

# Inlämnings uppgift VG nivå

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# Azure konto

- skapa Azure konto - pay as you go
- skapa IoT hub
- skapa cosmos DB
- skapa Azure function
- **skapa Sql DB**
- **skapa Table Storage**

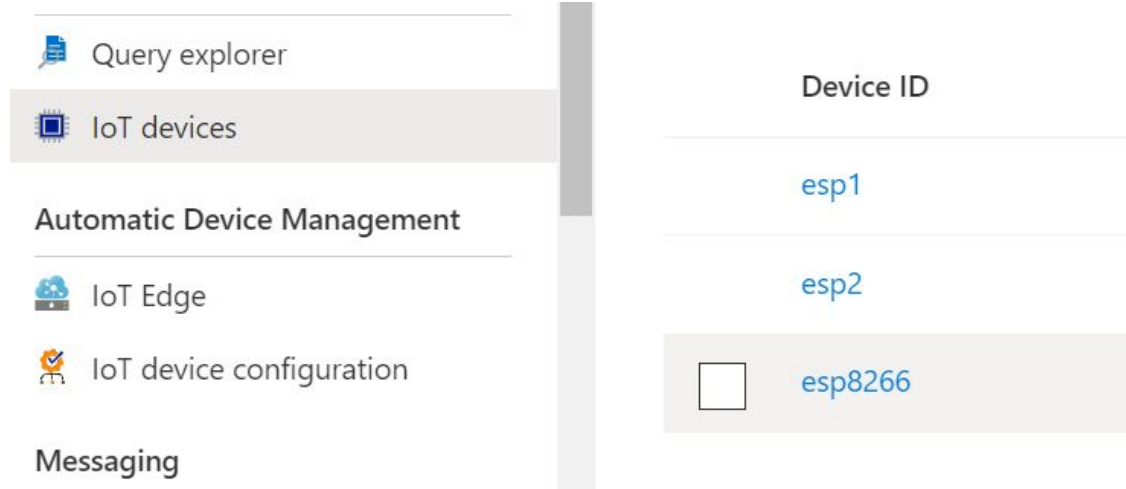
## Recent resources

### Name

 sqldbdemo1 (sqldbdemo1server/sqldbdemo1)
 juliacosmosdemo1
 juliafunctiondemo1
 juliaiothubdemo1
 GROUP1
 Azure subscription 1

# Arduino sketch -- C++

- använda device en till esp32
- sketch använder Wifi, IoT Hub, Ultrasonic, json, epochtime lib
- git ignore securities.h
- kör sketch så att IoT Hub kan få Distance meddelande från esp32



# Microsoft Sql Server Management -- SQL

- skriva SQL på Microsoft Sql Server Management så att skapa relation databas
- kör och testa

# Visual Studio 2019 -- C#

- skapa tre metoder: SaveToSql, SaveToTableStorage och GetDataFromTableStorage
- kör metoder för att fånga meddelande från IoT Hub och skicka till sqlDB och table storage
- när lokal kör success, sen kan publicera till Azure. Då Azure kan köra funktion automatiskt

# Azure Table Storage

Storage Explorer (preview)

