Ms Sql Database for Grafana

Basic Excel
Create Database
Create Table
Select From Where
Node-Red Level Control Dashboard

https://github.com/chalermchonv/UtccFoodIotCodes

https://www.youtube.com/watch?v=SR89A1twIDM&list=PLhgZnNDXug_KgSpvYuTVtNdK-YN4blHh-

Grafana

- Data Source (Any Database)

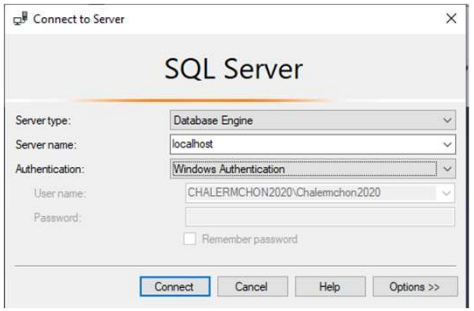
	id	metric	value	time	machine
1	1	Temperature	39	2021-06-20 12:05:40.220	m01
2	2	Humidity	67	2021-06-20 12:05:40.220	m01
3	3	Temperature	72	2021-06-20 12:05:54.083	m01
4	4	Humidity	56	2021-06-20 12:05:54.083	m01
5	5	Temperature	43	2021-06-20 12:06:00.280	m01
6	6	Humidity	41	2021-06-20 12:06:00.280	m01
7	7	Temperature	37	2021-06-20 12:09:50.193	m01
8	8	Humidity	47	2021-06-20 12:09:50.193	m01

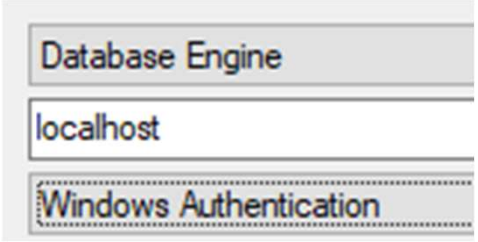
- Dashboard (SQL)

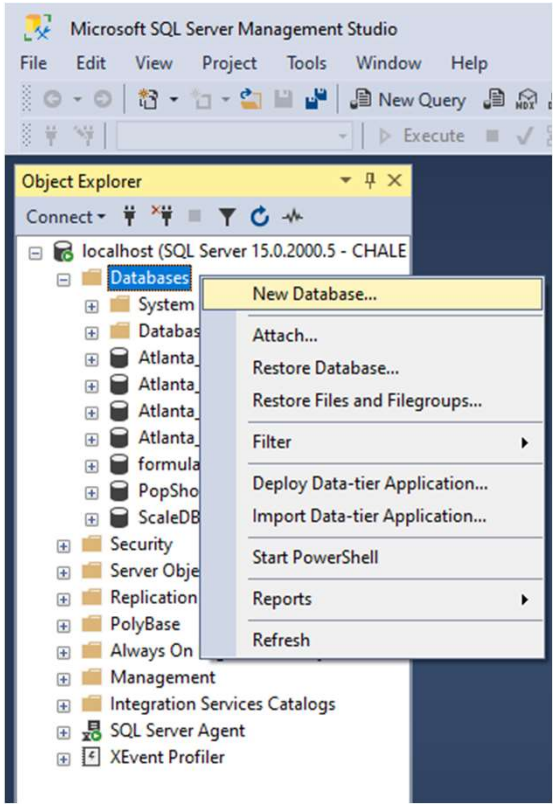

```
SELECT
  [time] ,  [value]  ,  [metric]
FROM [IotDB].[dbo].[IotDemo]
WHERE  $__timeFilter([time])
ORDER BY  time ASC
```

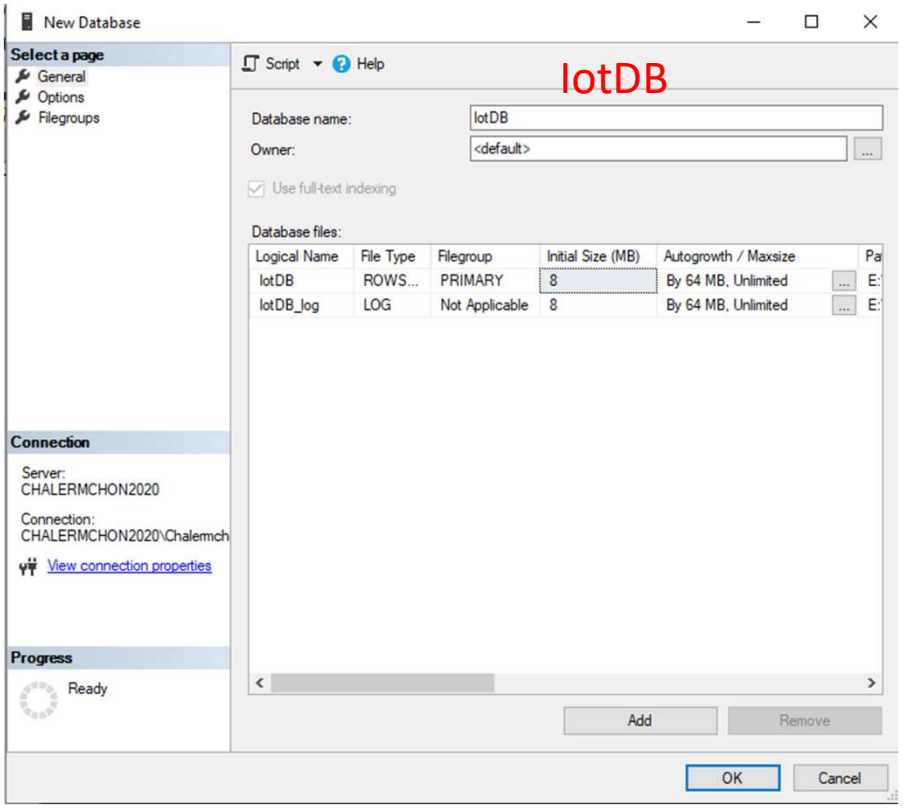
Youtube MsSql 01 SSMS Create Db and Table

Sql Server Management Studio
Create New Database (IotDB)

