

# DCF

## Data Collection Framework

### User Manual



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## 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.

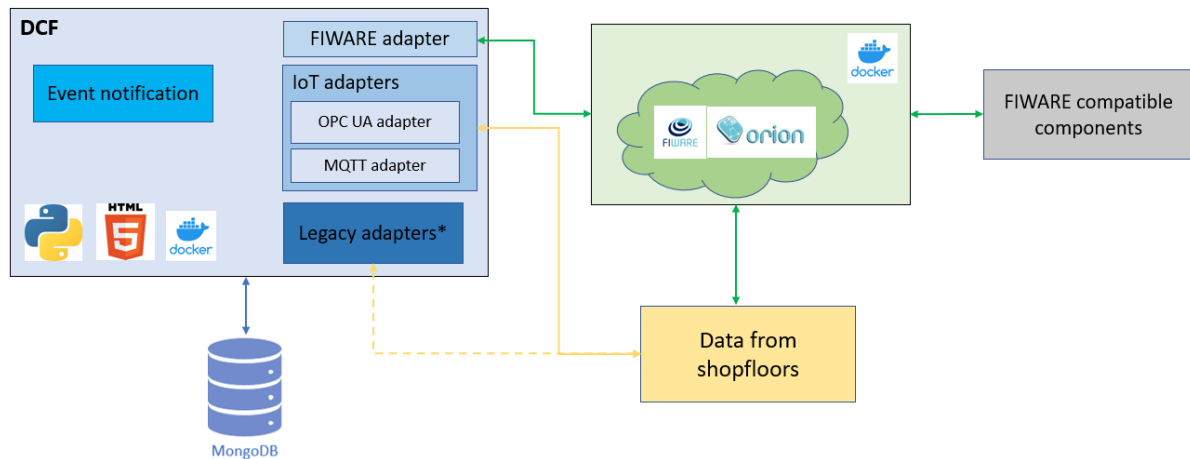


Figure 1: DCF architecture

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

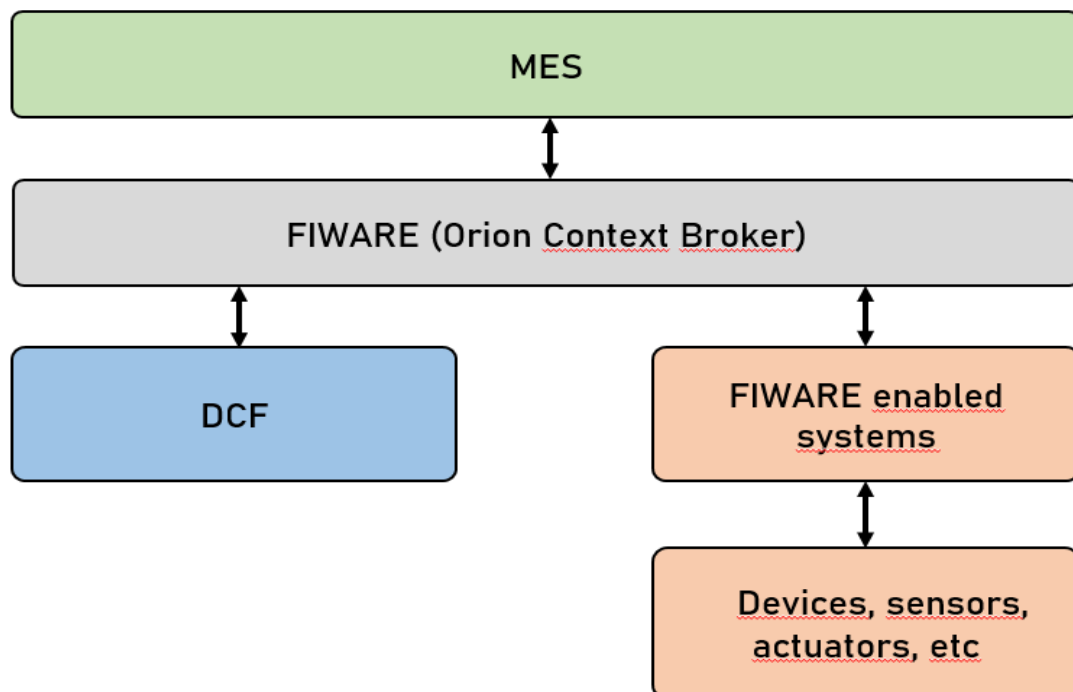
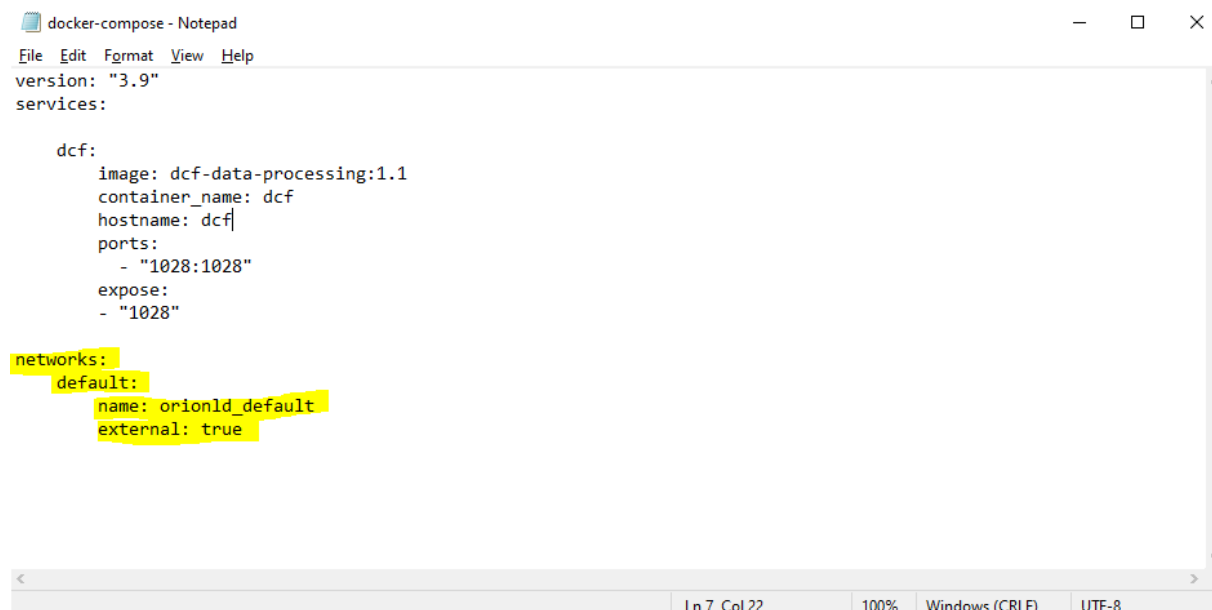


