



From Device to Cloud

IQRF → Windows 10 IoT → Azure

Martin Šimeček
Technical Evangelist
martin.simecek@microsoft.com

Internet of Things

From Device to Cloud

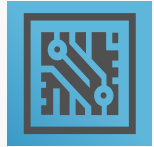
Windows 10 IoT Core

Azure IoT Hub

Azure Stream Analytics

Power BI

Azure IoT Hub



01010...



001010101100...



0010101011001010...



0010101011001010...



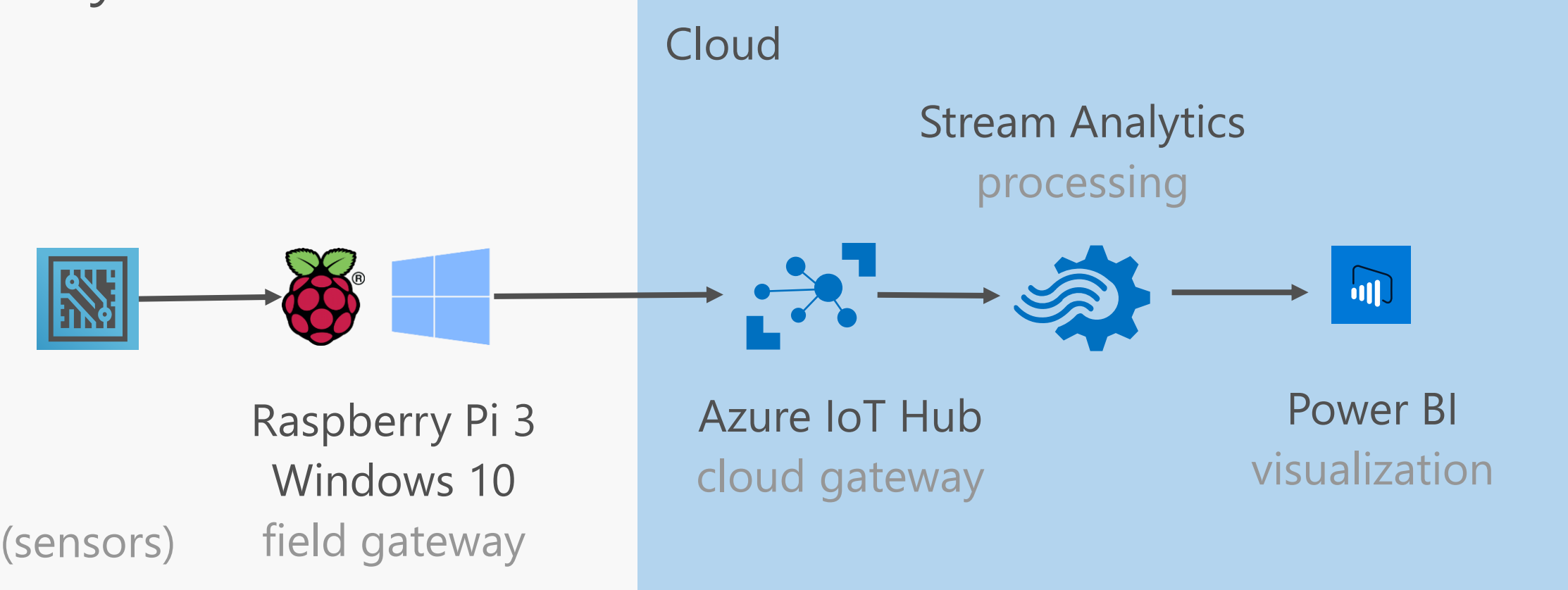
1. Collect

2. Process

3. Analyze

4. Control

Today's work



IQRF
Resource group

Settings Add Delete Refresh

Essentials ^

Subscription name: **Customer demo**
Subscription ID: [ID]

Last deployment: **21. 5. 2016 (Succeeded)**
Location: North Europe

[All settings →](#)

Summary

Filter items...