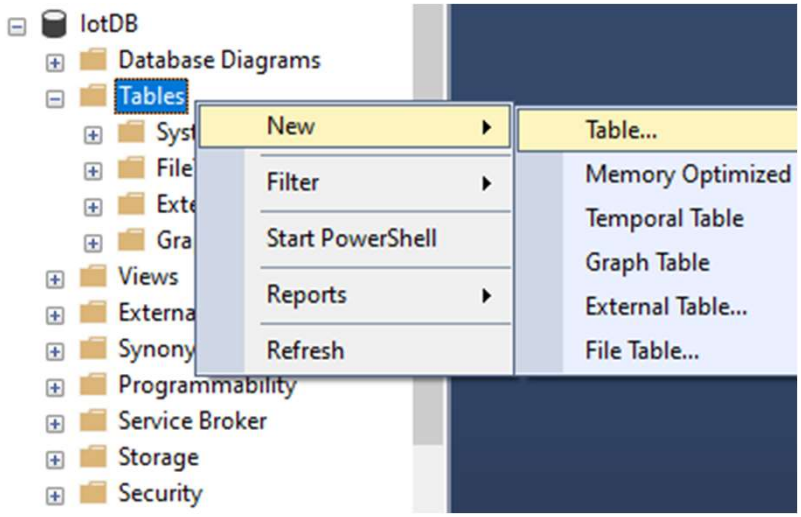


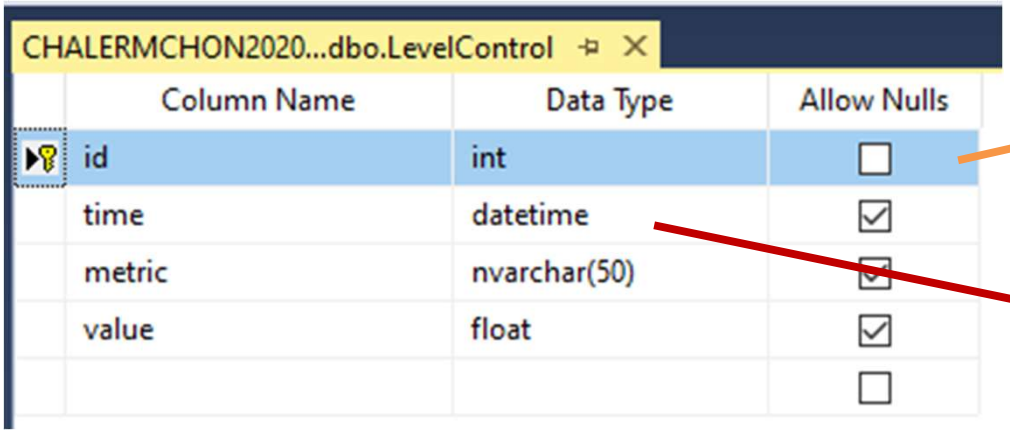


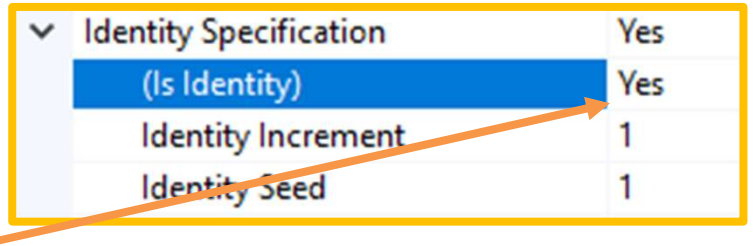


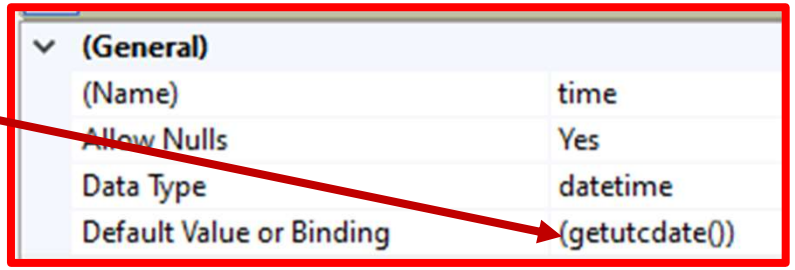


Create LevelControlData Table



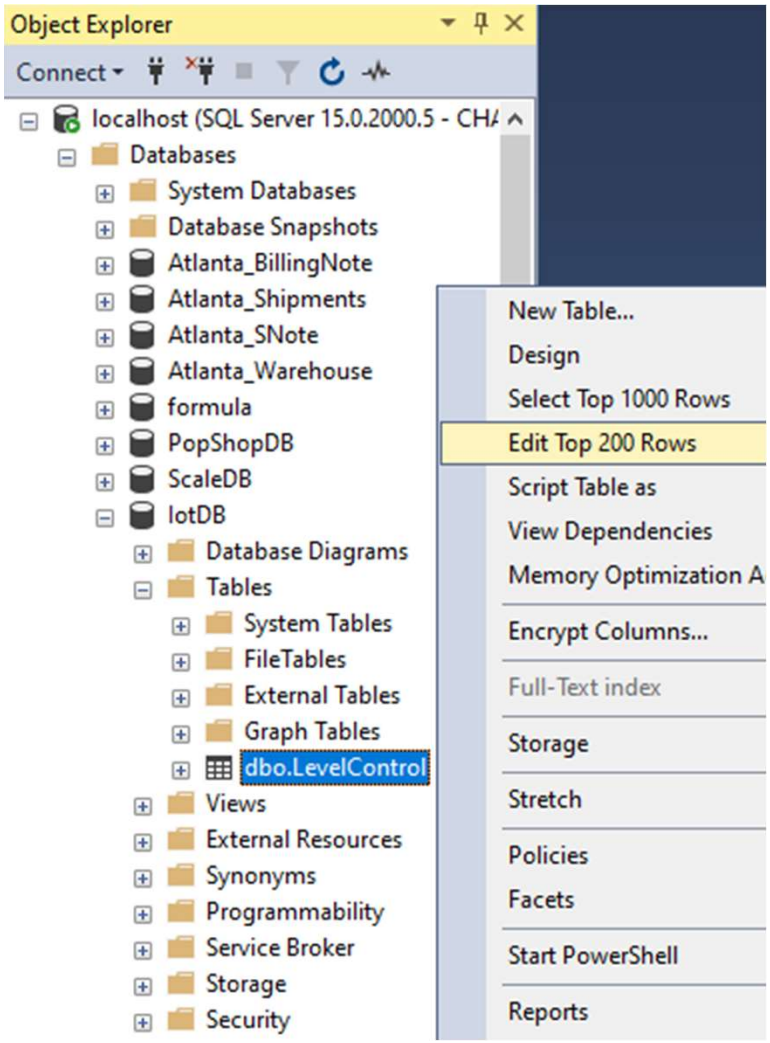


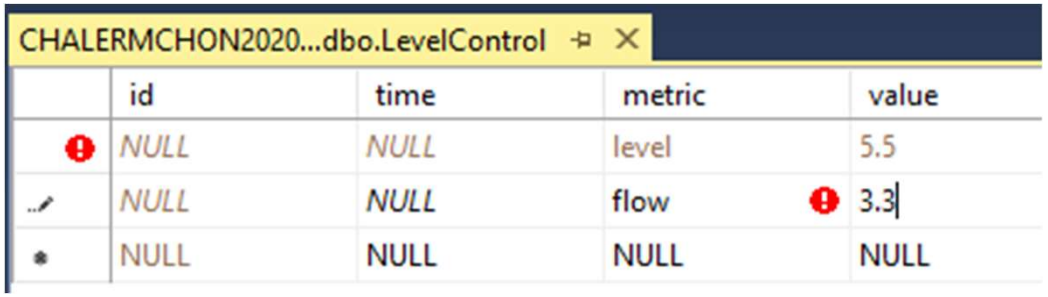




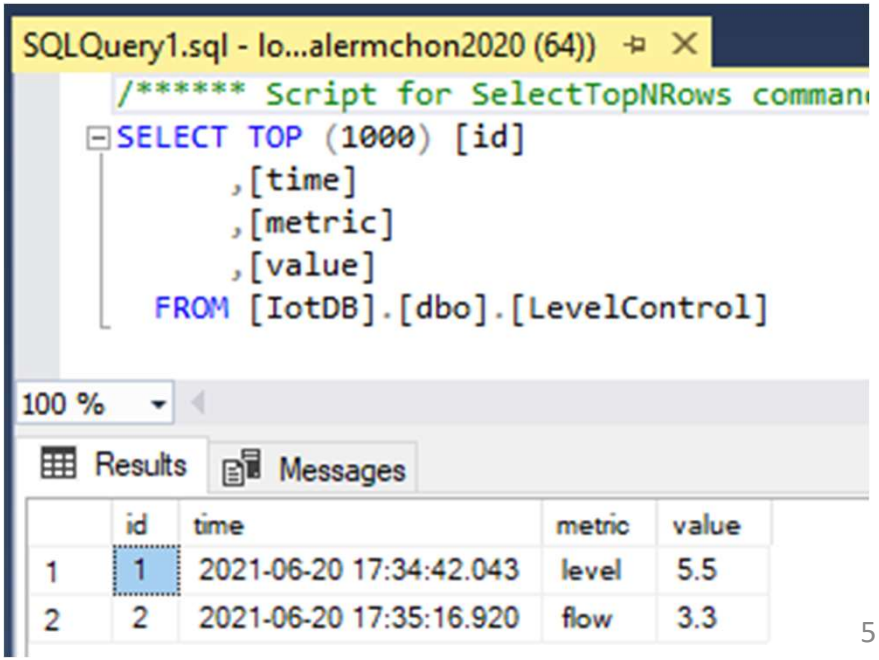
(Getutcdate())

Edit Table


Object Explorer
Connect
localhost (SQL Server 15.0.2000.5 - CHA
Databases
System Databases
Database Snapshots
Atlanta_BillingNote
Atlanta_Shipments
Atlanta_SNote
Atlanta_Warehouse
formula
PopShopDB
ScaleDB
IotDB
Database Diagrams
Tables
System Tables
FileTables
External Tables
Graph Tables
dbo.LevelControl
Views
External Resources
Synonyms
Programmability
Service Broker
Storage
Security
New Table...
Design
Select Top 1000 Rows
Edit Top 200 Rows
Script Table as
View Dependencies
Memory Optimization A
Encrypt Columns...
Full-Text index
Storage
Stretch
Policies
Facets
Start PowerShell
Reports

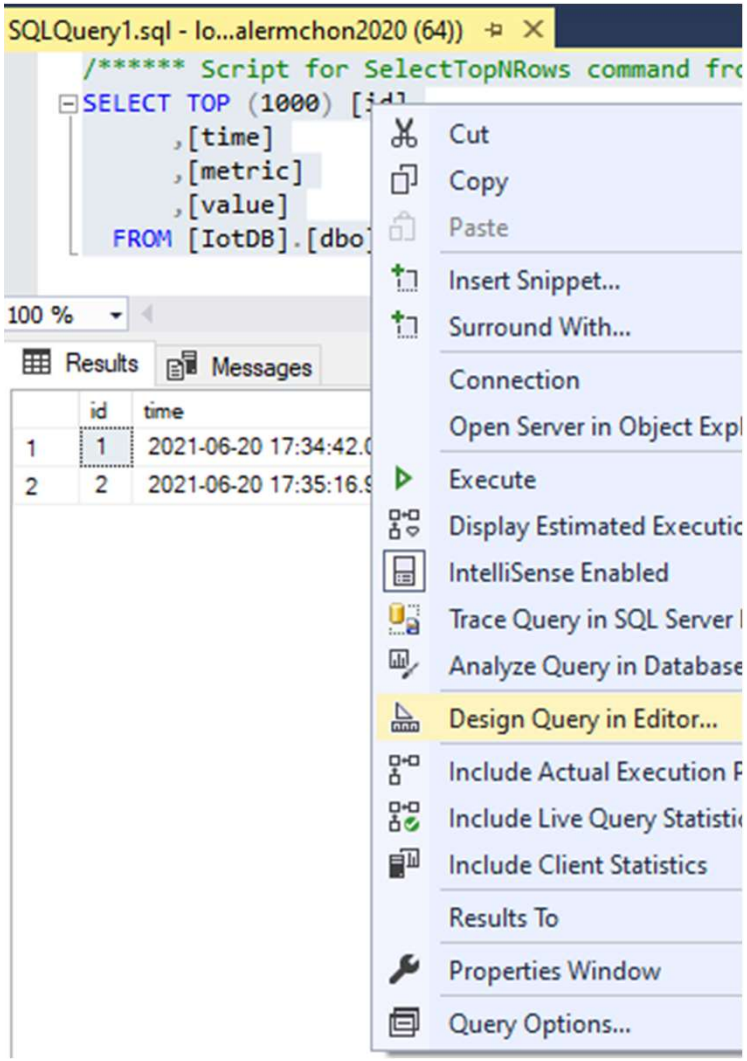

CHALERMCHON2020...dbo.LevelControl
id
time
metric
value
NULL
NULL
level
5.5
NULL
NULL
flow
3.3
NULL
NULL
NULL
NULL

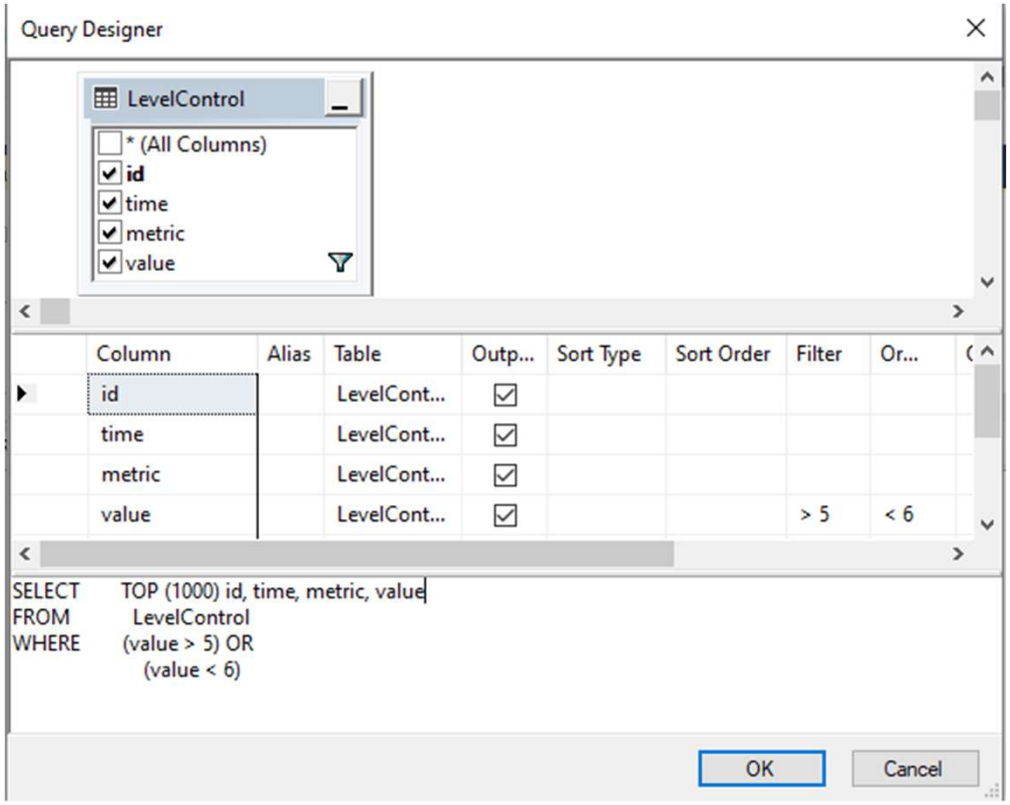

Select Top 1000 Rows


SQLQuery1.sql - lo...alermchon2020 (64))
/****** Script for SelectTopNRows comman
SELECT TOP (1000) [id]
,[time]
,[metric]
,[value]
FROM [IotDB].[dbo].[LevelControl]
100 %
Results
Messages
id
time
metric
value
1
1
2021-06-20 17:34:42.043
level
5.5
2
2
2021-06-20 17:35:16.920
flow
3.3