Figure 2: DCF communication with other components

## 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>.

Before composing the image, the networks parameter in docker-compose.yml file needs to be configured. If users want use containerized MongoDB and Fiware-Orion server images without knowing their IP address, the DCF container needs to be put into the same existing docker network as MongoDB and Fiware-Orion by replacing networks/default/name parameter with name of the network name, with this, the domain name of the images can be used as domain address without the need of exact IP addresses or web addresses. If users use noncontainerized Fiware/Orion-Id and MongoDB server image or do not want to add the DCF image to any network (only use sperate network), the entire networks section needs to be deleted.

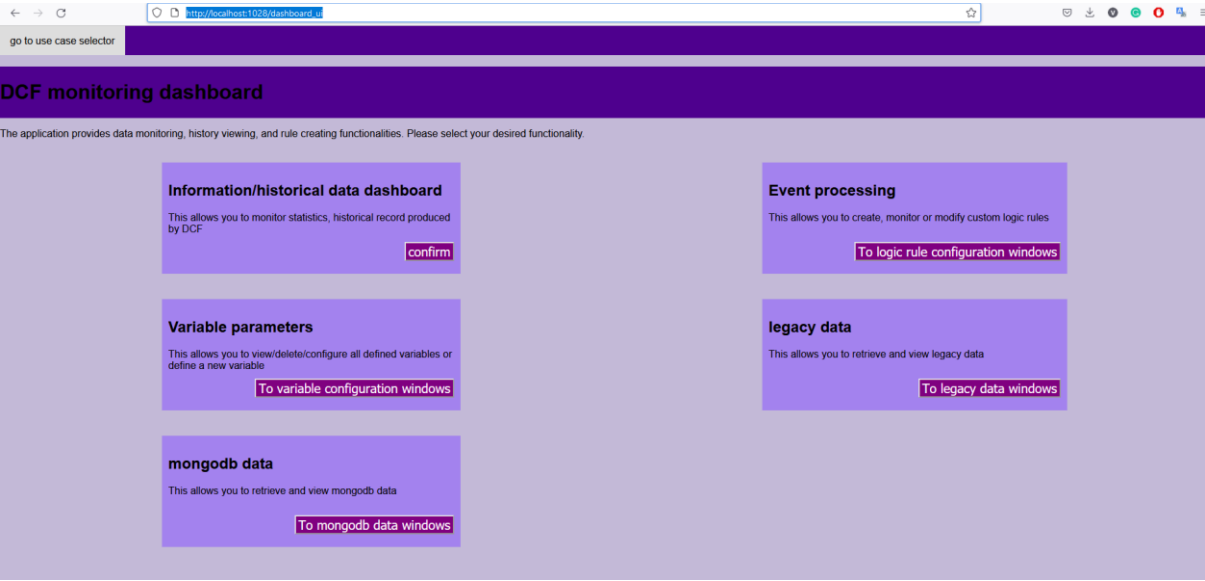


```
docker-compose - Notepad
File Edit Format View Help
version: "3.9"
services:
  dcf:
    image: dcf-data-processing:1.1
    container_name: dcf
    hostname: dcf
    ports:
      - "1028:1028"
    expose:
      - "1028"
networks:
  default:
    name: orionld_default
    external: true
Ln 7, Col 22 100% Windows (CRLF) UTF-8
```

## 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.

DCF history monitor					
load all recorded event data					
function_type	function_logic	function_alarm_limit	result_published_to	counter	
ALARM	Pressure > 100 and Temperature > 30	1	mqtt,broker.hivemq.com,/tuanvutest/alarm1;fiware,orion,urn:ngsi-ld:test.Alert.alert1	0	
COUNT	Pressure < 80 and Pressure > 50		mqtt,broker.hivemq.com,/tuanvutest/counter	0	
COUNT	Temperature > 20		mqtt,broker.hivemq.com,/tuanvutest/counter500;fiware,orion,urn:ngsi-ld:test.Alert.cnt1	2	
COUNT	Temperature > 4		mqtt,broker.hivemq.com,/tuanvutest/counter3	2	
ALARM	Temperature < 1000	3	mqtt,broker.hivemq.com,/tuanvutest/alarm10	4	
COUNT	Pressure_emx > 10		mqtt,broker.hivemq.com,/tuanvutest/count12	0	
COUNT	Moisture_emx > 10 and Moisture > 10		mqtt,broker.hivemq.com,/tuanvutest/count372	0	
COUNT	Temperature_fiware <= 20		fiware,orion,urn:ngsi-ld:test.Alert.count20	2625	
COUNT	Pressure_fiware >= 20		fiware,localhost,urn:ngsi-ld:test.Alert.count100	0	

