

Storing Sensor Data in SQL Tables – 25-Feb-2020

SNP-22020-Project-Session1-SQL



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SNP STEAM ACADEMY

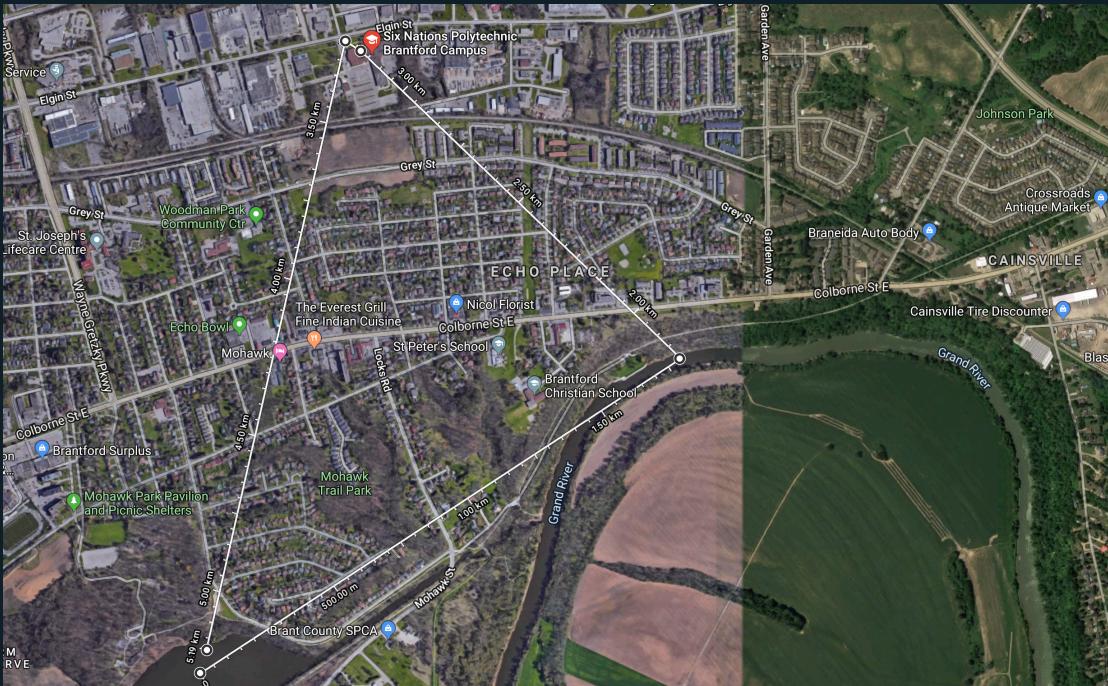
<https://www.snpolytechnic.com/steam-academy>

<https://github.com/SixNationsPolytechnic/2020-Project-session1-sql>



SIX NATIONS
POLYTECHNIC

Our Goal – Environmental Monitoring



Challenges

- Funding
- Time
- Paperwork
- Hardware
- Device Incompatibility



What we did so far

- Experiments
 - Networks
 - Distance
 - Hardware
 - Sensors



Data storage

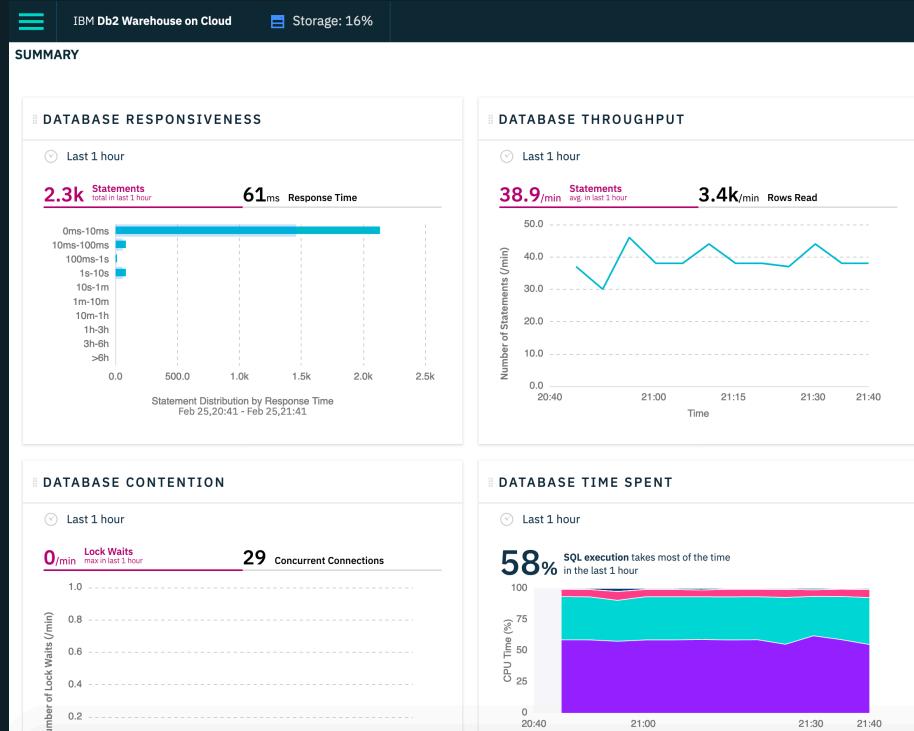
- We will have a lot of incoming sensor data
- We need to come-up with a structure to store and analyze data
-