Youtube MsSql 02 Design Query

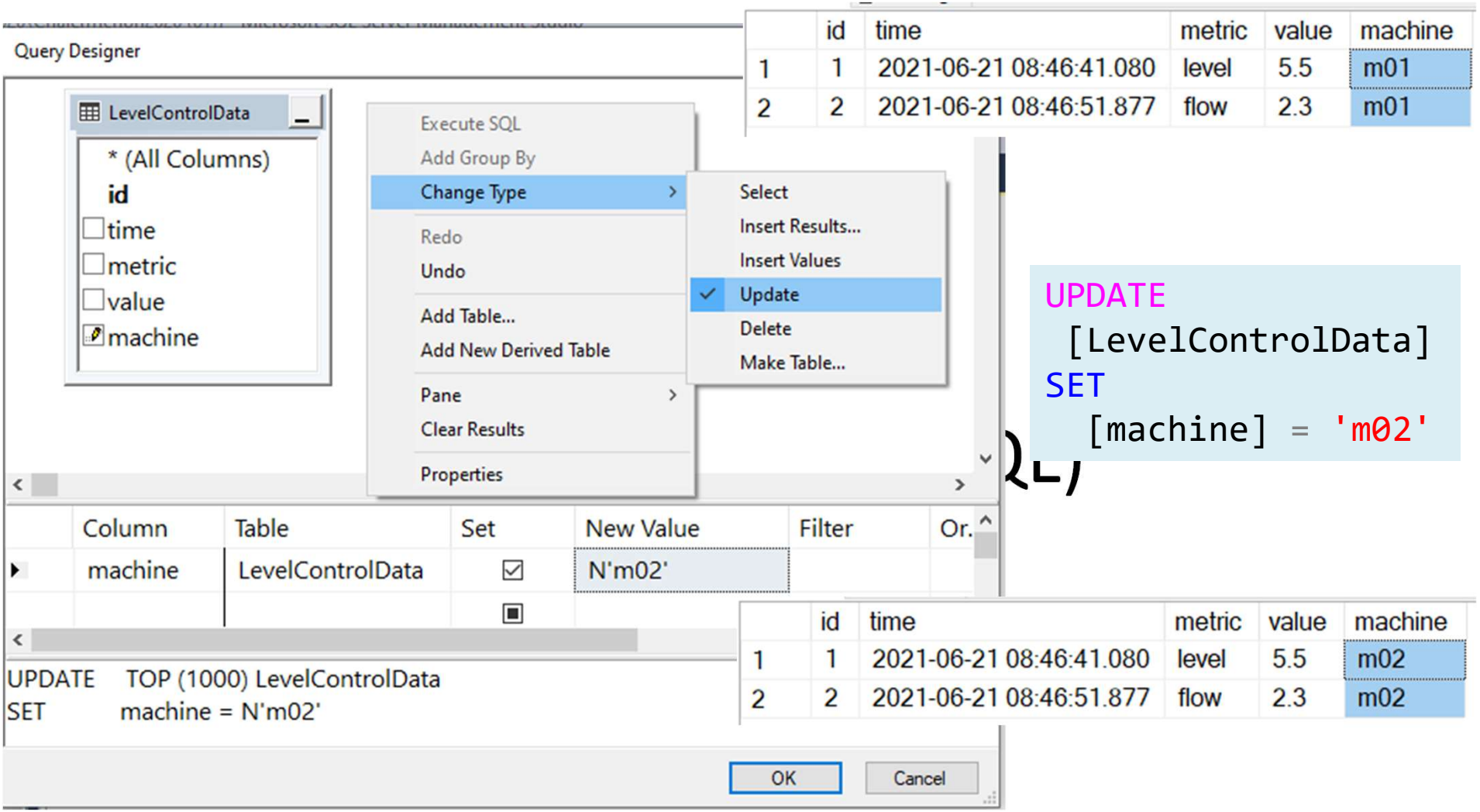
Design Query In Editor






```
SELECT TOP (100) id, time, metric,value
FROM    LevelControl
WHERE (value > 5) OR (value < 6)
```

Update (SQL)



	id	time	metric	value	machine
1	1	2021-06-21 08:46:41.080	level	5.5	m01
2	2	2021-06-21 08:46:51.877	flow	2.3	m01

```
UPDATE
 [LevelControlData]
SET
  [machine] = 'm02'
```

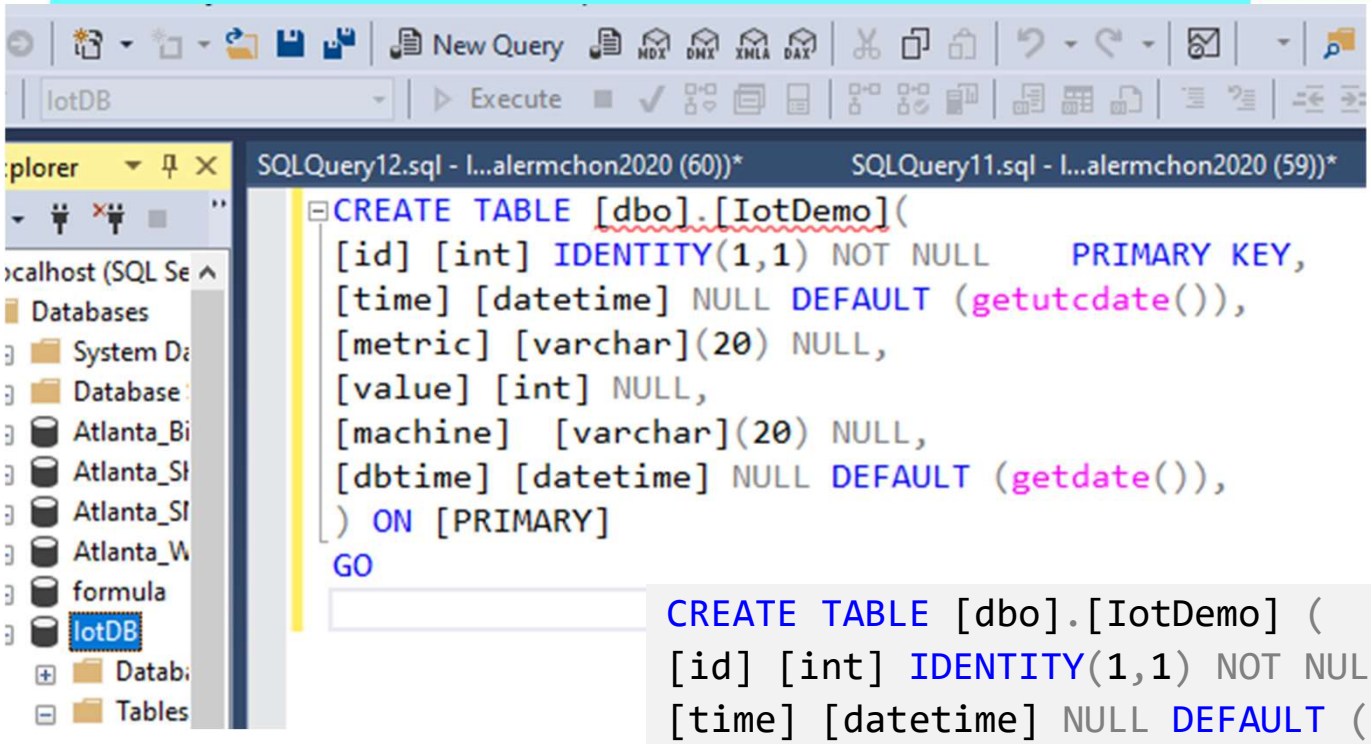
	id	time	metric	value	machine
1	1	2021-06-21 08:46:41.080	level	5.5	m02
2	2	2021-06-21 08:46:51.877	flow	2.3	m02

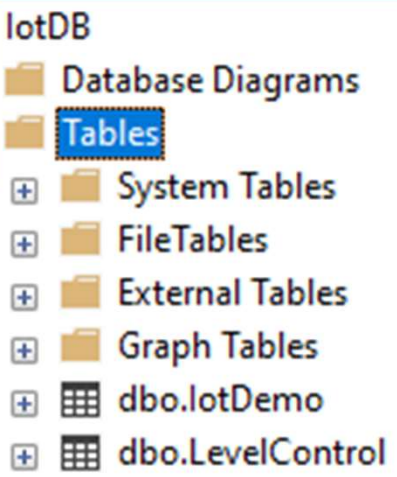
```
UPDATE [LevelControlData] SET  [machine] = 'm01' Where id = 1
```

Basic SQL Language

- SELECT -- Column names
- FROM -- Table or View name
- WHERE -- Filter criteria
- GROUP BY -- Logic to roll-up records
- HAVING -- Criteria for GROUP BY logic
- ORDER BY – Sort column name data either
  - ASC (ascending) or
  - DESC (descending)

Create Table (SQL Script)