NAME	RESOURCE GRO...	LOCATION	TYPE	SUBSCRIP1
iqrf-demo	IQRF	North Europe	Cloud ser...	Customer
iqrf-sa-clasic	IQRF	North Europe	Storage a...	Customer
iqrf-test	IQRF	North Europe	IoT Hub	Customer
iqrf	IQRF	North Europe	SQL server	Customer
iqrf	IQRF	North Europe	SQL data...	Customer
iqrf-sa	IQRF	North Europe	Storage a...	Customer
iqrf-ext-temperature	IQRF	North Europe	Stream A...	Customer
iqrf-temperature	IQRF	North Europe	Stream A...	Customer

iqrf-temperature
Stream Analytics job

Settings Start Stop Delete

Running

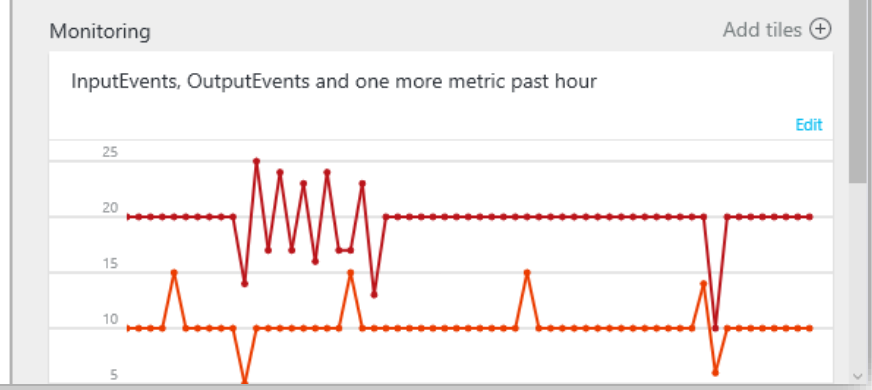
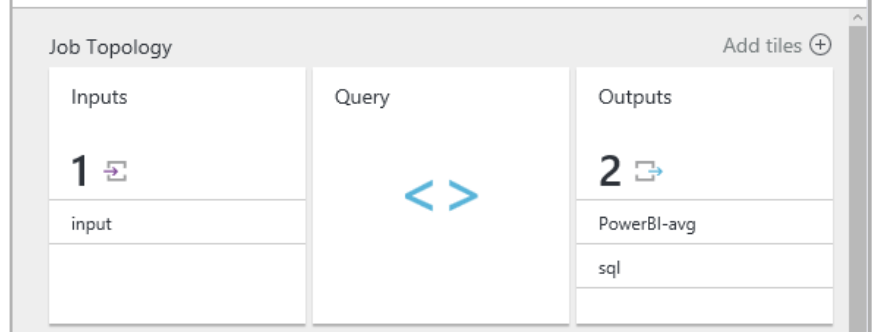
Essentials ^

Resource group: **IQRF**
Status: **Running**
Location: **North Europe**
Subscription name: **Customer demo**
Subscription ID: [ID]

Send feedback: [UserVoice](#)

Created: sobota 21. května 2016 11:50:12
Started: sobota 21. května 2016 13:21:14
Last output: pondělí 23. května 2016 16:45:00

[All settings →](#)



iqrf-temperature

Query



Save



Discard



Test

Need help with your query? Check out some of the most common Stream Analytics query patterns [here](#).

```
1 SELECT
2     System.Timestamp as UtcTimeStamp,
3     GatewayID,
4     GatewayName,
5     NodeID,
6     Temperature
7 INTO
8     sql
9 FROM
10    input TIMESTAMP BY UtcTimeStamp
11
12 SELECT
13     System.Timestamp as Time,
14     GatewayID,
15     GatewayName,
16     NodeID,
17     AVG(Temperature) as Temperature
18 INTO
19     [PowerBI-avg]
20 FROM
21    input TIMESTAMP BY UtcTimeStamp
22 GROUP BY
23     TUMBLINGWINDOW(minute, 15),
24     GatewayID,
25     GatewayName,
26     NodeID
```

Device Explorer

Configuration Management Data Messages To Device

Actions

Create Refresh Update Delete SAS Token...

