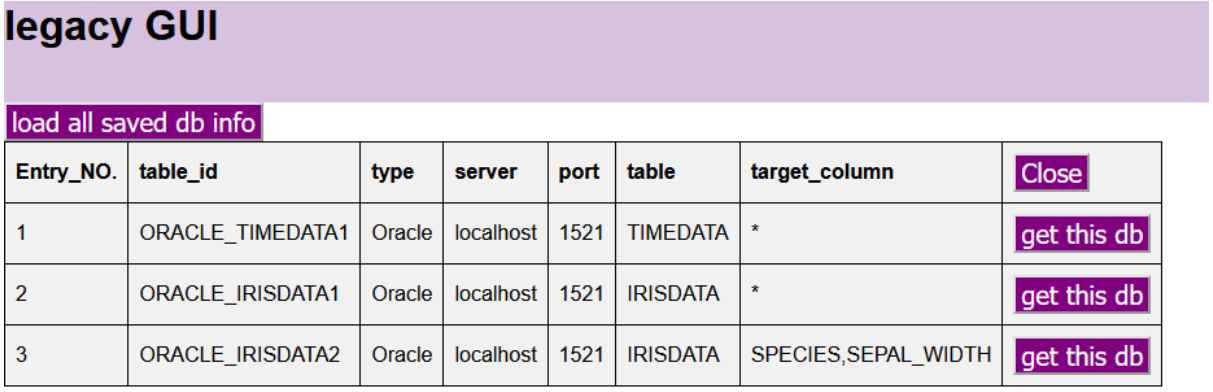
ORACLE_IRISDATA2

SPECIES	SEPAL_WIDTH	Close
dawawd	0.01	
dads	1.01	
dsdaw	2.01	
dwafs	3.01	
caw	4.01	

choose an action

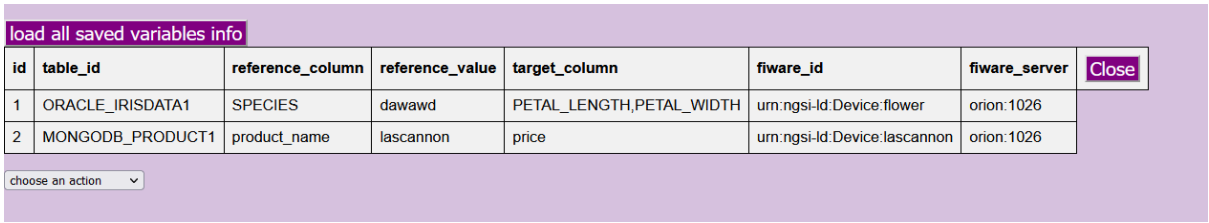
Deleting existing entry

To delete entry, choose “delete database entry” and provide the ENTRY_NO. of the needed entry



Entry_NO.	table_id	type	server	port	table	target_column
1	ORACLE_TIMEDATA1	Oracle	localhost	1521	TIMEDATA	*
2	ORACLE_IRISDATA1	Oracle	localhost	1521	IRISDATA	*
3	ORACLE_IRISDATA2	Oracle	localhost	1521	IRISDATA	SPECIES,SEPAL_WIDTH

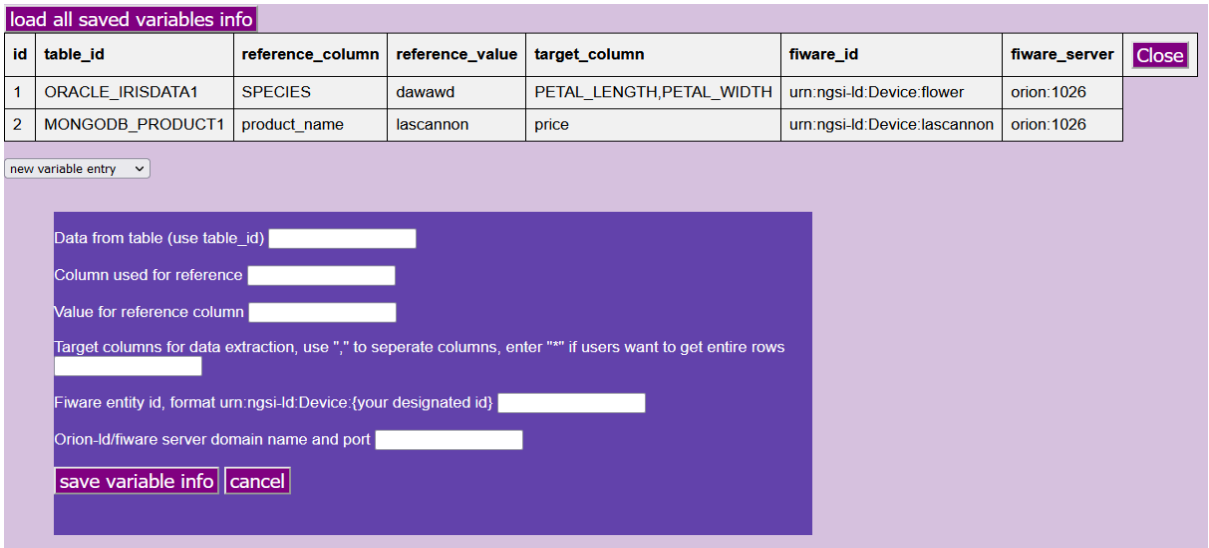
Adding new parameters for retrieving data from saved database entries or deleting existing entries