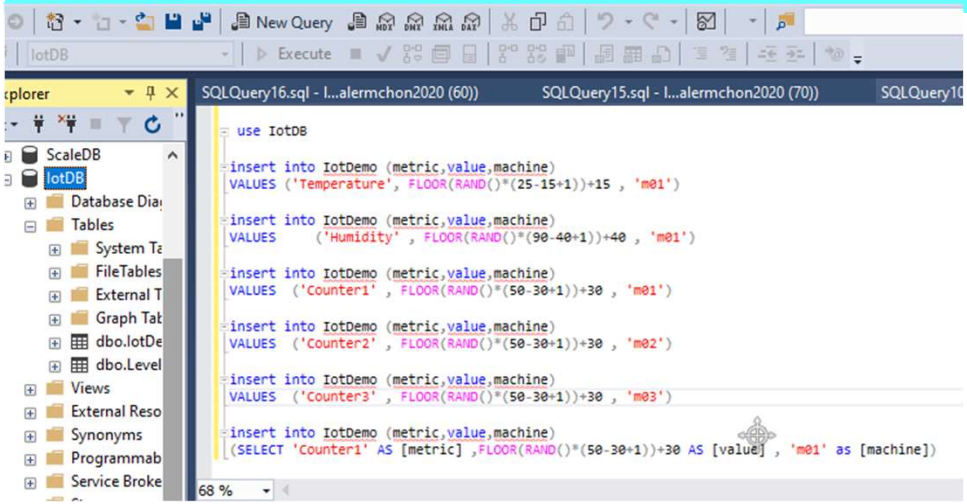


UtccFoodIotCodes/Ms SQL/
CreateIotDemoTable.sql

```
CREATE TABLE [dbo].[IotDemo] (
[id] [int] IDENTITY(1,1) NOT NULL     PRIMARY KEY,
[time] [datetime] NULL DEFAULT (getutcdate()),
[metric] [varchar](20) NULL,
[value] [int] NULL,
[machine]  [varchar](20) NULL,
[dbtime] [datetime] NULL DEFAULT (getdate()),
) ON [PRIMARY]
GO
```

https://github.com/chalermchonv/UtccFoodIotCodes

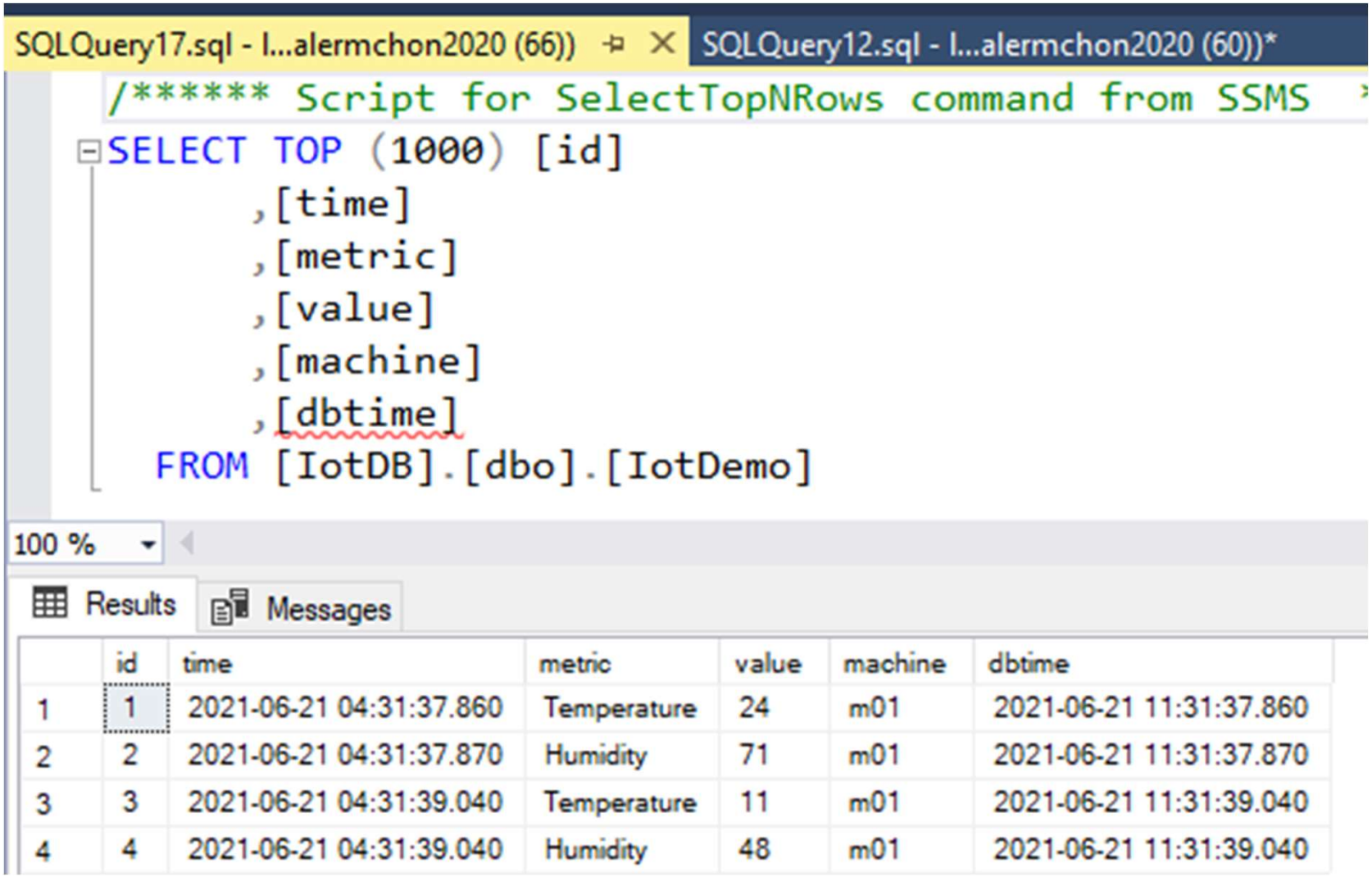
Insert IotDemo Table (SQL Script)




```
Delete FROM
[IotDB].[dbo].[IotDemo]
```

UtccFoodIotCodes/Ms SQL/
Insert Data to IotDemo.sql

```
use IotDB
insert into IotDemo (metric,value,machine)
     VALUES ('Temperature', FLOOR(RAND()*(25-15+1))+15 , 'm01')
insert into IotDemo (metric,value,machine)
     VALUES ('Humidity' , FLOOR(RAND()*(90-40+1))+40 , 'm01')
insert into IotDemo (metric,value,machine)
     VALUES ('Counter1' , FLOOR(RAND()*(50-30+1))+30 , 'm01')
insert into IotDemo (metric,value,machine)
     VALUES ('Counter2' , FLOOR(RAND()*(50-30+1))+30 , 'm02')
insert into IotDemo (metric,value,machine)
     VALUES ('Counter3' , FLOOR(RAND()*(50-30+1))+30 , 'm03')
insert into IotDemo (metric,value,machine)
(SELECT 'Counter1' AS [metric] ,FLOOR(RAND()*(25-15+1))+15 AS
[value] , 'm01' as [machine])
```



	id	time	metric	value	machine	dbtime
1	1	2021-06-21 04:31:37.860	Temperature	24	m01	2021-06-21 11:31:37.860
2	2	2021-06-21 04:31:37.870	Humidity	71	m01	2021-06-21 11:31:37.870
3	3	2021-06-21 04:31:39.040	Temperature	11	m01	2021-06-21 11:31:39.040
4	4	2021-06-21 04:31:39.040	Humidity	48	m01	2021-06-21 11:31:39.040

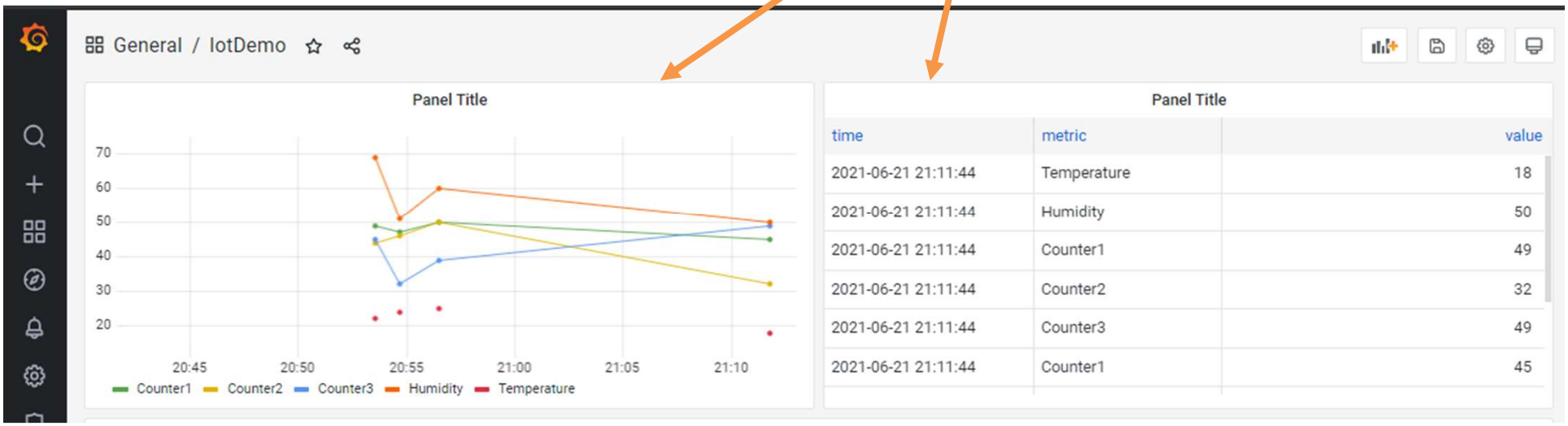
Grafana

- Data Source (Any Database)

	id	metric	value	time	machine
1	1	Temperature	39	2021-06-20 12:05:40.220	m01
2	2	Humidity	67	2021-06-20 12:05:40.220	m01
3	3	Temperature	72	2021-06-20 12:05:54.083	m01
4	4	Humidity	56	2021-06-20 12:05:54.083	m01
5	5	Temperature	43	2021-06-20 12:06:00.280	m01
6	6	Humidity	41	2021-06-20 12:06:00.280	m01
7	7	Temperature	37	2021-06-20 12:09:50.193	m01
8	8	Humidity	47	2021-06-20 12:09:50.193	m01