Today

- Create SQL Tables
- Load some example Data
- Insert Data via Node-RED
- Create a Dashboard in Node-RED
- Use Python Notebooks to access the data

Creating a Datawarehouse - using SQL

<https://db2w-seirbtf.us-south.db2w.cloud.ibm.com/console/#monitor/summary>



What is SQL ?

<https://en.wikipedia.org/wiki/SQL>

SQL (/ˌɛsˈkjuːəl/ (About this soundlisten) S-Q-L,[4] /'si:kwəl/ "sequel"; Structured Query Language)[5][6][7] is a domain-specific language used in programming and designed for managing data held in a relational database management system (RDBMS), or for stream processing in a relational data stream management system (RDSMS). It is particularly useful in handling structured data, i.e. data incorporating relations among entities and variables.

SQL Databases are Column base like a XLS

Date	Time	TS	Group	Location	Temperature	Humidity	Pressure
25/02/2020	10:00:00		1.58267E+12.snp21	LocationLocation	24.11	1000.12	1000.12
25/02/2020	10:01:00		1.58267E+12.snp21	Markus SNP	-10.51	1000.12	1000.12

TS	Group	Location	Temperature	Humidity	Pressure
1.58267E+12.snp21	LocationLocation	24.11	1000.12	1000.12	
1.58267E+12.snp21	Markus SNP	-10.51	1000.12	1000.12	



SQL Syntax

<https://www.dofactory.com/sql/syntax>

```
SELECT FirstName, LastName, City, Country
FROM Customer
WHERE City = 'Paris'
ORDER BY LastName
```



Logon Infos

<https://db2w-seirbtf.us-south.db2w.cloud.ibm.com/console/#load/wizard/target>

```
"password": "",  
"username": "bluadmin",
```



Create a Table based on .csv file - create your own tables.snp21-28

LOAD DATA

Source Target Define

You are loading the file **SensorDataTestsnp21.csv**

Select a load target

Schema	Table	Create a new Table
Find a schema	Find a table in DB2INST1	Create a new Table
AUDIT	MVKTEST	SNP22
DB2INST1	SNP20	Create
NULLIDR1	SNP21	
NULLIDRA		
ST_INFORMTN_SCHEMA <small>Sample</small>		