Storage account

Search

- BLOB CONTAINERS
- FILE SHARES
- QUEUES
- TABLES
  - TotalMessages

Query Add Edit Select All Column Options Delete Table Statistics More

PARTITIONKEY	ROWKEY	TIMESTAMP	CREATED	DEVICEID	TEMPERATURE	HUMIDITY	DISTAN
dht	790150ca-1b52-41e4-bfbe-03e378d407c6	2021-03-03T20:03:24.5828585Z	1614713020	esp2	33.79999923706055	68	0
dht	84eacd16-f5d6-4da9-af7d-9e11b8c1bb17	2021-03-03T20:03:23.1504538Z	1614712882	esp2	31.600000381469727	28	0
dht	8847f1bd-383d-4138-8835-47b4b73d4994	2021-03-03T20:03:21.8978908Z	1614712466	esp2	30.5	77	0
dht	be9e5557-eb56-449e-95ea-9975a0f1a319	2021-03-03T20:03:22.9637184Z	1614712732	esp2	32.70000076293945	66	0
dht	d6d8c2f9-bec8-4575-95fa-9f77a65a6777	2021-03-03T20:03:24.6835348Z	1614713122	esp2	32.70000076293945	27	0
dht	d72fba09-ab7a-4618-9b1f-482e138236ac	2021-03-03T20:03:22.494389Z	1614712624	esp2	32.70000076293945	39	0
distance	05475594-e558-4f61-b528-579cb38aa10e	2021-03-03T20:03:23.9580228Z	1614712989	esp1	0	0	18
distance	06ebabe6-1608-472b-a02a-6cbe06f42db0	2021-03-03T20:03:23.6888334Z	1614712981	esp1	0	0	20
distance	0b3e47b6-a1ed-47e3-9269-4d2f0e017ea5	2021-03-03T21:17:43.0816646Z	1614804027	esp1	0	0	17
distance	0e6fd77-9237-4818-b822-88bf38010780	2021-03-03T20:03:23.4320485Z	1614712977	esp1	0	0	18
distance	1662f300-b259-44c4-a598-7cafd1c35a41	2021-03-03T20:03:22.4423519Z	1614712611	esp1	0	0	4
distance	1727f3d2-bde0-4382-adac-066038a0fc6d	2021-03-03T20:03:23.9864391Z	1614712993	esp1	0	0	6
distance	203ca052-4803-4749-a2ff-2c85643a012f	2021-03-03T20:03:22.9246914Z	1614712726	esp1	0	0	3
distance	2228f8b2-a697-4de8-8275-7a66a26fd8bf	2021-03-03T20:03:22.3452836Z	1614712610	esp1	0	0	16
distance	2676d16a-6b5b-41de-8ddf-f3c38e7d40f7	2021-03-03T20:36:05.5700326Z	1614803764	esp1	0	0	60

Showing 1 to 55 of 55 cached items

# Power BI -- os

- koppla till Azure Sql DB
- filter type som “distance”
- visa data i diagram och spara som png

The screenshot shows the Microsoft Power BI Desktop interface. On the left is the ribbon with 'File', 'Home', and 'Insert' tabs. The 'Home' tab is active, showing options like Paste, Cut, Copy, Format painter, and Get data. Below the ribbon is a vertical pane with icons for Reports, Datasets, and Pages. The main area is currently blank. On the right, the 'Navigator' pane is open, showing a list of data sources. Under 'sqldbdemo1 [5]', the 'MessageLines' table is selected. Below the Navigator is a 'Select Related Tables' button. To the right of the Navigator is a preview of the 'MessageLines' table data.

MessageId	DateNr	TypeName	Data	Messages
106	2021-03-02 19:22:38	humidity	62	Value
106	2021-03-02 19:22:38	temperature	32.7	Value
107	2021-03-02 19:22:44	distance	7	Value
108	2021-03-02 19:22:51	distance	14	Value
109	2021-03-02 19:22:55	distance	6	Value
110	2021-03-02 19:22:57	distance	18	Value
111	2021-03-02 19:22:59	distance	7	Value
112	2021-03-02 19:23:01	distance	20	Value
113	2021-03-02 19:23:04	distance	7	Value
114	2021-03-02 19:23:06	distance	17	Value
115	2021-03-02 19:23:07	distance	8	Value
116	2021-03-02 19:23:09	distance	18	Value
117	2021-03-02 19:23:13	distance	6	Value
118	2021-03-02 19:23:16	distance	16	Value
119	2021-03-02 19:23:19	distance	6	Value
120	2021-03-02 19:23:22	distance	17	Value
121	2021-03-02 19:23:23	distance	5	Value
122	2021-03-02 19:23:25	distance	18	Value
123	2021-03-02 19:23:28	distance	7	Value
124	2021-03-02 19:23:40	humidity	68	Value
124	2021-03-02 19:23:40	temperature	33.8	Value
125	2021-03-02 19:23:56	distance	20	Value

At the bottom of the screen, there is a 'Page 1' indicator and a '+', a 'Select Related Tables' button, and three buttons: 'Load', 'Transform Data', and 'Cancel'. The status bar at the very bottom says 'AGE 1 OF 1' and 'ATE AVAILABLE (CLICK'.