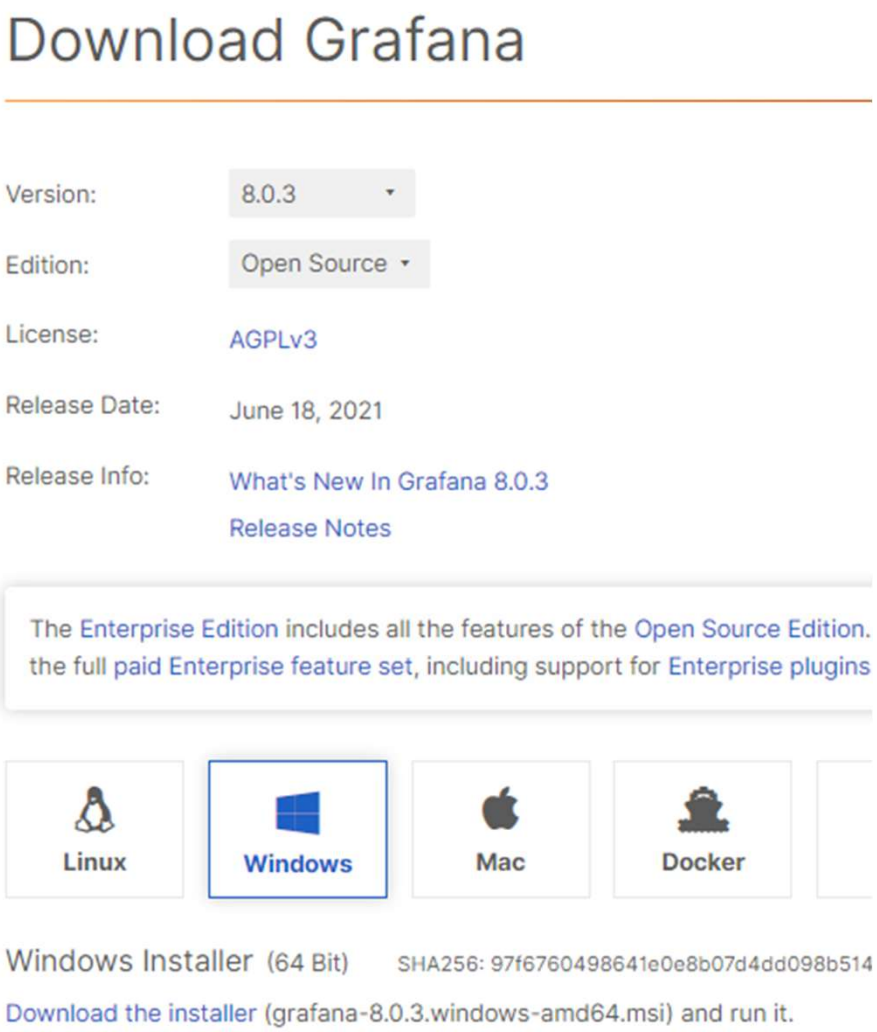
- Dashboard (SQL)

```
SELECT
  [time] ,  [value]  ,  [metric]
FROM [IotDB].[dbo].[IotDemo]
WHERE  $__timeFilter([time])
ORDER BY  time ASC
```

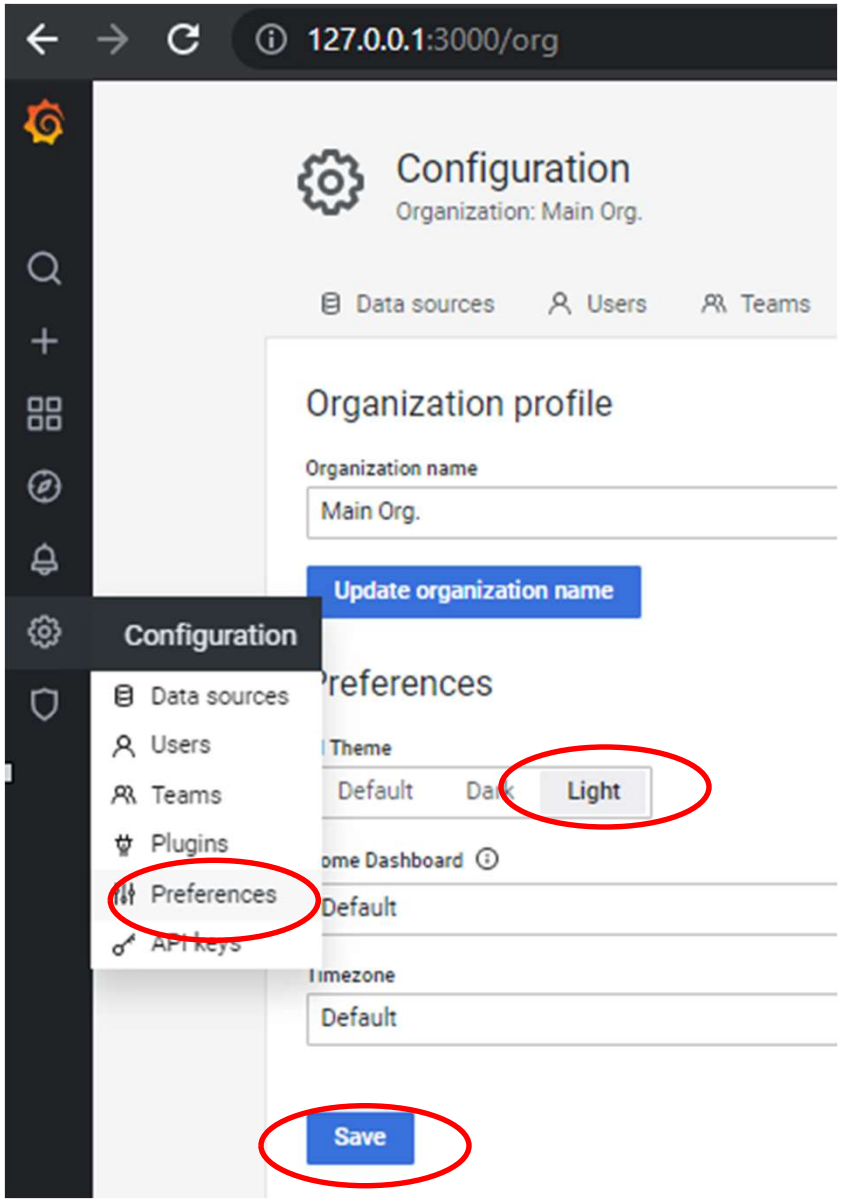


Download Grafana

https://grafana.com/grafana/download?edition=oss&platform=windows

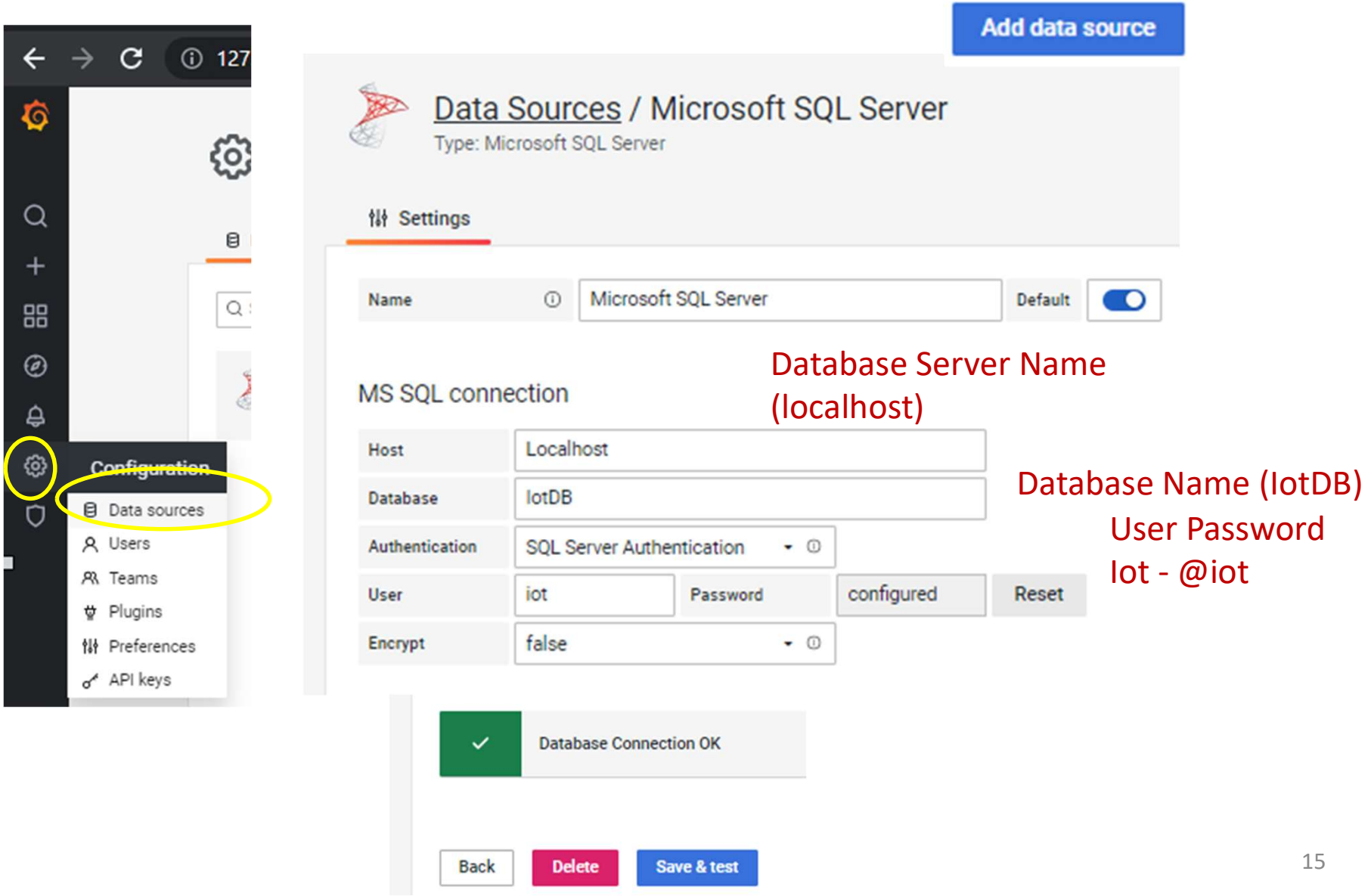


Change to Light Theme



Youtube Grafana 01 Data Source and Dashboard

Add Data Source



Prepare Data

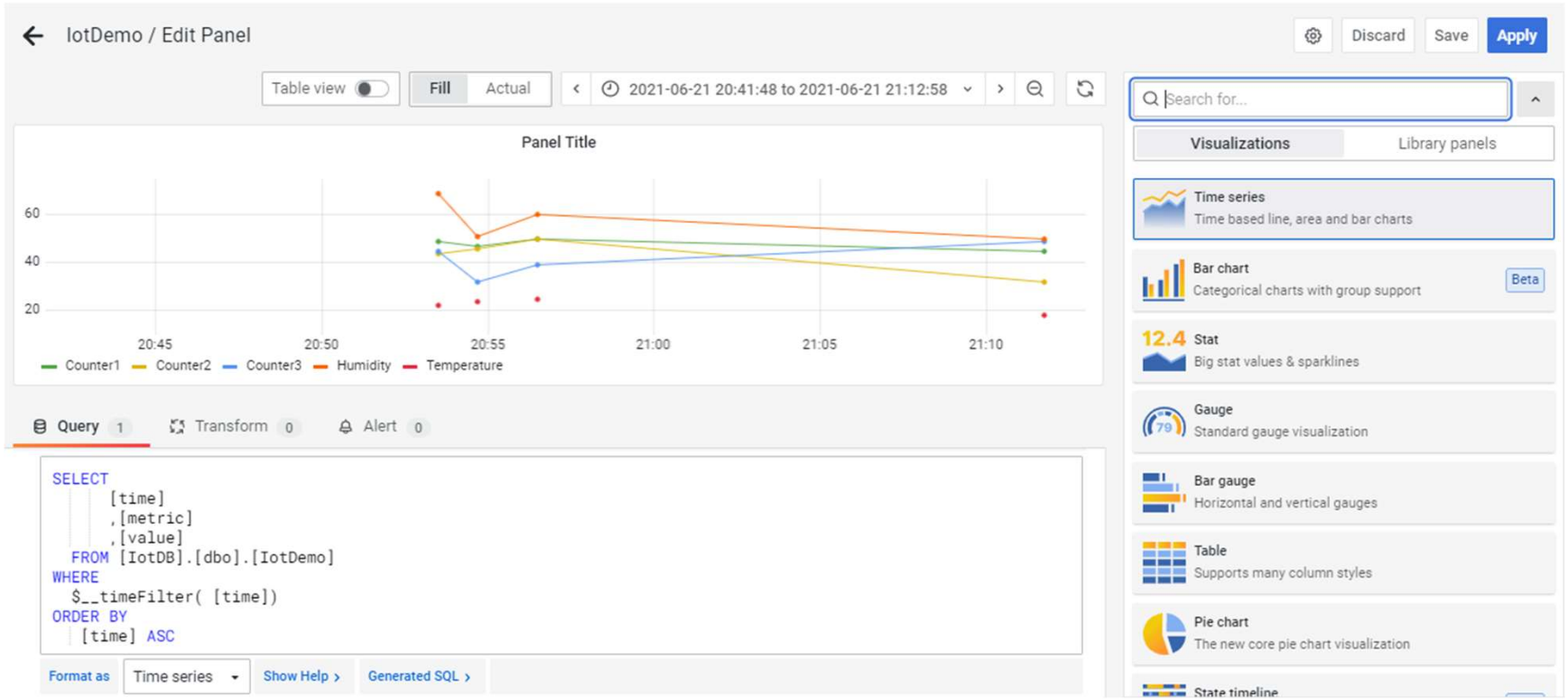
```
Delete FROM
[IotDB].[dbo].[IotDemo]
```