Event processing interface

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

← → ↺

🔍 http://localhost:1028/index\_function

back to main dashboard page   to variable GUI

Function GUI

click load all defined operations button to show updated operations list and their parameters 

load all defined operations

id	Function_type	Logic_condition	Alarm_limit_count	Result_published_to	Close
1	ALARM	Pressure > 100 and Temperature > 30	1	mqtt,broker.hivemq.com,/tuanvutest/alarm1,fiware,orion,urn:ngsi-ld:test.Alert.alert1	
2	COUNT	Pressure < 80 and Pressure > 50		mqtt,broker.hivemq.com,/tuanvutest/counter	
3	COUNT	Temperature > 20		mqtt,broker.hivemq.com,/tuanvutest/counter500,fiware,orion,urn:ngsi-ld:test.Alert.cnt1	
4	COUNT	Temperature > 4		mqtt,broker.hivemq.com,/tuanvutest/counter3	
5	ALARM	Temperature < 1000	3	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,urn:ngsi-ld:test.Alert.count20	
9	COUNT	Pressure_fiware >= 20		fiware,localhost,urn:ngsi-ld:test.Alert.count100	

click load all defined variables button to view all defined variable inputs 

load all defined variables

do you want to create new function/variable or modify existing function/variable or delete a function/variable?  
CHOOSE AN OPTION ▾

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

← → ↺

🔍 http://localhost:1028/index\_function

3	COUNT	Temperature > 20		mqtt,broker.hivemq.com,/tuanvutest/counter500,fiware,orion,urn:ngsi-ld:test.Alert.cnt1
4	COUNT	Temperature > 4		mqtt,broker.hivemq.com,/tuanvutest/counter3
5	ALARM	Temperature < 1000	3	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,urn:ngsi-ld:test.Alert.count20
9	COUNT	Pressure_fiware >= 20		fiware,localhost,urn:ngsi-ld:test.Alert.count100

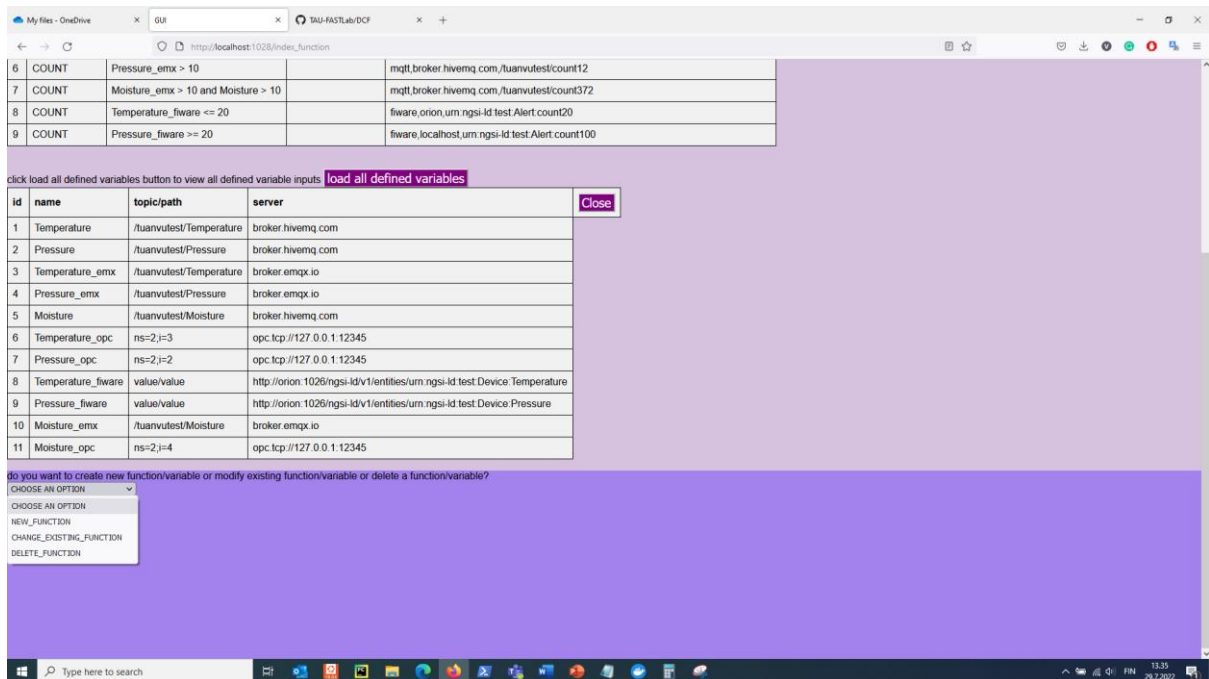
click load all defined variables button to view all defined variable inputs 

load all defined variables

id	name	topic/path	server	Close
1	Temperature	/tuanvutest/Temperature	broker.hivemq.com	
2	Pressure	/tuanvutest/Pressure	broker.hivemq.com	
3	Temperature_emx	/tuanvutest/Temperature	broker.emqx.io	
4	Pressure_emx	/tuanvutest/Pressure	broker.emqx.io	
5	Moisture	/tuanvutest/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	value/value	http://orion:1026/ngsi-ld/v1/entities/urn:ngsi-ld:test.Device:Temperature	
9	Pressure_fiware	value/value	http://orion:1026/ngsi-ld/v1/entities/urn:ngsi-ld:test.Device:Pressure	
10	Moisture_emx	/tuanvutest/Moisture	broker.emqx.io	
11	Moisture_opc	ns=2,i=4	opc.tcp://127.0.0.1:12345	

do you want to create new function/variable or modify existing function/variable or delete a function/variable?  
CHOOSE AN OPTION ▾