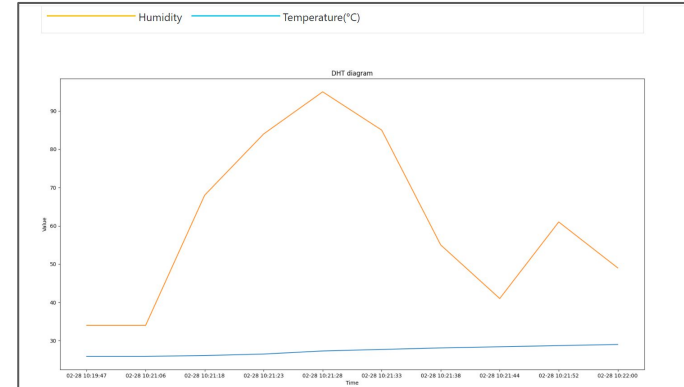
# Visual Studio Code -- Javascript

- använda React ramverk
- bygga frontend sida att anropa GetAllFromCosmosDb api från Azure
- kan visa tabel för DHT
- kan visa diagram för DHT (python matplotlib)
- kan visa distance diagram (Power BI)
- kan visa table storage och diagram (import react linechart)

Inlämningskrav Table Diagram

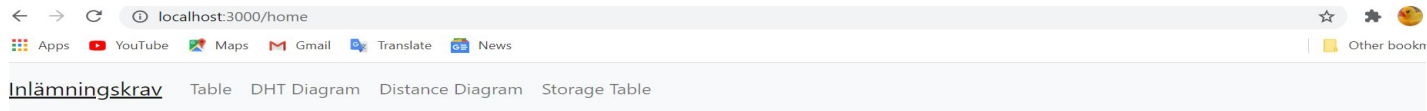
#	DeviceId	Timestamp	Temperature	Humidity
e9dc08b7-3968-4961-8dc0-17b70ea0b3b9	esp2	2021-02-28 10:22:00	29	49
f65bb877-7945-4169-95f2-85458413d9e4	esp2	2021-02-28 10:21:52	28.7	61
b0ac80df-5eb8-46f0-a143-310164a00222	esp2	2021-02-28 10:21:44	28.4	41
b789bf69-2dff-4c58-9a0e-4d5d71b71ede	esp2	2021-02-28 10:21:38	28.1	55
14790f9b-bcc2-405a-ae1-6407c573497c	esp2	2021-02-28 10:21:33	27.7	85
62b940d3-37e1-4223-b4d6-e6e91391b09e	esp2	2021-02-28 10:21:28	27.3	95
529ab316-0392-4eda-9ba5-72c3e48cdc8d	esp2	2021-02-28 10:21:23	26.5	84
de529b81-f65a-4493-be1c-4378dee509e3	esp2	2021-02-28 10:21:18	26.1	68
b18aa583-946c-485d-96cf-d4eb635b4c75	esp2	2021-02-28 10:21:06	25.9	34
cbfe6d04-fed9-4d61-92ca-1da5d09fb813	esp2	2021-02-28 10:19:47	25.9	34

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# Webbsidan -- Inlämningskrav



## Skicka meddelanden

I denna inlämningsuppgift ska du skapa ett antal olika iot-enheter som ska skicka in data till din Azure IOT Hub. Du bestämmer själv vad för typ av data som dessa iot-enheter ska skicka. Det kan vara allt från temperatur och luftfuktighet från en DHT-sensor till distanssensor som mäter avstånd etc. Allt är lite beroende på hur mycket utrustning du har. Dock ska meddelanden som skickas in i din Azure IOT Hub endast vara meddelanden som har ett annat värde än det som var tidigare. Exempelvis temperaturen ändras med  $\pm 1$  grad. Annars ska inget meddelande skickas iväg. **Det som ska vara gemensamt för samtliga meddelande är följande information:**

- Enhetens unika id
- Tidsangivelse då meddelandet skapas

**Du ska även kunna skicka information genom Json-properties såsom:**

- Skolans namn
- Ditt namn

För godkänt räcker det med att du kan skicka information från en iot-enhet och då måste denna iot-enhet vara en MCU. För väl godkänt krävs det att du skickar data från minst två olika iot-enheter. Dessa iot-enheter måste då skicka olika typer av sensor-data.