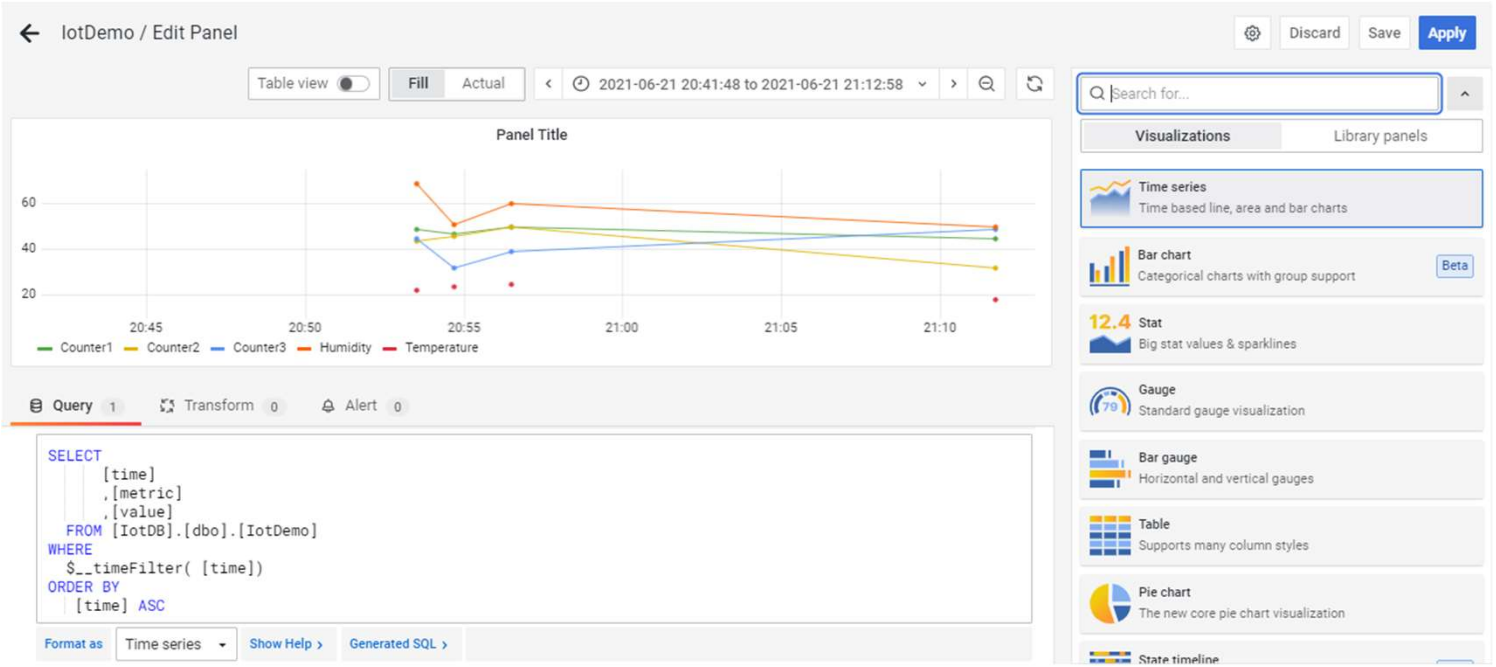
```
use IotDB
insert into IotDemo (metric,value,machine)
     VALUES ('Temperature', FLOOR(RAND()*(25-15+1))+15 , 'm01')
insert into IotDemo (metric,value,machine)
     VALUES ('Humidity' , FLOOR(RAND()*(90-40+1))+40 , 'm01')
insert into IotDemo (metric,value,machine)
     VALUES ('Counter1' , FLOOR(RAND()*(50-30+1))+30 , 'm01')
insert into IotDemo (metric,value,machine)
     VALUES ('Counter2' , FLOOR(RAND()*(50-30+1))+30 , 'm02')
insert into IotDemo (metric,value,machine)
     VALUES ('Counter3' , FLOOR(RAND()*(50-30+1))+30 , 'm03')
insert into IotDemo (metric,value,machine)
(SELECT ‘Counter1' AS [metric] ,FLOOR(RAND()*(25-15+1))+15 AS
[value] , 'm01' as [machine])
```

Grafana Code

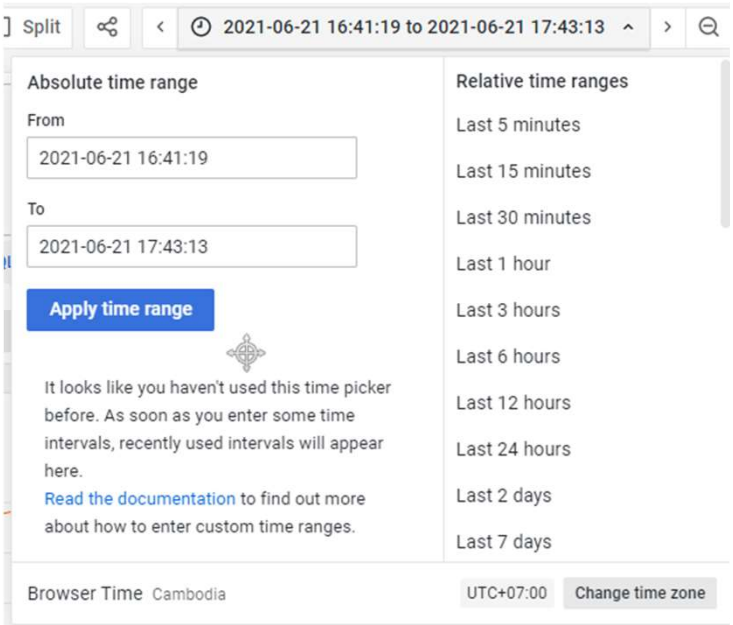
```
SELECT [time], [value], [metric]
FROM [IotDB].[dbo].[IotDemo]
WHERE $__timeFilter([time])
ORDER BY time ASC
```

	id	metric	value	time	machine
1	1	Temperature	39	2021-06-20 12:05:40.220	m01
2	2	Humidity	67	2021-06-20 12:05:40.220	m01
3	3	Temperature	72	2021-06-20 12:05:54.083	m01
4	4	Humidity	56	2021-06-20 12:05:54.083	m01
5	5	Temperature	43	2021-06-20 12:06:00.280	m01
6	6	Humidity	41	2021-06-20 12:06:00.280	m01
7	7	Temperature	37	2021-06-20 12:09:50.193	m01
8	8	Humidity	47	2021-06-20 12:09:50.193	m01