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

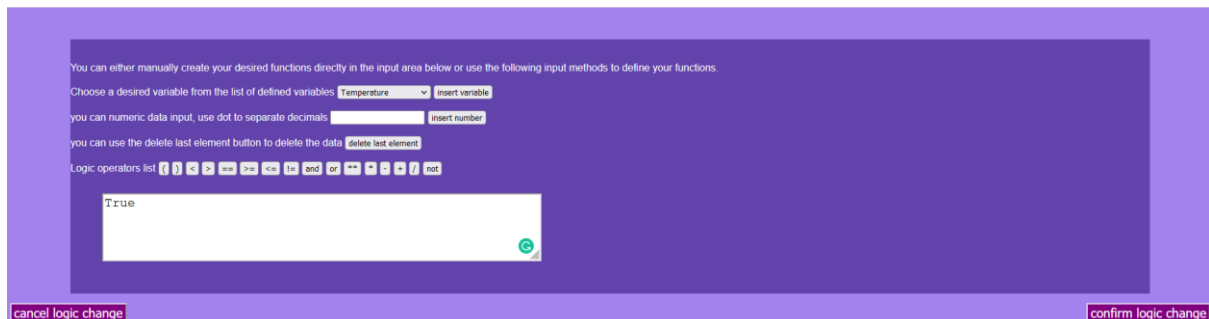


## Creating new operation



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.

To change the logic condition, click the highlighted button, the button is labelled with the current logic condition of the operation, 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.

do you want to create new function/variable or modify existing function/variable or delete a function/variable?

NEW\_FUNCTION

all operation parameters can be changed here

choose an operation type from the list COUNT

logic condition is shown here, click the button to move to logic config windows Temperature\_fiware > 5 and Pressure\_fiware <= 30

Alarm count limit, empty if function type is COUNT

Topic where the result will be published to

cancel all changes add newly defined function

Due to being a COUNT type function, the Alarm count limit can be ignored. To publish the data to MQTT or Fiware/orion-Id, the “Topic where the result will be published to” needs to be filled as well. The format for the input is “protocol”, “server domain”, “id” with unique id, protocol is either “fiware” or “mqtt”. In this case, the result needs to be publish to fiware with the entity id “urn:ngsi-Id:test:Alert:count5”, on my containerized fiware/orion-Id server so the input should be “fiware,orion,urn:ngsi-Id:test:Alert:count5”, to add additional endpoints, these inputs need to be separated by using “;”.

do you want to create new function/variable or modify existing function/variable or delete a function/variable?

NEW\_FUNCTION

all operation parameters can be changed here

choose an operation type from the list COUNT

logic condition is shown here, click the button to move to logic config windows Temperature\_fiware > 5 and Pressure\_fiware <= 30

Alarm count limit, empty if function type is COUNT

Topic where the result will be published to ngsi-Id:test:Alert:count5

cancel all changes add newly defined function

Push “add newly defined function” button to update the data.

click load all defined operations button to show updated operations list and their parameters load all defined operations

id	Function_type	Logic_condition	Alarm_limit_count	Result_published_to	Close
1	ALARM	Pressure > 100 and Temperature > 30	1	mqtt,broker.hivemq.com,/tuanvutest/alarm1,fiware,orion,urn:ngsi-Id:test:Alert:alert1	
2	COUNT	Pressure < 80 and Pressure > 50		mqtt,broker.hivemq.com,/tuanvutest/counter	
3	COUNT	Temperature > 20		mqtt,broker.hivemq.com,/tuanvutest/counter500,fiware,orion,urn:ngsi-Id:test:Alert:cnt1	
4	COUNT	Temperature > 4		mqtt,broker.hivemq.com,/tuanvutest/counter3	
5	ALARM	Temperature < 1000	3	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,urn:ngsi-Id:test:Alert:count20	
9	COUNT	Pressure_fiware >= 20		fiware,localhost,urn:ngsi-Id:test:Alert:count100	
10	COUNT	Temperature_fiware > 5 and Pressure_fiware <= 30		fiware,orion,urn:ngsi-Id:test:Alert:count5	