## Lagring av meddelanden

Alla meddelanden som skickas ska kunna sparas i någon form av lagringslösning. Du får själv välja vilken typ av lagringslösning du vill lagra i. Alternativen du har att välja mellan är följande:

- Table Storage (NoSql)
- Cosmos DB (NoSql)

# Webbsidan -- Table

 Apps  YouTube  Maps  Gmail  Translate  News

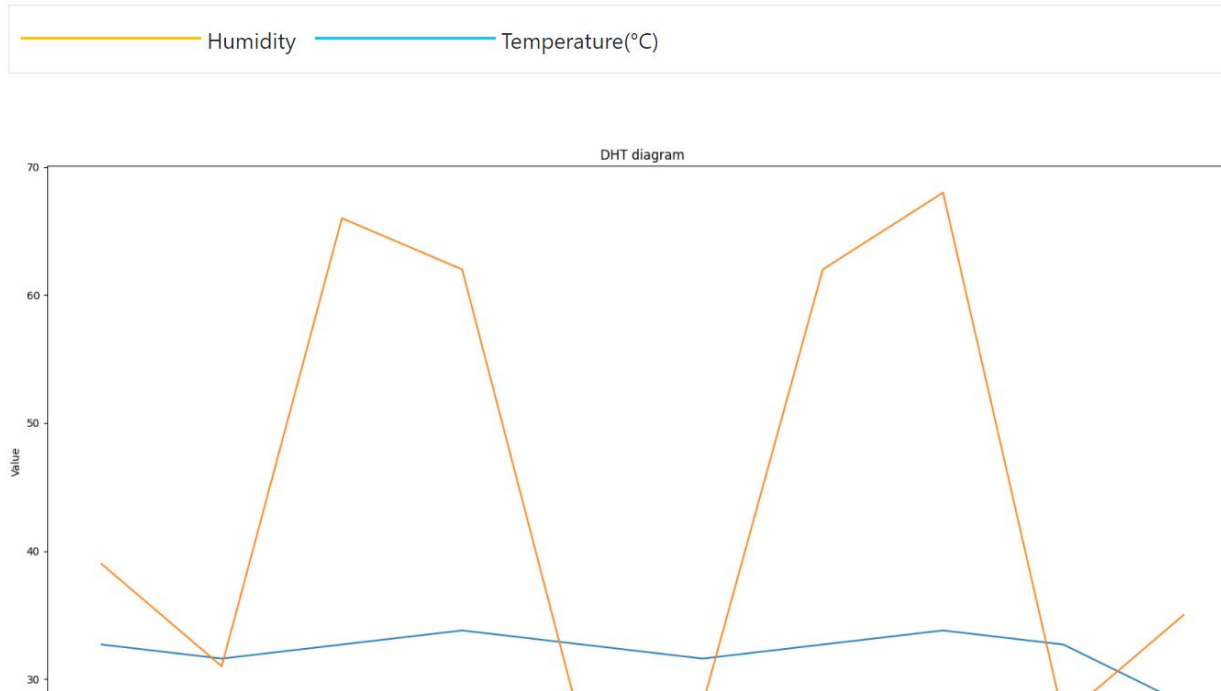
 Other book

Inlämningskrav [Table](#) DHT Diagram Distance Diagram Storage Table

#	DeviceId	Timestamp	Temperature	Humidity
53e0c6ac-ebc5-4fd6-b45c-f4586eab3fdd	esp2	2021-03-03 20:09:04	28.1	35
3dd29a38-3ab3-4cbf-bf22-61253fb16024	esp2	2021-03-02 19:25:22	32.7	27
27910cab-12d4-4816-ac8c-e25398f39b4a	esp2	2021-03-02 19:23:40	33.8	68
b3c0bf14-5d12-46d7-b2cb-9e7e2e5e2326	esp2	2021-03-02 19:22:38	32.7	62
a566312f-5bf8-4295-b951-abcc6d47090d	esp2	2021-03-02 19:21:22	31.6	28
581e591e-f589-4a03-a54b-b6eb7594ef6a	esp2	2021-03-02 19:20:38	32.7	26
46dfa284-50d5-42ae-a015-856664524bd4	esp2	2021-03-02 19:19:22	33.8	62
62696f93-b9ac-4972-a5be-4c8fb5ad33e5	esp2	2021-03-02 19:18:52	32.7	66
cb1233db-9897-4f89-989a-832813228e90	esp2	2021-03-02 19:18:08	31.6	31
9bc15732-0fa2-48c4-9b16-311b57e0eb2b	esp2	2021-03-02 19:17:04	32.7	39