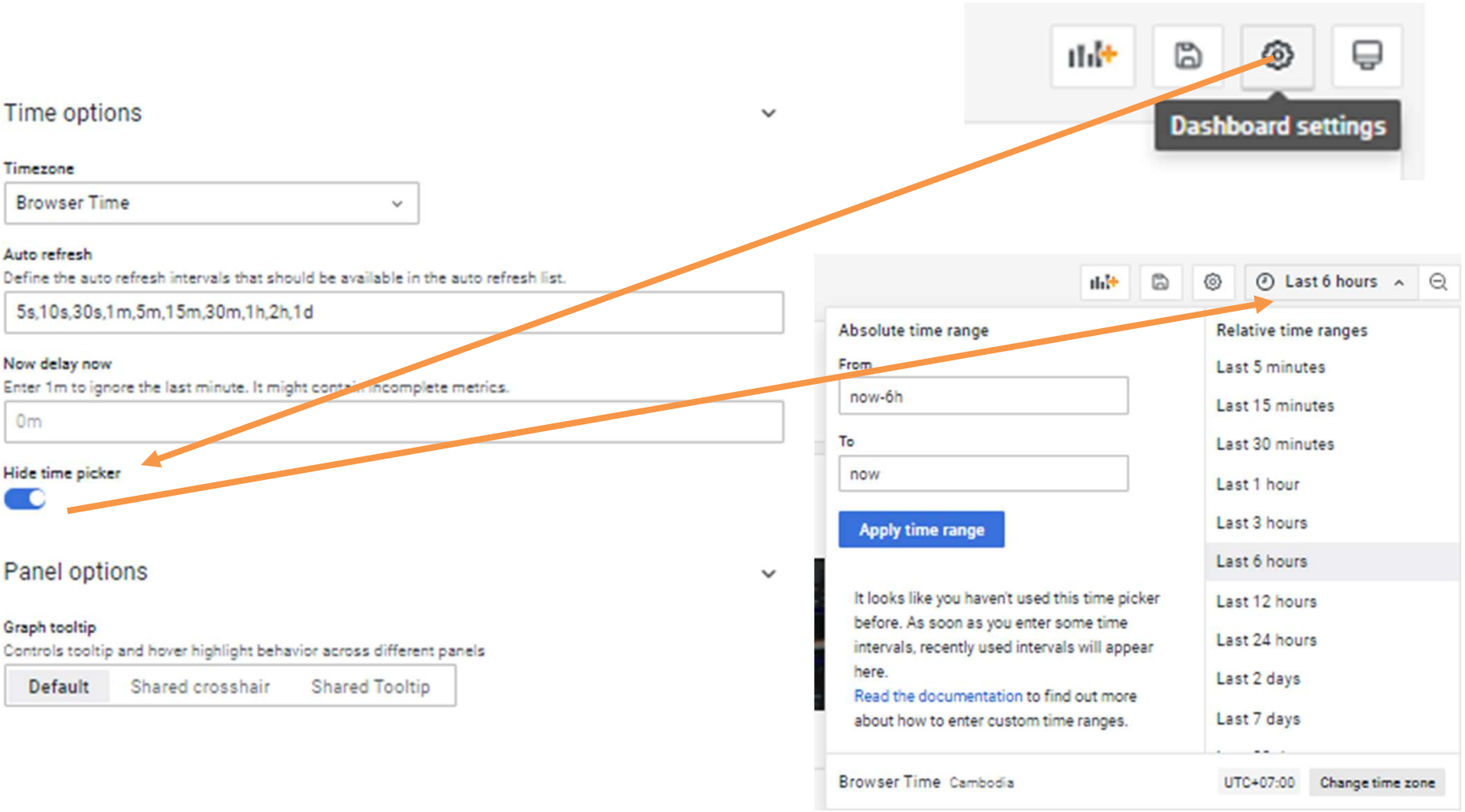




time	Counter1	Counter2	Counter3	Humidity	Temperature
2021-06-21 16:28:31					20
2021-06-21 16:30:34	37	31	46	49	17
2021-06-21 16:30:34					15
2021-06-21 16:32:04	43	45	50	56	21
2021-06-21 16:32:04					23
2021-06-21 16:52:12	45	36	48	52	15
2021-06-21 16:52:12					19
2021-06-21 16:53:21	50	45	31	81	19
2021-06-21 16:53:21					20
2021-06-21 17:02:20					15

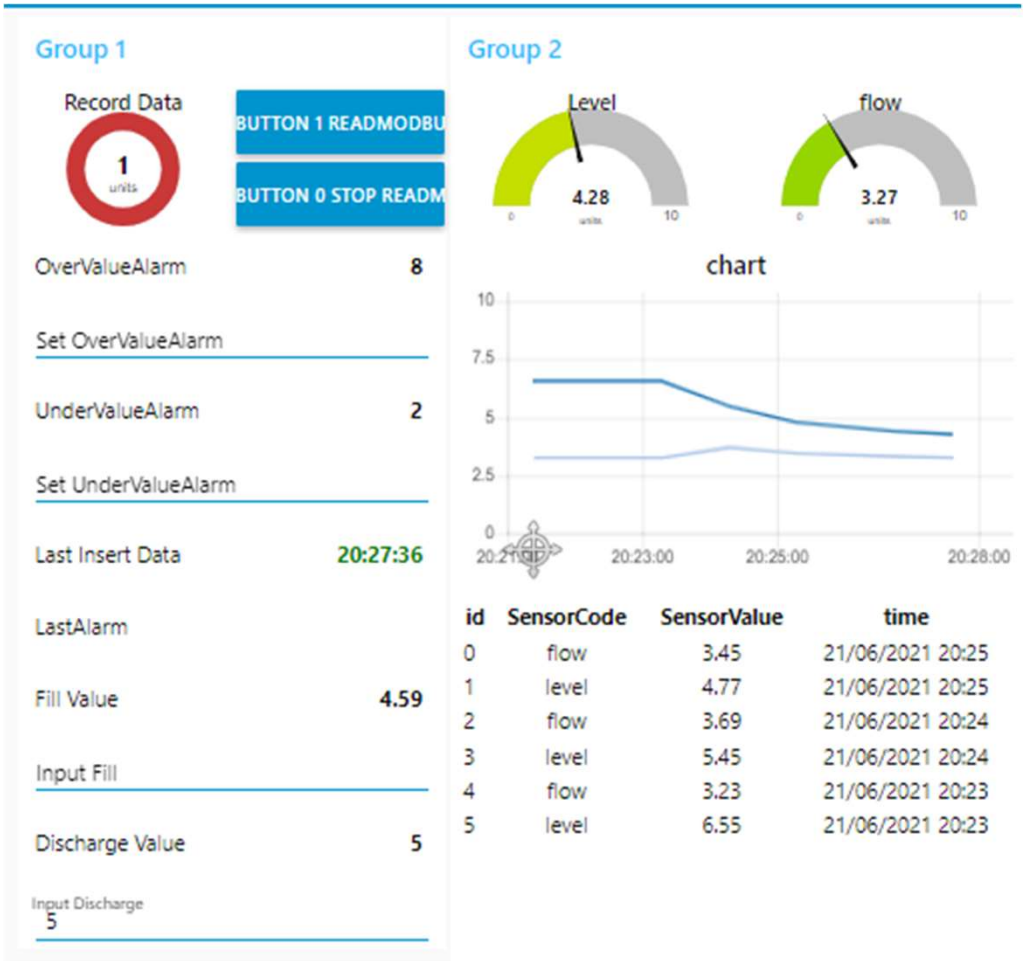


Show time picker

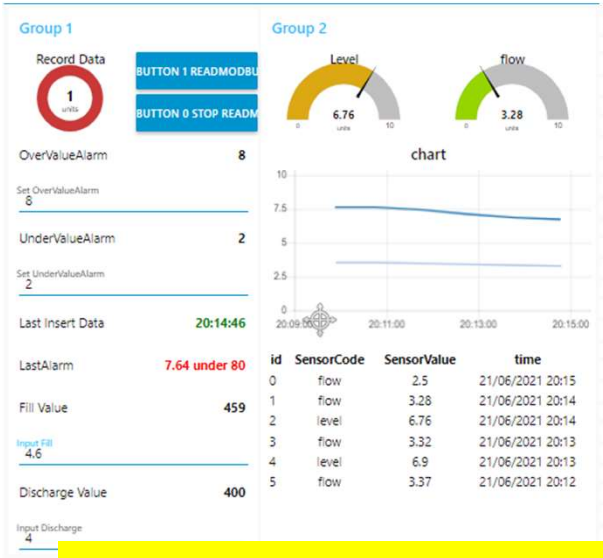


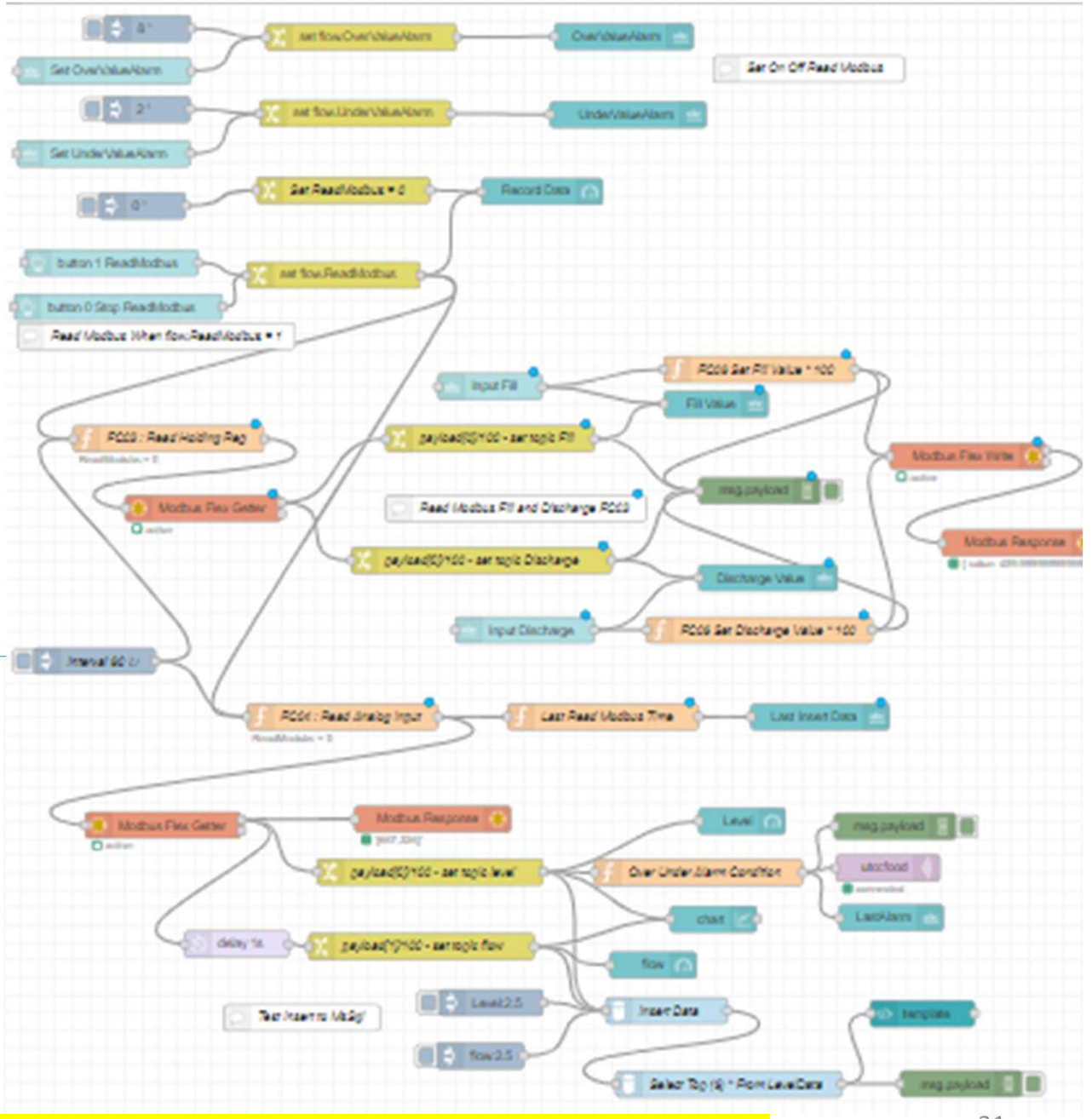
Youtube Node-Red Level Control

Node-Red Control FactoryIO
(Advanced Level Control Dashboard)



UtccFoodIotCodes/Node-Red/Node-Red Level Control.json





UtccFoodIotCodes/Node-Red/Node-Red Level Control.json

DATEADD , FORMAT

```
SELECT TOP (1000) [id]
      ,[time]
      ,[metric]
      ,[value]
      ,[machine]
  ,FORMAT( DATEADD(hour,7, [time]), 'dd/MM/yyyy HH:mm ') as lctime
  FROM [IotDB].[dbo].[LevelControlData]
```