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

← → ↺ http://localhost:1028/DCF\_monitor\_event

back to main dashboard page

DCF history monitor

load all recorded event data

function_type	function_logic	function_alarm_limit	result_published_to	counter
ALARM	Pressure > 100 and Temperature > 30	1	mqtt,broker.hivemq.com,/tuanvutest/alarms1,fiware,orion,urn:ngsi-ld:test.Alert:alert1	0
COUNT	Pressure < 80 and Pressure > 50		mqtt,broker.hivemq.com,/tuanvutest/counter	0
COUNT	Temperature > 20		mqtt,broker.hivemq.com,/tuanvutest/counter500,fiware,orion,urn:ngsi-ld:test.Alert:cnt1	666
COUNT	Temperature > 4		mqtt,broker.hivemq.com,/tuanvutest/counter3	1732
ALARM	Temperature < 1000	3	mqtt,broker.hivemq.com,/tuanvutest/alarms10	1988
COUNT	Pressure_emx > 10		mqtt,broker.hivemq.com,/tuanvutest/count12	0
COUNT	Moisture_emx > 10 and Moisture > 10		mqtt,broker.hivemq.com,/tuanvutest/count372	0
COUNT	Temperature_fiware <= 20		fiware,orion,urn:ngsi-ld:test.Alert:count20	3954
COUNT	Pressure_fiware >= 20		fiware,localhost,urn:ngsi-ld:test.Alert:count100	5
COUNT	Temperature_fiware > 5 and Pressure_fiware <= 30		fiware,orion,urn:ngsi-ld:test.Alert:count5	1

← → ↺ http://localhost:1026/ngsi-ld/v1/entities/urn:ngsi-ld:test.Alert:count5

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:	"Property"
type:	"alert"
https://smart-data-models.github.io/data-models/terms.jsonld#definitions/validTo:	"Property"
type:	"DateTime"
value:	"2022-07-29T11:14:33.682"
value:	"Property"
type:	"DateTime"
value:	1
observedAt:	"2022-07-29T11:14:33.682"
description:	"Property"
type:	"COUNT;Temperature_fiware > 5 and Pressure_fiware <= 30;;fiware,orion,urn:ngsi-ld:test.Alert:count5"
https://smart-data-models.github.io/data-models/terms.jsonld#definitions/dateIssued:	"Property"
type:	"Property"
value:	"DateTime"
@type:	"2022-07-29T11:14:33.682"
@value:	"Relationship"
https://smart-data-models.github.io/data-models/terms.jsonld#definitions/alertSource:	"urn:ngsi-ld:dcf-logic-engine"
type:	"Relationship"
object:	"Property"
https://smart-data-models.github.io/data-models/terms.jsonld#definitions/validFrom:	"Property"
type:	"Property"
value:	"DateTime"
@type:	"2022-07-29T11:14:33.682"
@value:	"Property"
https://smart-data-models.github.io/data-models/terms.jsonld#definitions/severity:	"Property"
type:	"high"
value:	"Property"
humanVerified:	"false"
type:	"Property"
value:	"false"

The operation is registered and output is published.

## Modifying existing operation

To modifying existing operation, select “CHANGE\_EXISTING\_FUNCTION” option

← → ↺ http://localhost:1028/index\_function  
back to main dashboard page to variable GUI

### Function GUI

click load all defined operations button to show updated operations list and their parameters **load all defined operations**

id	Function_type	Logic_condition	Alarm_limit_count	Result_published_to	Close
1	ALARM	Pressure > 100 and Temperature > 30	1	mqtt,broker.hivemq.com,/tuanvutest/alarm1,fiware,orion,urn:ngsi-ld:test.Alert.alert1	
2	COUNT	Pressure < 80 and Pressure > 50		mqtt,broker.hivemq.com,/tuanvutest/counter	
3	COUNT	Temperature > 20		mqtt,broker.hivemq.com,/tuanvutest/counter500,fiware,orion,urn:ngsi-ld:test.Alert.cnt1	
4	COUNT	Temperature > 4		mqtt,broker.hivemq.com,/tuanvutest/counter3	
5	ALARM	Temperature < 1000	3	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,urn:ngsi-ld:test.Alert.count20	
9	COUNT	Pressure_fiware >= 20		fiware,localhost,urn:ngsi-ld:test.Alert.count100	
10	COUNT	Temperature_fiware > 5 and Pressure_fiware <= 30		fiware,orion,urn:ngsi-ld:test.Alert.count5	

click load all defined variables button to view all defined variable inputs **load all defined variables**

do you want to create new function/variable or modify existing function/variable or delete a function/variable?  
CHANGE\_EXISTING\_FUNCTION ▾

id of function needs changing:

**get the function**

From here, users need to provide the id of the operation that needs to be modified, for example, operation 10 needs to add new logic condition, after providing the id, “get the function” button need to be clicked to retrieve the operation parameter

do you want to create new function/variable or modify existing function/variable or delete a function/variable?  
CHANGE\_EXISTING\_FUNCTION ▾

id of function needs changing: 10

**get the function**

all operation parameters can be changed here

choose an operation type from the list: **COUNT** ▾

logic condition is shown here, click the button to move to logic config windows: **Temperature\_fiware > 5 and Pressure\_fiware <= 30**

Alarm count limit, empty if function type is COUNT:

Topic where the result will be published to: **fiware,orion,urn:ngsi-ld:**

**cancel all changes** **save change to selected function**

---

do you want to create new function/variable or modify existing function/variable or delete a function/variable?  
CHANGE\_EXISTING\_FUNCTION ▾

id of function needs changing: 10

**get the function**

all operation parameters can be changed here

choose an operation type from the list: **COUNT** ▾

logic condition is shown here, click the button to move to logic config windows: **Temperature\_fiware > 5 and Pressure\_fiware <= 30 and Pressure\_fiware > 0**

Alarm count limit, empty if function type is COUNT:

Topic where the result will be published to: **fiware,orion,urn:ngsi-ld:**

**cancel all changes** **save change to selected function**

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.