# Webbsidan -- DHT Diagram

Inlämningskrav [Table](#) [DHT Diagram](#) [Distance Diagram](#) [Storage Table](#)



# Webbsidan -- Distance Diagram

Inlämningskrav Table DHT Diagram Distance Diagram Storage Table

MessageId	DateNr	TypeName	Data
125	2021-03-02 19:23:56	distance	20
123	2021-03-02 19:23:28	distance	7
122	2021-03-02 19:23:25	distance	18
121	2021-03-02 19:23:23	distance	5
120	2021-03-02 19:23:22	distance	17
119	2021-03-02 19:23:19	distance	6
118	2021-03-02 19:23:16	distance	16
117	2021-03-02 19:23:13	distance	6
116	2021-03-02 19:23:09	distance	18
115	2021-03-02 19:23:07	distance	8
114	2021-03-02 19:23:06	distance	17
113	2021-03-02 19:23:04	distance	7
112	2021-03-02 19:23:01	distance	20
111	2021-03-02 19:22:59	distance	7
110	2021-03-02 19:22:57	distance	18
109	2021-03-02 19:22:55	distance	6
108	2021-03-02 19:22:51	distance	14
107	2021-03-02 19:22:44	distance	7



18.80  
Average of Data

# Webbsidan -- Storage Table

Inlämningskrav   Table   DHT Diagram   Distance Diagram   Storage Table

all

▼

4

▼

asc

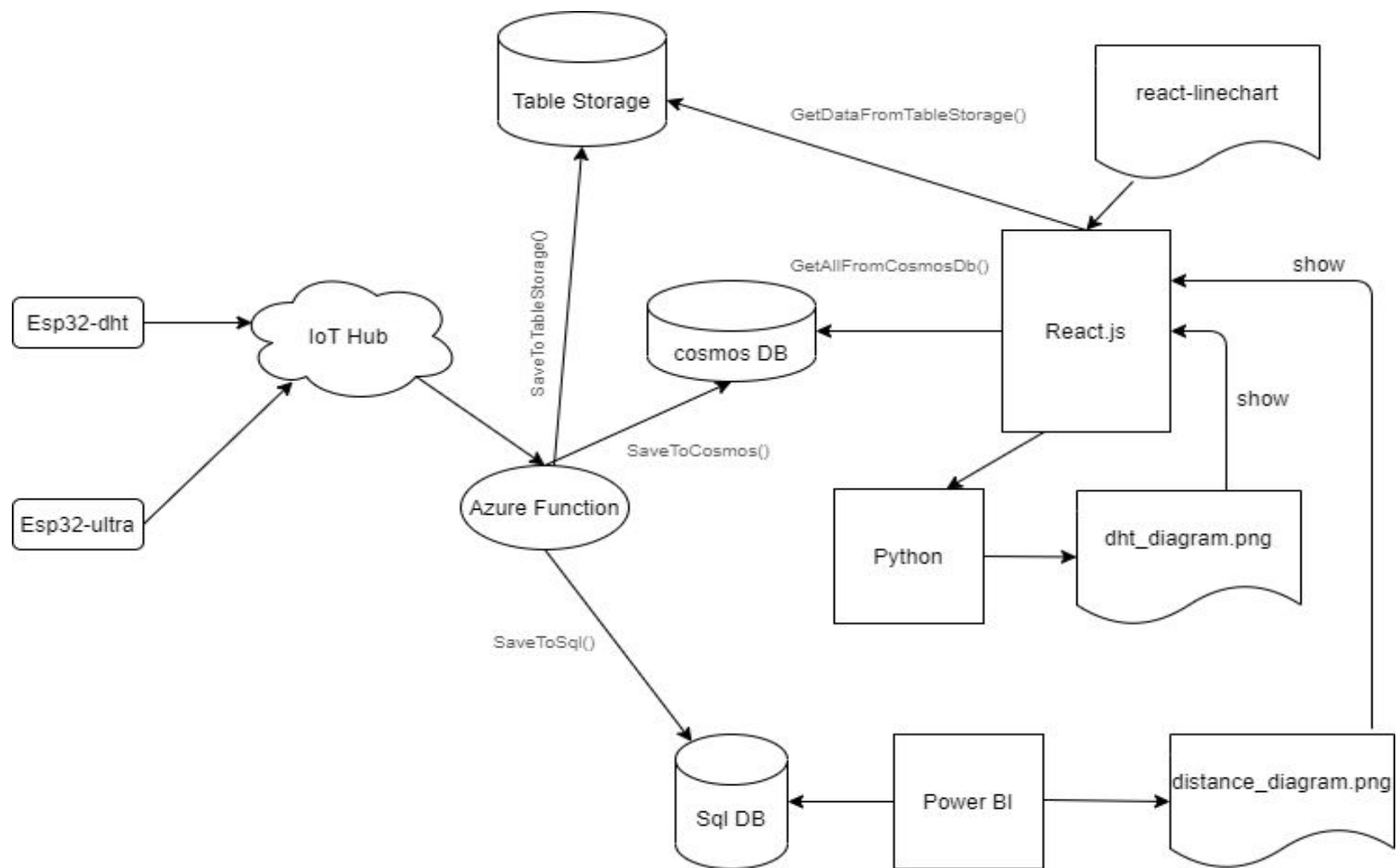
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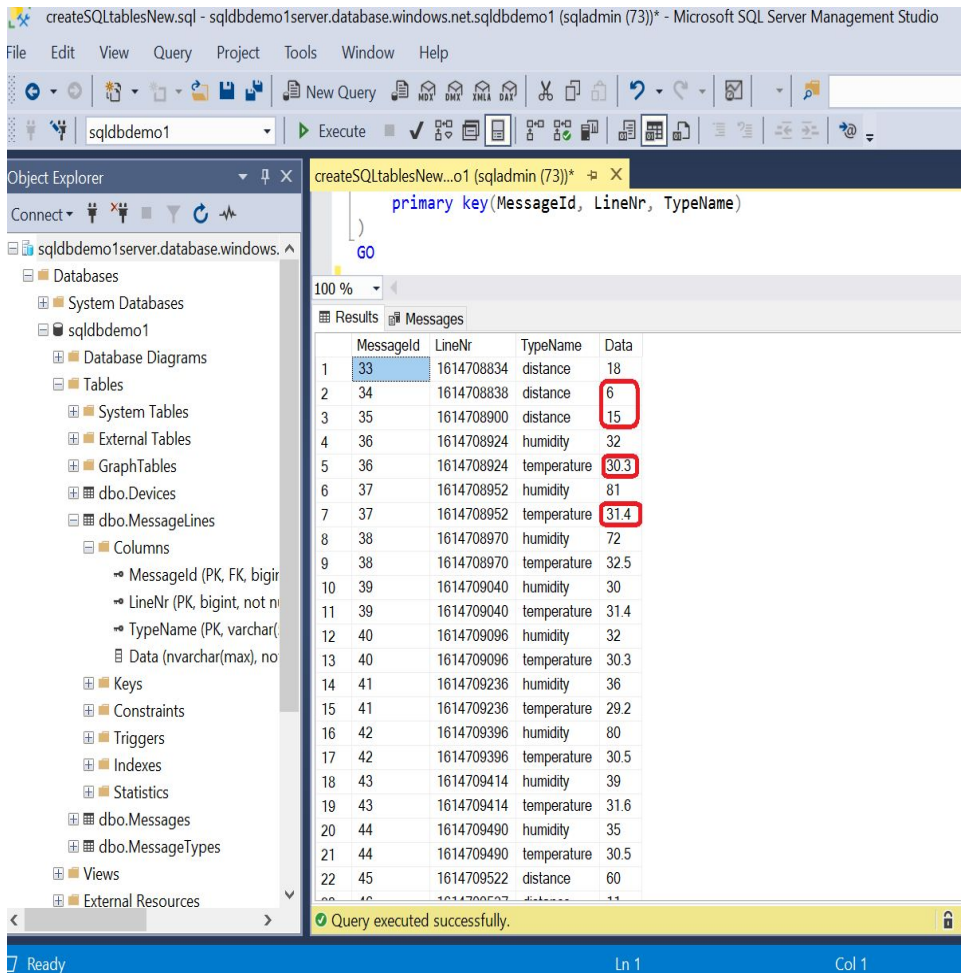
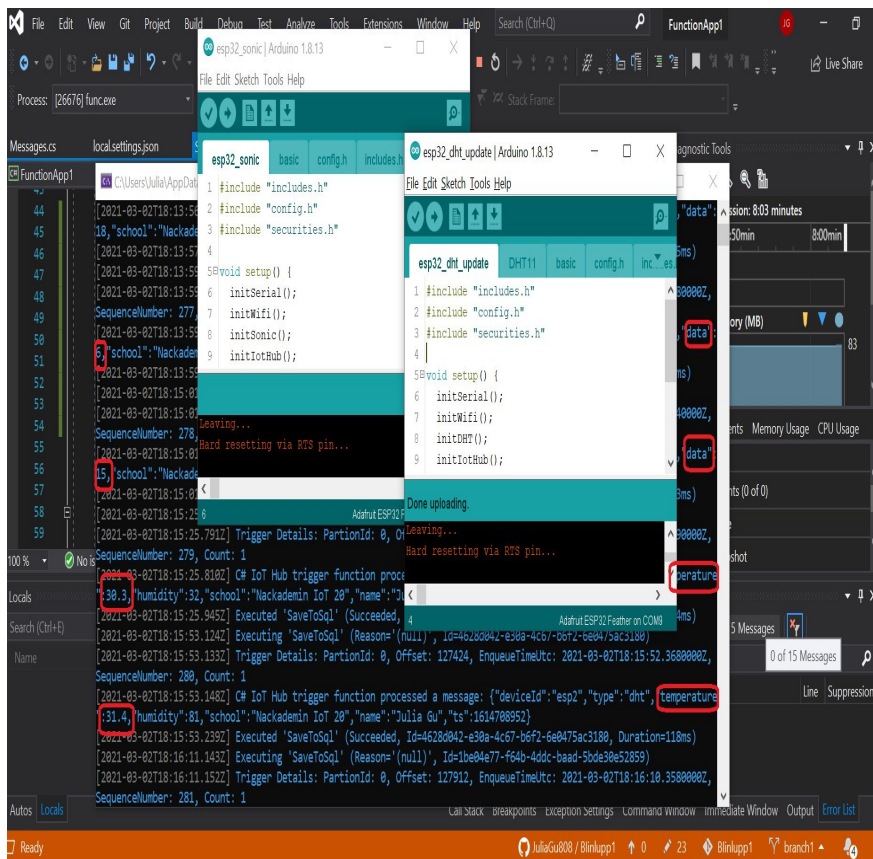
SÖK