Load Content

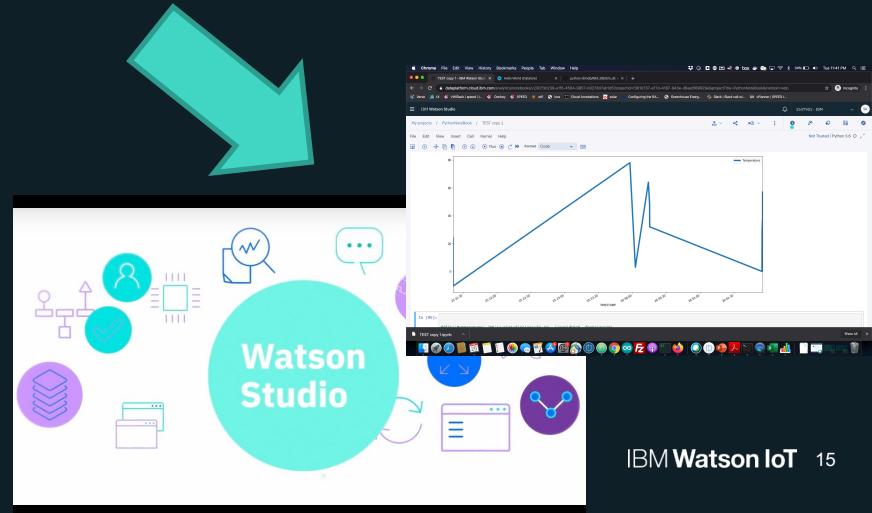
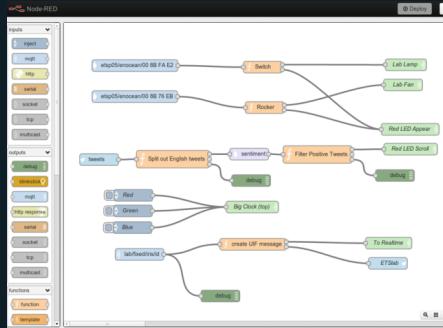
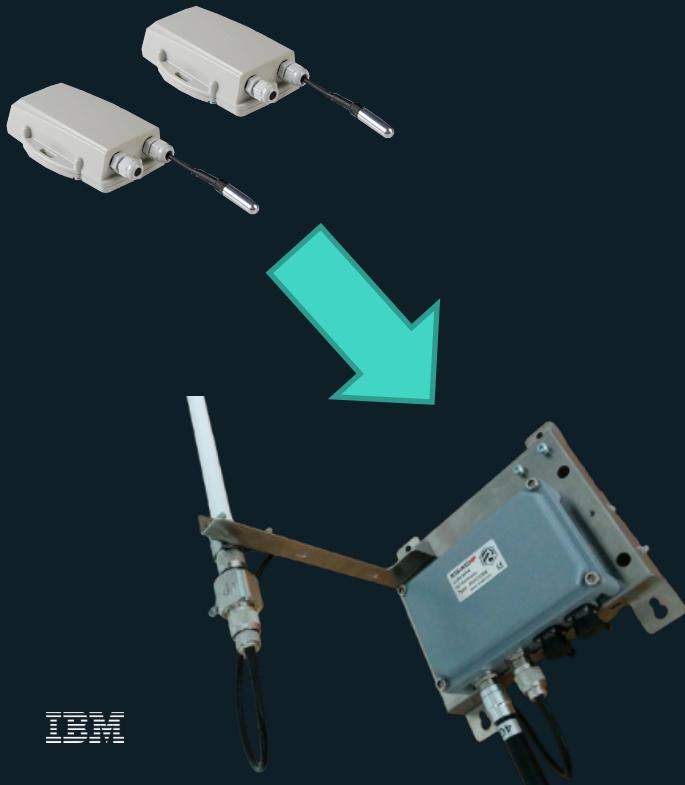
File is here

DB2INST1.SNP22

	DATE DATE	TIME TIME	TS BIGINT	GROUP VARCHAR(5)	LOCATION VARCHAR(16)	TEMPERATURE DECIMAL(6, 2)	HUMIDITY DECIMAL(8, 2)
1	2020-02-25	10:00:00	1582670000000	snp21	LocationLocation	24.11	1000.12
2	2020-02-25	10:01:00	1582670000000	snp21	Markus SNP	-10.51	1000.12