http://localhost:1028/DCF\_monitor\_event

back to main dashboard page

DCF history monitor

load all recorded event data

function_type	function_logic	function_alarm_limit	result_published_to	counter
ALARM	Pressure > 100 and Temperature > 30	1	mqtt.broker.hivemq.com/tuanvutest/alarm1,fiware,orion,urn.ngsi-ld:test.Alert:alert1	0
COUNT	Pressure < 80 and Pressure > 50		mqtt.broker.hivemq.com/tuanvutest/counter	0
COUNT	Temperature > 20		mqtt.broker.hivemq.com/tuanvutest/counter500,fiware,orion,urn.ngsi-ld:test.Alert:cnt1	807
COUNT	Temperature > 4		mqtt.broker.hivemq.com/tuanvutest/counter3	2123
ALARM	Temperature < 1000	3	mqtt.broker.hivemq.com/tuanvutest/alarm10	2445
COUNT	Pressure_emx > 10		mqtt.broker.hivemq.com/tuanvutest/count12	0
COUNT	Moisture_emx > 10 and Moisture > 10		mqtt.broker.hivemq.com/tuanvutest/count372	0
COUNT	Temperature_fiware <= 20		fiware,orion,urn.ngsi-ld:test.Alert:count20	4268
COUNT	Pressure_fiware >= 20		fiware,localhost,urn.ngsi-ld:test.Alert:count100	423
COUNT	Temperature_fiware > 5 and Pressure_fiware <= 30 and Pressure_fiware > 0		fiware,orion,urn.ngsi-ld:test.Alert:count5	51

Tuan Vu (TAU)

## 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 9 with logic condition “Pressure\_fiware >= 20”

**Function GUI**

click load all defined operations button to show updated operations list and their parameters [load all defined operations](#)

id	Function_type	Logic_condition	Alarm_limit_count	Result_published_to	Close
1	ALARM	Pressure > 100 and Temperature > 30	1	mqtt.broker.hivemq.com,/tuavutest/alarm1,fiware,orion,urn.ngsi-ld:test.Alert.alert1	
2	COUNT	Pressure < 80 and Pressure > 50		mqtt.broker.hivemq.com,/tuavutest/counter	
3	COUNT	Temperature > 20		mqtt.broker.hivemq.com,/tuavutest/counter500,fiware,orion,urn.ngsi-ld:test.Alert.cnt1	
4	COUNT	Temperature > 4		mqtt.broker.hivemq.com,/tuavutest/counter3	
5	ALARM	Temperature < 1000	3	mqtt.broker.hivemq.com,/tuavutest/alarm10	
6	COUNT	Pressure_emx > 10		mqtt.broker.hivemq.com,/tuavutest/count12	
7	COUNT	Moisture_emx > 10 and Moisture > 10		mqtt.broker.hivemq.com,/tuavutest/count372	
8	COUNT	Temperature_fiware <= 20		fiware,orion,urn.ngsi-ld:test.Alert.count20	
9	COUNT	Pressure_fiware >= 20		fiware,localhost,urn.ngsi-ld:test.Alert.count100	
10	COUNT	Temperature_fiware > 5 and Pressure_fiware <= 30 and Pressure_fiware > 0		fiware,orion,urn.ngsi-ld:test.Alert.count5	

click load all defined variables button to view all defined variable inputs [load all defined variables](#)

do you want to create new function/variable or modify existing function/variable or delete a function/variable?  
 DELETE\_FUNCTION ▼

id of function needs deleting

[cancel delete](#) [confirm delete the function](#)

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

[back to main dashboard page](#) [to variable GUI](#)

**Function GUI**

click load all defined operations button to show updated operations list and their parameters [load all defined operations](#)