id	table_id	reference_column	reference_value	target_column	fiware_id	fiware_server
1	ORACLE_IRISDATA1	SPECIES	dawawd	PETAL_LENGTH,PETAL_WIDTH	urn:ngsi-ld:Device:flower	orion:1026
2	MONGODB_PRODUCT1	product_name	lascannon	price	urn:ngsi-ld:Device:lascannon	orion:1026

Adding new entry for retrieving data

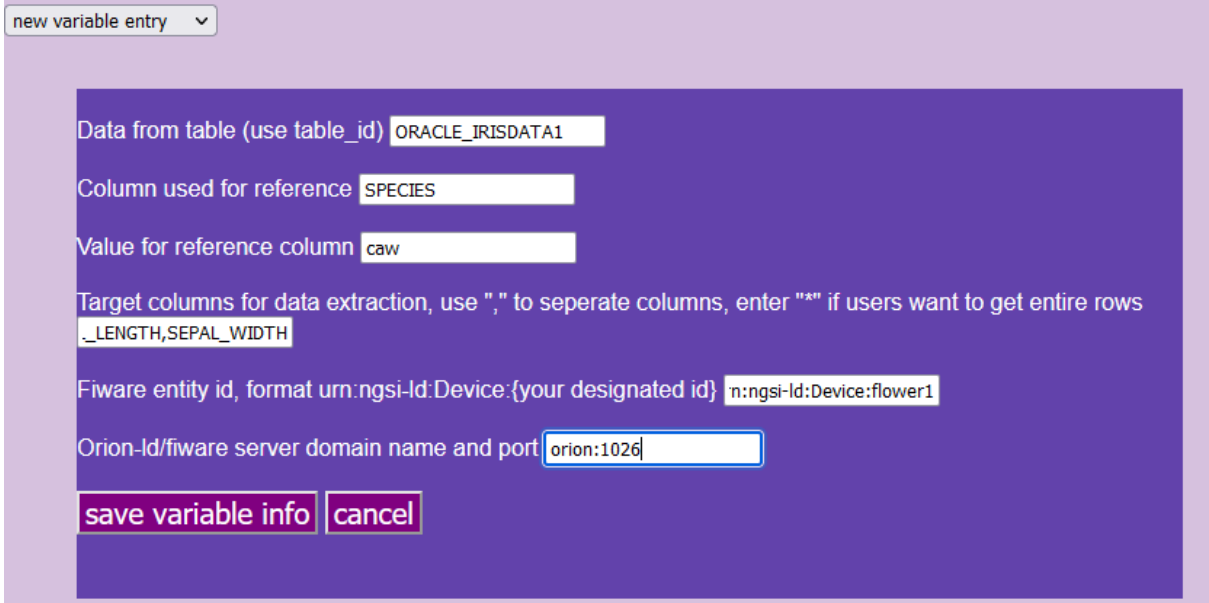
Data from saved database table can be extracted and sent through fiware as entity, this functionality is shared and can be shown in both MongoDB interface and legacy interface, to add new parameters entry, choose “new variable entry”

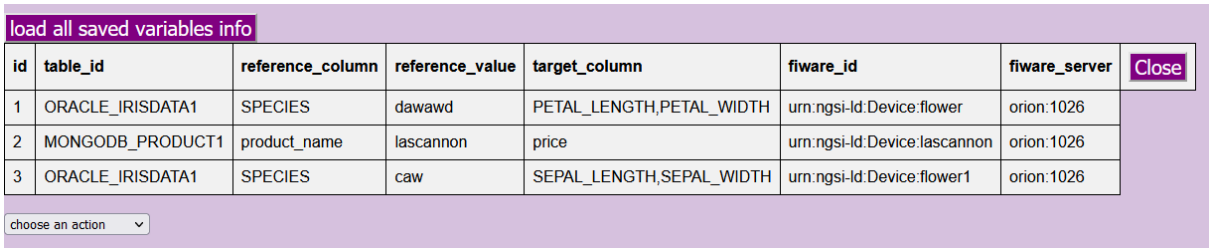


id	table_id	reference_column	reference_value	target_column	fiware_id	fiware_server
1	ORACLE_IRISDATA1	SPECIES	dawawd	PETAL_LENGTH,PETAL_WIDTH	urn:ngsi-ld:Device:flower	orion:1026
2	MONGODB_PRODUCT1	product_name	lascannon	price	urn:ngsi-ld:Device:lascannon	orion:1026