Sensor Orchestration using Node-RED

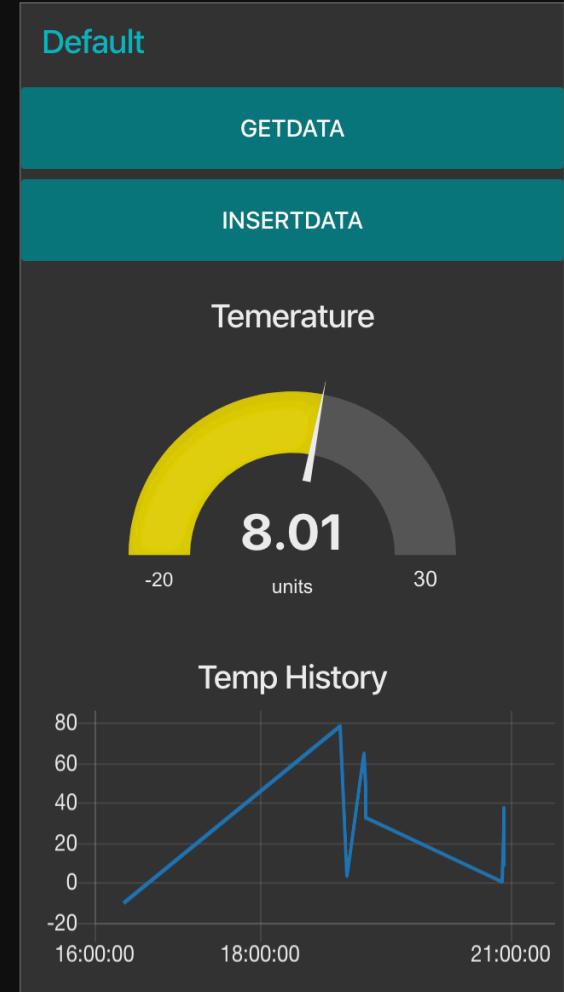


Example flow to retrieve and insert data

<http://snp????.mybluemix.net/red>

Use your own instance

Snp21....28



Jupyter

<https://jupyter.org/>

The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations and narrative text. Uses include: data cleaning and transformation, numerical simulation, statistical modeling, data visualization, machine learning, and much more.

Jupyter python notebooks



Access Python Notebook

URL

<https://dataplatform.cloud.ibm.com/analytics/notebooks/v2/02f3d239-a1f5-4584-9857-b0278d7ab1d5?projectId=f361b737-e17d-4187-943e-d8ae0f89929e&projectTitle=PythonNoteBook&context=wdp>

user: snpkid01@gmail.com

PWD:



Jupyter works by cell and execution

The screenshot shows a Jupyter Notebook interface within the IBM Watson Studio environment. The top navigation bar includes tabs for Chrome, File, Edit, View, History, Bookmarks, People, Tab, Window, and Help. The address bar shows the URL dataplatform.cloud.ibm.com/analytics/notebooks/v2/02f3d239-a1f5-4584-9857-b0278d7ab1d5?projectId=f361b737-e17d-4187-943e-d8ae0f89929&projectTitle=PythonNoteBook&context=wdp. The main workspace displays two code cells:

In [7]:

```
# test query
query = "SELECT * FROM DB2INST1.SNP21"
# run direct SQL
#stmt = ibm_db.exec_immediate(conn, query)
#ibm_db.fetch_both(stmt)

df = pandas.read_sql(query,hdbi)
df2 = pandas.read_sql(query,hdbi)
#df.info()
#df.hist()
```

File "<ipython-input-7-560c8fc0309c>", line 10
 `@df.hist()`
SyntaxError: unexpected EOF while parsing

In [5]: df

Out[5]:

	Date	Time	TS	Group	Location	Temperature	Humidity	Pressure	Comment	TIMESTAMP
0	2020-02-25	10:00:00	1582670000000	snp21	Location	24.11	1000.12	1000.12	wwwwwwwwwqqjjdsfsdjfhsdhfsdnfwwwwwww...	2020-02-25 21:21:15
1	2020-02-25	10:01:00	1582670000000	snp21	Markus SNP	-10.51	1000.12	1000.12	Markus SNP Markus SNP Markus SNP Markus...	2020-02-25 21:21:15
2	2020-08-12	22:28:54	1582669734515	SNP21	LOC02	53.01	1800.00	2000.00		Test1 NaT
3	2020-08-12	23:57:50	1582675070639	SNP21	LOC02	78.01	1800.00	2000.00		Test1 2020-02-25 23:57:50
4	2020-08-13	00:02:41	1582675361863	SNP21	LOC02	3.01	1800.00	2000.00		Test1 2020-02-26 00:02:41
5	2020-08-13	00:14:13	1582676053304	SNP21	LOC02	64.01	1800.00	2000.00		Test1 2020-02-26 00:14:13
6	2020-08-13	00:15:18	1582676118003	SNP21	LOC02	48.01	1800.00	2000.00		Test1 2020-02-26 00:15:18

The bottom taskbar shows various application icons, and the status bar indicates the file is TEST copy 1.ipynb, the timestamp is Tue 11:42 PM, and the battery level is 34%.

References

<https://github.com/SixNationsPolytechnic/2020-Project-session1-sql>