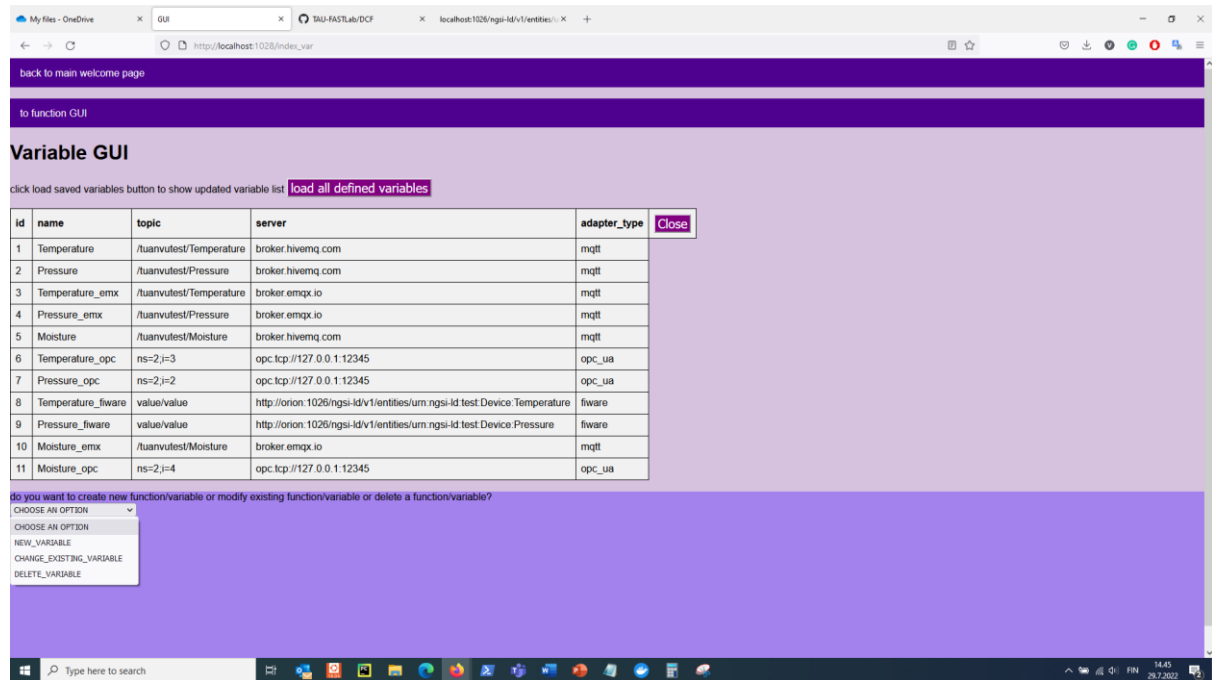
id	Function_type	Logic_condition	Alarm_limit_count	Result_published_to	Close
1	ALARM	Pressure > 100 and Temperature > 30	1	mqtt.broker.hivemq.com,/tuavutest/alarm1,fiware,orion,urn.ngsi-ld:test.Alert.alert1	
2	COUNT	Pressure < 80 and Pressure > 50		mqtt.broker.hivemq.com,/tuavutest/counter	
3	COUNT	Temperature > 20		mqtt.broker.hivemq.com,/tuavutest/counter500,fiware,orion,urn.ngsi-ld:test.Alert.cnt1	
4	COUNT	Temperature > 4		mqtt.broker.hivemq.com,/tuavutest/counter3	
5	ALARM	Temperature < 1000	3	mqtt.broker.hivemq.com,/tuavutest/alarm10	
6	COUNT	Pressure_emx > 10		mqtt.broker.hivemq.com,/tuavutest/count12	
7	COUNT	Moisture_emx > 10 and Moisture > 10		mqtt.broker.hivemq.com,/tuavutest/count372	
8	COUNT	Temperature_fiware <= 20		fiware,orion,urn.ngsi-ld:test.Alert.count20	
9	COUNT	Temperature_fiware > 5 and Pressure_fiware <= 30 and Pressure_fiware > 0		fiware,orion,urn.ngsi-ld:test.Alert.count5	

click load all defined variables button to view all defined variable inputs [load all defined variables](#)

do you want to create new function/variable or modify existing function/variable or delete a function/variable?  
 CHOOSE AN OPTION ▼

## Variable parameters interface

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



## Defining new variables

Choose option "NEW\_VARIABLE" to bring up new section



List of parameters:

- Variable name: the name of variable to be assigned value to
- Variable topic/path: the json path (fiware-orion) or topic (mqtt) or node location (opc-ua) where the variable value is located.
- Variable server: the server/link where the data is located.

For example, the value for Temperature\_fiware variable is located in domain orion:1026 with entity id urn:ngsi-id:test:Device:Temperature, the json file has format:

```

1 {
2   "id": "urn:ngsi-ld:test:Device:Temperature",
3   "type": "https://uri.fiware.org/ns/data-models#Device",
4   "https://smart-data-models.github.io/data-models/terms.jsonld#/definitions
      /source": {
5     "type": "Relationship",
6     "object": "urn:ngsi-ld:Device:company-xyz:busbar-789"
7   },
8   "https://smart-data-models.github.io/data-models/terms.jsonld#/definitions
      /category": {
9     "type": "Property",
10    "value": "sensor"
11  },
12  "value": {
13    "type": "Property",
14    "value": 9.06,
15    "observedAt": "2020-12-01T11:23:19.000Z"
16  },
17  "https://smart-data-models.github.io/data-models/terms.jsonld#/definitions
      /deviceState": {
18    "type": "Property",
19    "value": "ok"
20  },
21  "isSpecifiedBy": {
22    "type": "Property",
23    "value": {
24      "type": "Relationship",
25      "object": "urn:ngsi-ld:ResourceSpecification:company-xyz:sensor"
26    }
27  }
28 }

```

And users want to extract only the value “9.06”, so the path to the value is “value/value”. Thus, the inputs for the variable is

Variable name: Temperature\_fiware

Variable topic/path: value/value

Variable server: <http://orion:1026/ngsi-ld/v1/entities/urn:ngsi-ld:test:Device:Temperature>

Choose your adapter here: fiware

To save the variable, choose “add newly defined variable”, or else, choose “cancel change”

Modify existing variable

To modify existing variable, choose “CHANGE\_EXISTING\_VARIABLE”

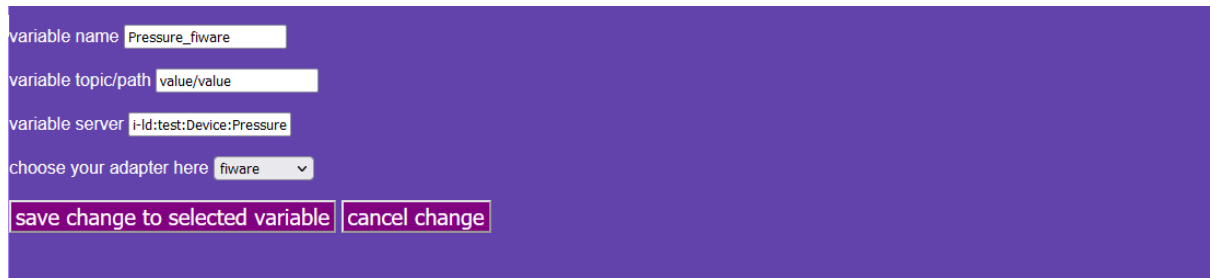
do you want to create new function/variable or modify existing function/variable or delete a function/variable?