UtccFoodIotCodes/Grafana/
Show Local Datetime from UTCDate.sql

	id	time	metric	value	machine	lctime
1	1	2021-06-21 08:46:41.080	level	5.5	m01	21/06/2021 15:46
2	2	2021-06-21 08:46:51.877	flow	2.4	m02	21/06/2021 15:46

```
Select TOP (6) id, metric, value
  , FORMAT( DATEADD(hour,7, [time]), 'dd/MM/yyyy HH:mm ') as [time]
From LevelControlData
 Order by id Desc;
```

	id	metric	value	time
1	15	flow	2.36	21/06/2021 20:07
2	14	level	3.49	21/06/2021 20:07
3	13	flow	1.82	21/06/2021 20:07

Query

```
1  Select TOP (6) id, metric, value
2   , FORMAT( DATEADD(hour,7, [time]), 'dd/MM/yyyy HH:mm ') as [time]
3  From LevelControlData
4   Order by id Desc;
```

id	SensorCode	SensorValue	time
0	flow	3.23	21/06/2021 20:31
1	level	4.19	21/06/2021 20:31
2	flow	3.24	21/06/2021 20:30
3	level	4.2	21/06/2021 20:30
4	flow	3.24	21/06/2021 20:29
5	level	4.21	21/06/2021 20:29

Template

```
1  <table style="width:100%">
2    <tr>
3      <th>id</th>
4      <th>SensorCode</th>
5      <th>SensorValue</th>
6      <th>time</th>
7    </tr>
8    <tr ng-repeat="x in msg.payload | limitTo:20">
9      <td>{{$index}}</td>
10     <td align="center">{{msg.payload[$index].metric}}</td>
11     <td align="center">{{msg.payload[$index].value}}</td>
12     <td align="center">{{msg.payload[$index].time}}</td>
13   </tr>
14 </table>
```

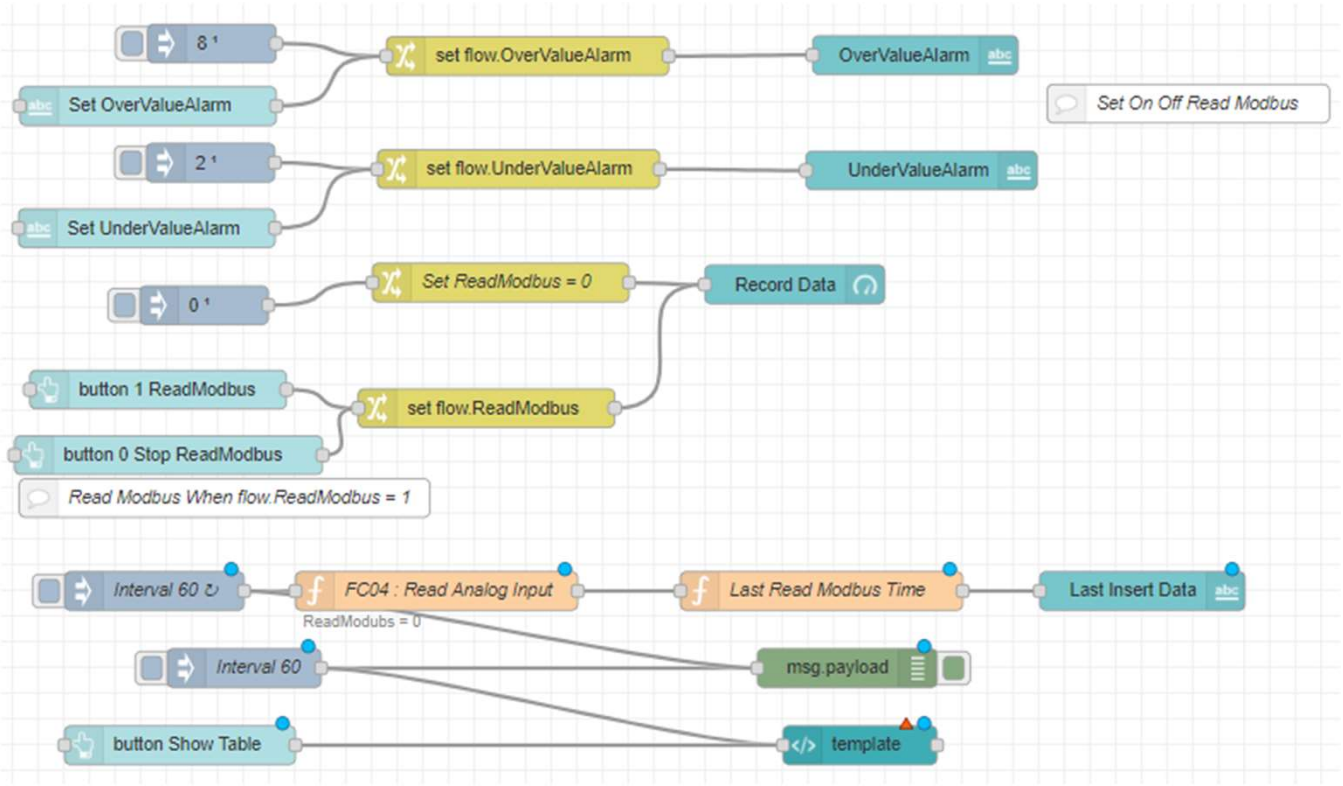
6/21/2021, 8:31:54 PM node: 9754d97e.876f78

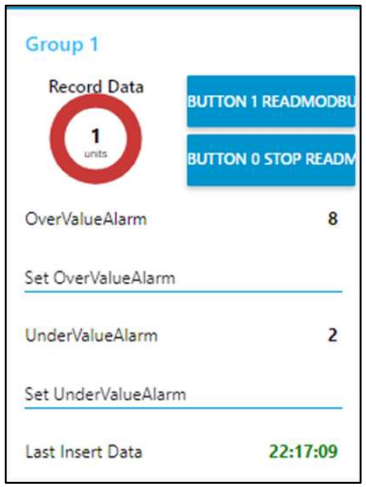
msg.payload : array[6]

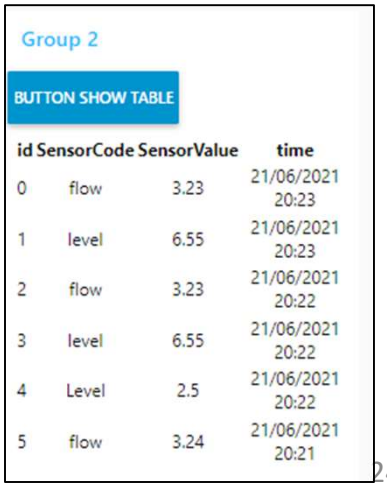
```
▾ array[6]
  ▾ 0: object
      id: 63
      metric: "flow"
      value: 3.23
      time: "21/06/2021 20:31 "
  ▸ 1: object
  ▸ 2: object
  ▸ 3: object
  ▸ 4: object
  ▸ 5: object
```

Node-Red : Flow Variable Tutorial

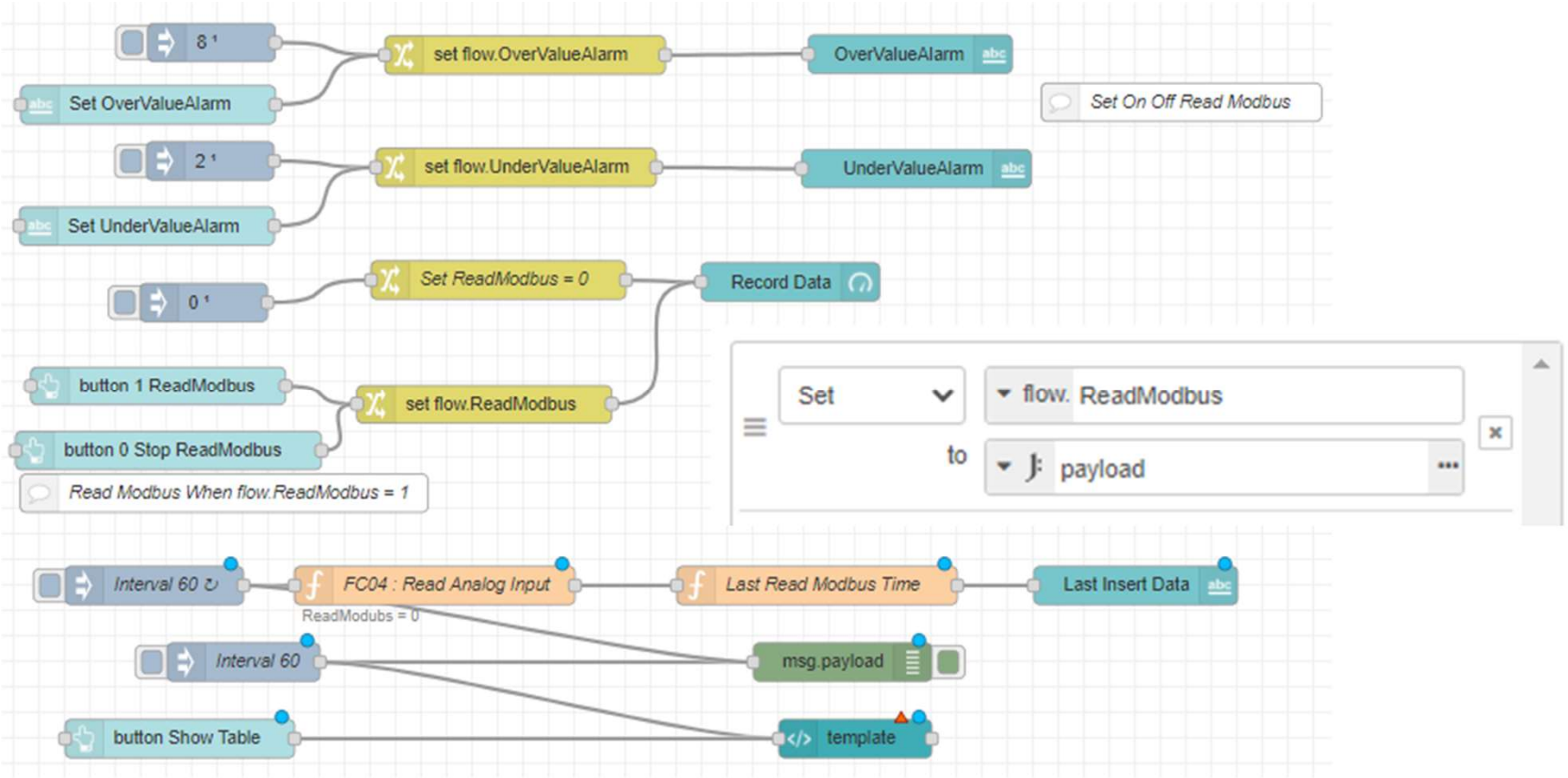
UtccFoodIotCodes/Node-Red/
Flow Variable Tutorial.json







Flow Variable Tutorial




```
var ReadModbus = flow.get("ReadModbus");

if ( ReadModbus === 0) {

    node.status({text:"ReadModubs = 0"});
    return null;
} else {
    node.status({text:"ReadModubs = 1"});
    return msg;
}
```