The table_id must be the table_id of one of defined database table (either legacy or mongodb table).

For example, defining a new entity with id “urn:ngsi-ld:Device:flower1” that retrieves the SEPAL_LENGTH, SEPAL_WIDTH of SPECIES with name “caw” from table ORACLE_IRISDATA1





id	table_id	reference_column	reference_value	target_column	fiware_id	fiware_server
1	ORACLE_IRISDATA1	SPECIES	dawawd	PETAL_LENGTH,PETAL_WIDTH	urn:ngsi-ld:Device:flower	orion:1026
2	MONGODB_PRODUCT1	product_name	lascannon	price	urn:ngsi-ld:Device:lascannon	orion:1026
3	ORACLE_IRISDATA1	SPECIES	caw	SEPAL_LENGTH,SEPAL_WIDTH	urn:ngsi-ld:Device:flower1	orion:1026

Result from orion server


```
localhost:1026/ngsi-ld/v1/entities/urn:ngsi-ld:Device:flower1
JSON  Raw Data  Headers
Save  Copy  Collapse All  Expand All  Filter JSON
id:                                                                  "urn:ngsi-ld:Device:flower1"
type:                                                                "https://uri.fiware.org/ns/data-models#Device"
https://smart-data-models.github.io/data-models/terms.jsonld#/definitions/source:
  type:                                                              "Relationship"
  object:                                                            "urn:ngsi-ld:Device:company-xyz:database"
value:
  type:                                                              "Property"
  value:
    value:
      0:
        SPECIES:                                                     "caw"
        SEPAL_LENGTH:                                                4.01
        SEPAL_WIDTH:                                                 4.01
    type:                                                            "Property"
  observedAt:                                                        "2022-07-29T17:26:55.450Z"
isSpecifiedBy:
  type:                                                              "Property"
  value:
    type:                                                            "Relationship"
    object:                                                          "urn:ngsi-ld:ResourceSpecification:legacyDatabase"
```


Delete entry

To delete entry, choose “delete variable entry” and provide the id of the entry that need deleting

load all saved variables info

id	table_id	reference_column	reference_value	target_column	fiware_id	fiware_server	Close
1	ORACLE_IRISDATA1	SPECIES	dawawd	PETAL_LENGTH,PETAL_WIDTH	urn:ngsi-ld:Device:flower	orion:1026	
2	MONGODB_PRODUCT1	product_name	lascannon	price	urn:ngsi-ld:Device:lascannon	orion:1026	
3	ORACLE_IRISDATA1	SPECIES	caw	SEPAL_LENGTH,SEPAL_WIDTH	urn:ngsi-ld:Device:flower1	orion:1026	