CHANGE\_EXISTING\_VARIABLE ▾

Id of variable needs changing:

**get the variable** **cancel change**

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



variable name

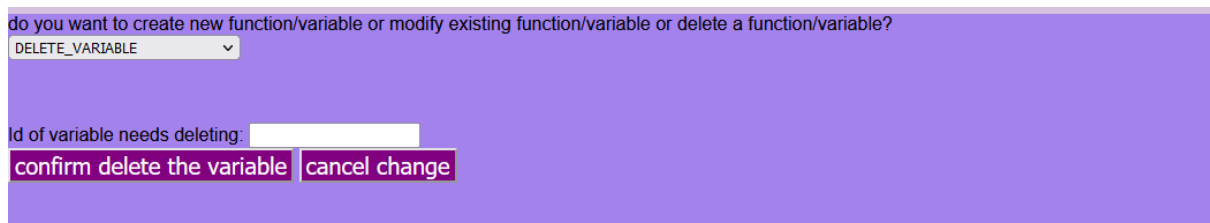
variable topic/path

variable server

choose your adapter here

### Delete existing variable

To delete existing variable, select “DELETE\_VARIABLE” and provide the id of the variable needing to be deleted



do you want to create new function/variable or modify existing function/variable or delete a function/variable?

Id of variable needs deleting:



## 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 addresslocalhost

server port1521

Username system

PasswordTest\_372

Table nameIRISDATA

Get column, put "\*" if users want to get entire tableSPECIES,SEPAL\_WIDTH

Assign table id for data extractionORACLE\_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

## 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
3	ORACLE_IRISDATA2	Oracle	localhost	1521	IRISDATA	SPECIES,SEPAL_WIDTH	get this db

delete database entry ▾

choose ENTRY\_NO. to be deleted 

save database info

cancel

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

## 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-Id:Device:flower	orion:1026	
2	MONGODB_PRODUCT1	product_name	lascannon	price	urn:ngsi-Id:Device:lascannon	orion:1026	

choose an action ▾

## 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”

## 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-Id:Device:flower	orion:1026	
2	MONGODB_PRODUCT1	product_name	lascannon	price	urn:ngsi-Id:Device:lascannon	orion:1026	

new variable entry ▾

Data from table (use table\_id) Column used for reference Value for reference column 

Target columns for data extraction, use "," to separate columns, enter "" if users want to get entire rows

Fiware entity id, format urn:ngsi-Id:Device:{your designated id} Orion-Id/fiware server domain name and port 

save variable info

cancel

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-lid:Device:flower1” that retrieves the SEPAL\_LENGTH, SEPAL\_WIDTH of SPECIES with name “caw” from table ORACLE\_IRISDATA1

new variable entry

Data from table (use table\_id)

ORACLE\_IRISDATA1

Column used for reference

SPECIES

Value for reference column

caw

Target columns for data extraction, use "," to separate columns, enter "\*" if users want to get entire rows

\_LENGTH,SEPAL\_WIDTH

Fiware entity id, format urn:ngsi-lid:Device:{your designated id}

n:ngsi-lid:Device:flower1

Orion-lid/fiware server domain name and port

orion:1026

save variable info

cancel

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-lid:Device:flower	orion:1026	
2	MONGODB_PRODUCT1	product_name	lascannon	price	urn:ngsi-lid:Device:lascannon	orion:1026	
3	ORACLE_IRISDATA1	SPECIES	caw	SEPAL_LENGTH,SEPAL_WIDTH	urn:ngsi-lid:Device:flower1	orion:1026	

choose an action

Result from orion server

← → ↺ 🏠

localhost:1026/ngsi-lid/v1/entities/urn:ngsi-lid:Device:flower1

JSONRaw DataHeaders

SaveCopyCollapse AllExpand All🔍 Filter JSON

id:

type:

▼ https://smart-data-models.github.io/data-models/terms.jsonld#/definitions/source:

type:

object:

▼ value:

type:

▼ value:

▼ value:

▼ 0:

SPECIES:

SEPAL\_LENGTH:

SEPAL\_WIDTH:

type:

observedAt:

▼ isSpecifiedBy:

type:

▼ value:

type:

object:

"urn:ngsi-lid:Device:flower1"

"https://uri.fiware.org/ns/data-models#Device"

"Relationship"

"urn:ngsi-lid:Device:company-xyz:database"

"Property"

"caw"

4.01

4.01

"Property"

"2022-07-29T17:26:55.450Z"

"Property"

"Relationship"

"urn:ngsi-lid: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-lid:Device:flower	orion:1026	
2	MONGODB_PRODUCT1	product_name	lascannon	price	urn:ngsi-lid:Device:lascannon	orion:1026	
3	ORACLE_IRISDATA1	SPECIES	caw	SEPAL_LENGTH,SEPAL_WIDTH	urn:ngsi-lid:Device:flower1	orion:1026	

delete variable entry ▼

choose db id to be deleted

save database infocancel

## 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)

back to main dashboard page

# MongoDB GUI

load all saved mongodb table info

choose an action ▼

load all saved variables info

choose an action ▼

*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

## 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

delete database entry ▼

choose ENTRY\_NO. to be deleted

save database info

cancel

### Adding new parameters entry for data retrieval or deleting existing entry

The procedures are the same as in legacy interface