DeviceId	Timestamp	Temperature	Humidity	Distance
esp2	2021-03-02 19:14:01	29.20	33	0
esp2	2021-03-02 19:14:26	30.50	77	0
esp2	2021-03-02 19:14:40	31.60	70	0
esp2	2021-03-02 19:15:00	32.70	64	0

## Temperature









```
Storageaccountgroupphoto - m...
Select C:\Users\Julia\AppData\Local\AzureFunctionsTools\Releases\3.21.0\cli_x64\func.exe

[2021-03-03T20:38:36.567Z] C# IoT Hub trigger function processed a message: {"deviceId":"esp1","type":"distance","data":
16,"school":"Nackademin IoT 20","name":"Julia Gu","ts":1614803915}
[2021-03-03T20:38:36.575Z] Trigger Details: PartionId: 0, Offset: 171560, EnqueueTimeUtc: 2021-03-03T20:38:35.6570000Z,
SequenceNumber: 373, Count: 1
[2021-03-03T20:38:36.587Z] C# IoT Hub trigger function processed a message: {"deviceId":"esp1","type":"distance","data":
16,"school":"Nackademin IoT 20","name":"Julia Gu","ts":1614803915}
[2021-03-03T20:38:36.683Z] Executed 'SaveToSql' (Succeeded, Id=f2153372-0f8a-40ec-b90a-923d0e0af2f2, Duration=129ms)
[2021-03-03T20:38:36.770Z] Executed 'SaveToTableStorage' (Succeeded, Id=e52fc5e5-dd16-4808-91ba-8bd1ce4e5474, Duration=2
10ms)
[2021-03-03T20:38:36.919Z] Executed 'SaveToCosmos' (Succeeded, Id=92a6f50c-272c-4998-9763-c214ebda95a9, Duration=364ms)
[2021-03-03T20:38:45.815Z] Executing 'SaveToSql' (Reason='(null)', Id=b1f2430b-b24a-43fc-befe-0c9e54a19b5c)
[2021-03-03T20:38:45.817Z] Executing 'SaveToTableStorage' (Reason='(null)', Id=47fbf750-3188-4729-ae47-eaedd8fa401f)
[2021-03-03T20:38:45.820Z] Trigger Details: PartionId: 0, Offset: 172032, EnqueueTimeUtc: 2021-03-03T20:38:45.0370000Z,
SequenceNumber: 374, Count: 1
[2021-03-03T20:38:45.823Z] Trigger Details: PartionId: 0, Offset: 172032, EnqueueTimeUtc: 2021-03-03T20:38:45.0370000Z,
SequenceNumber: 374, Count: 1
[2021-03-03T20:38:45.828Z] C# IoT Hub trigger function processed a message: {"deviceId":"esp1","type":"distance","data":
94,"school":"Nackademin IoT 20","name":"Julia Gu","ts":1614803925}
[2021-03-03T20:38:45.832Z] PAYLOAD IN: {"deviceId":"esp1","type":"distance","data":94,"school":"Nackademin IoT 20","name":
":Julia Gu","ts":1614803925}
[2021-03-03T20:38:45.816Z] Executing 'SaveToCosmos' (Reason='(null)', Id=cef2e12f-45bc-4f52-b4e5-19cf4cd3cd41)
[2021-03-03T20:38:45.849Z] Trigger Details: PartionId: 0, Offset: 172032, EnqueueTimeUtc: 2021-03-03T20:38:45.0370000Z,
SequenceNumber: 374, Count: 1
[2021-03-03T20:38:45.856Z] C# IoT Hub trigger function processed a message: {"deviceId":"esp1","type":"distance","data":
94,"school":"Nackademin IoT 20","name":"Julia Gu","ts":1614803925}
[2021-03-03T20:38:45.877Z] Executed 'SaveToTableStorage' (Succeeded, Id=47fbf750-3188-4729-ae47-eaedd8fa401f, Duration=6
2ms)
[2021-03-03T20:38:45.891Z] Executed 'SaveToSql' (Succeeded, Id=b1f2430b-b24a-43fc-befe-0c9e54a19b5c, Duration=76ms)
[2021-03-03T20:38:45.900Z] Executed 'SaveToCosmos' (Succeeded, Id=cef2e12f-45bc-4f52-b4e5-19cf4cd3cd41, Duration=85ms)
```

- Access keys
- Geo-replication
- CORS
- Configuration

b2e755d2a4	2021-03-03T20:03:23.737868Z	esp1	1614712984	0	0	7
304fdc33c8	2021-03-03T20:38:45.1267166Z	esp1	1614803925	0	0	94
a92035276	2021-03-03T20:03:22.5774478Z	esp1	1614712717	0	0	2

Showing 1 to 50 of 50 cached items

1-a... Not syncing Other favorites

redmind

juliagu808@gmail.com DEFAULT DIRECTORY

Column Options More

CREATED	TEMPERATURE	HUMIDITY	DISTANCE
14712975	0	0	6
14803915	0	0	16
14712608	0	0	1
14712996	0	0	16
14803770	0	0	4
14712971	0	0	14
14712724	0	0	11
14712979	0	0	7
14713002	0	0	17
14713005	0	0	18
14713008	0	0	7
14802616	0	0	68
1614712984	0	0	7
1614803925	0	0	94
1614712717	0	0	2



# Sammanfattning

- Azure funktion är en bra verktyg att kan använda HTTP request
- Jag provat tre sätt för visualization. Python matplotlib passar för kodare.  
Power BI är en avancerad verktyg som behöva lära. React line chart funkar inte så bra, det behöver kolla libs doc och testa
- Porjekt är stort, men jag har lärt mig mycket från det !