delete variable entry

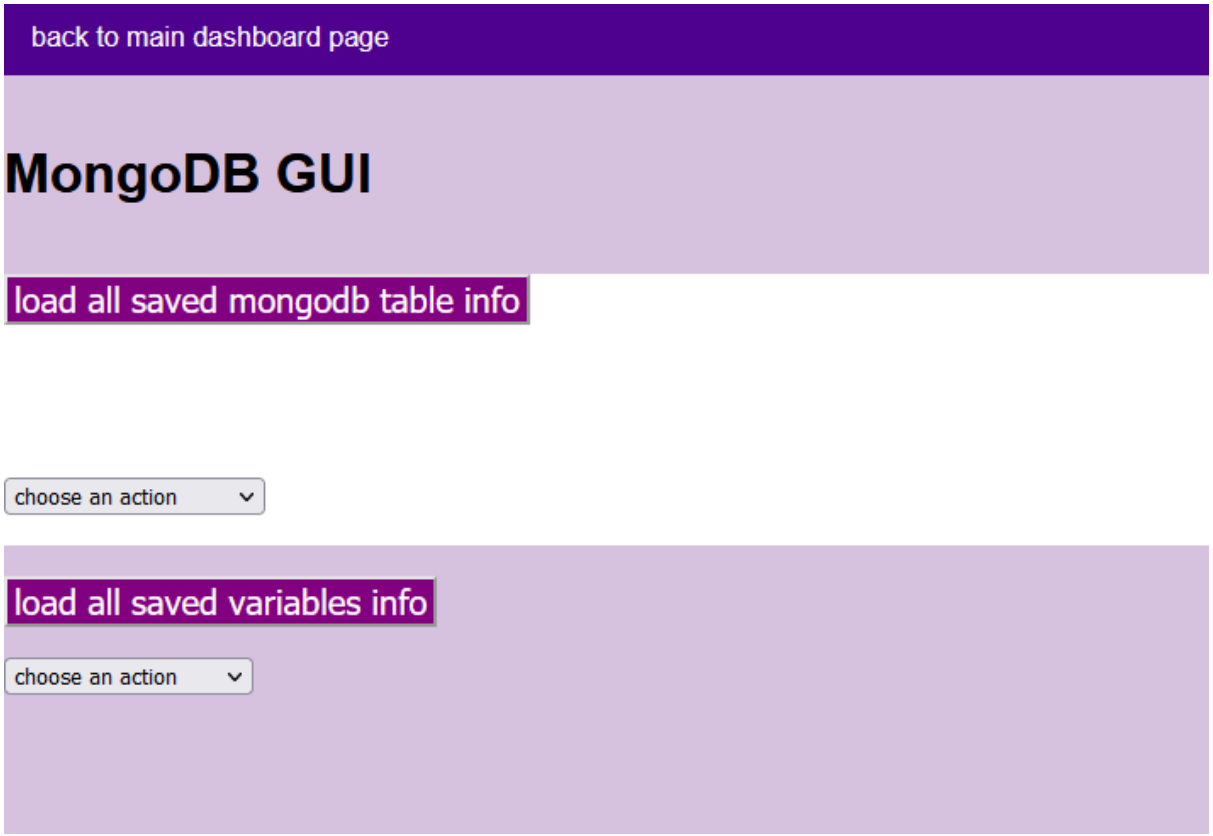
choose db id to be deleted

save database info cancel

MongoDB database interface

MongoDB database interface serves two purposes:

- Define database entry with parameters for saving the data within DCF (only apply for mongoDB)
- Define fiware entities for data extraction from saved database (this functionality is the same as the one in legacy interface)



Adding new mongoDB info entry for saving data or deleting existing entry

Adding new entry

To add new entry, select “new database entry”

MongoDB GUI

load all saved mongodb table info

Entry_NO.	table_id	server_address	db_name	collection_name	Close
1	MONGODB_PRODUCT1	mongodb://mongo-db/	test_db	test_col	get this db

new database entry

server uri

Database name

Collection name

Assign table id for data extraction

save database info cancel

Users need to provide needed parameters and unique table id, the table id is any of users' choosing and must be unique.

After the entry is defined and data is retrieved, the data can be viewed and used for data extraction.

For example, the content of table_id MONGODB_PRODUCT1

load all saved mongodb table info

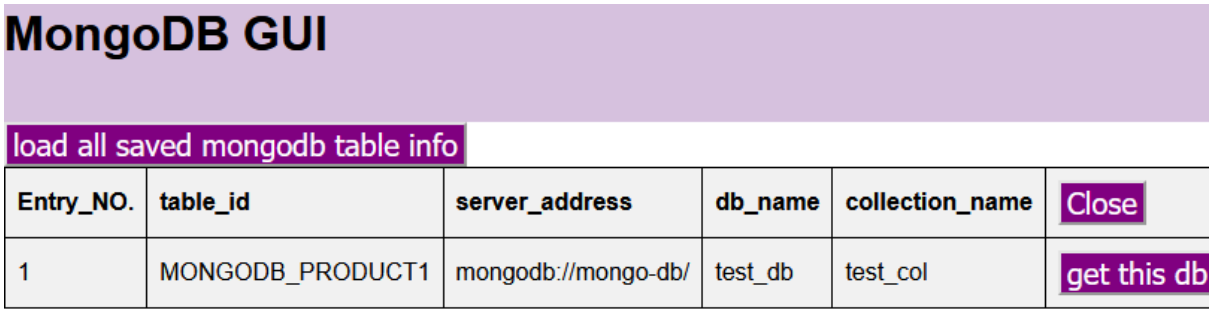
Entry_NO.	table_id	server_address	db_name	collection_name	Close
1	MONGODB_PRODUCT1	mongodb://mongo-db/	test_db	test_col	get this db

MONGODB_PRODUCT1

product_id	product_name	price	Close
1	lascannon	1200	
2	cogitator	200	
3	lance	350	
4	battle barge	8000	
5	cheese	400	

Deleting existing entry

To delete existing entry, select “delete database entry” and provide the ENTRY_NO. of the entry that needs deleting



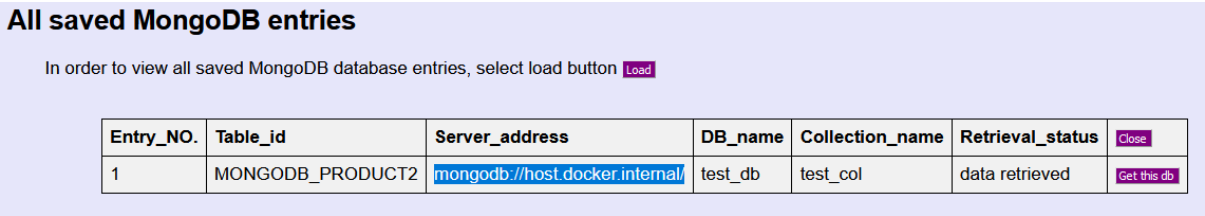
Adding new parameters entry for data retrieval or deleting existing entry

The procedures are the same as in legacy interface

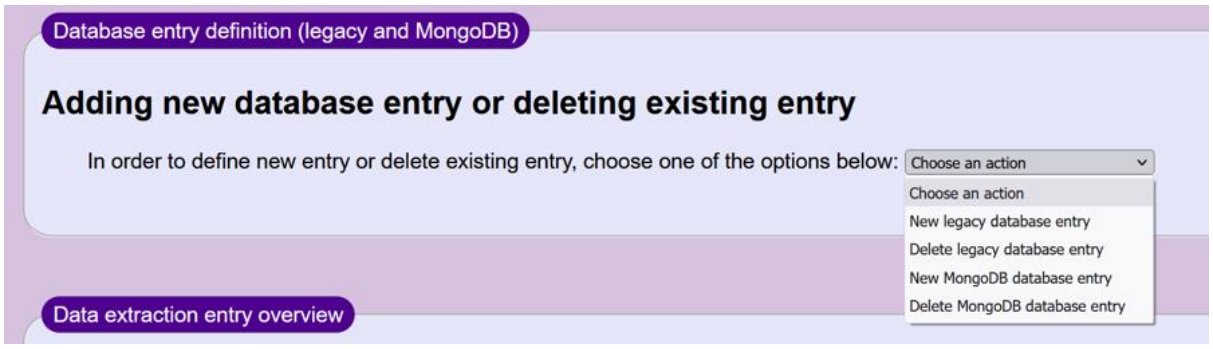
Update note on Legacy and Mongo DB database interface

Since version 1.6, both Legacy and Mongo DB interfaces are merged into the same interface.

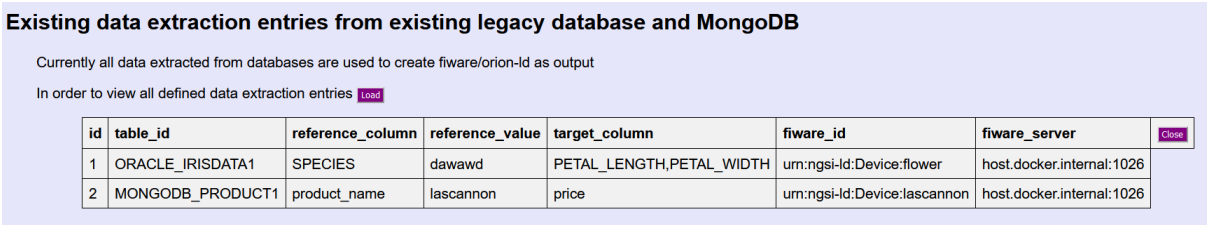
While procedures remain the same for all entries, there is a change to MongoDB domain for data extraction. Due to DCF container is no longer placed within the same network as dockerized Mongo-DB and Fiware orion-ld container, the domain for MongoDB is “mongodb://host.docker.internal/” and fiware orion-ld domain “host.docker.internal:1026”



Menu selection for database entries manipulation



Domain name for entity publishing.



id	table_id	reference_column	reference_value	target_column	fiware_id	fiware_server
1	ORACLE_IRISDATA1	SPECIES	dawawd	PETAL_LENGTH,PETAL_WIDTH	urn:ngsi-ld:Device:flower	host.docker.internal:1026
2	MONGODB_PRODUCT1	product_name	lascannon	price	urn:ngsi-ld:Device:lascannon	host.docker.internal:1026