Devices

Total: 1

	Id	PrimaryKey	SecondaryKey	ConnectionStrin	ConnectionStat	LastActivi
▶	0E238D8D-61...	f6RuC986sS4...	xHZjTjd8Uziq...	HostName=i...	Disconnected	24. 5. 2016
*						

< >

Device Explorer

Configuration Management Data Messages To Device

Monitoring

Event Hub:

Device ID:

Start Time: 05/24/2016 18:19:12

Consumer Group: Enable

Event Hub Data

Receiving events...

```
24. 5. 2016 18:19:23> Device: [0E238D8D-61E5-4B5C-9AFA-CE86EFEA2D7C], Data:
[{"UtcTimeStamp":"2016-05-24T16:19:23.6571574Z","GatewayID":"0E238D8D-61E5-4B5C-9AFA-CE86EFEA2D7C","GatewayName":"RPIlqrftest","NodeID":1,"Temperature":4.0}]
24. 5. 2016 18:19:23> Device: [0E238D8D-61E5-4B5C-9AFA-CE86EFEA2D7C], Data:
[{"UtcTimeStamp":"2016-05-24T16:19:23.7691903Z","GatewayID":"0E238D8D-61E5-4B5C-9AFA-CE86EFEA2D7C","GatewayName":"RPIlqrftest","NodeID":2,"Temperature":9.0}]
24. 5. 2016 18:19:23> Device: [0E238D8D-61E5-4B5C-9AFA-CE86EFEA2D7C], Data:
[{"UtcTimeStamp":"2016-05-24T16:19:23.8446534Z","GatewayID":"0E238D8D-61E5-4B5C-9AFA-CE86EFEA2D7C","GatewayName":"RPIlqrftest","NodeID":3,"Temperature":-6.0}]
24. 5. 2016 18:19:23> Device: [0E238D8D-61E5-4B5C-9AFA-CE86EFEA2D7C], Data:
[{"UtcTimeStamp":"2016-05-24T16:19:23.9540175Z","GatewayID":"0E238D8D-61E5-4B5C-9AFA-CE86EFEA2D7C","GatewayName":"RPIlqrftest","NodeID":4,"Temperature":0.0}]
24. 5. 2016 18:19:23> Device: [0E238D8D-61E5-4B5C-9AFA-CE86EFEA2D7C], Data:
[{"UtcTimeStamp":"2016-05-24T16:19:24.054542Z","GatewayID":"0E238D8D-61E5-4B5C-9AFA-CE86EFEA2D7C","GatewayName":"RPIlqrftest","NodeID":5,"Temperature":24.0}]
```


Položte otázku související s vašimi daty.

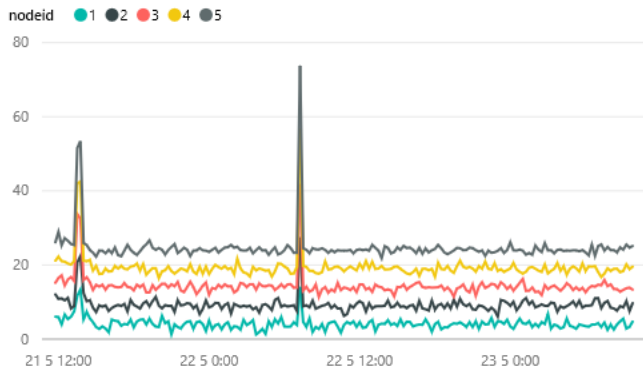
IQRF - demo dashboard

WINDOWS DATA PROCESSING DEMO

Data are based on streaming analytics real-time processing done by Azure. Source data flow is from Raspberry Pi with equipped with IQRF module collecting data from IQRF mesh network.

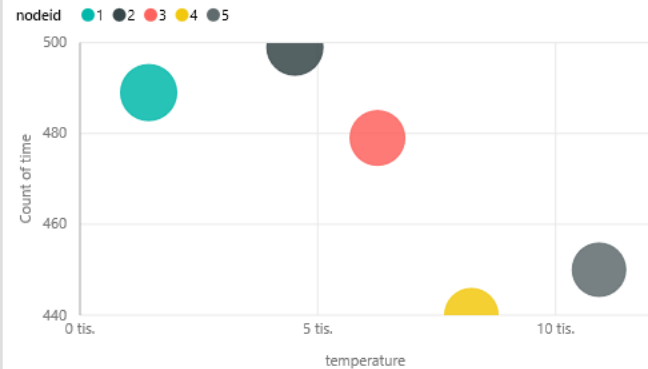
temperature

BY NODEID, TIME



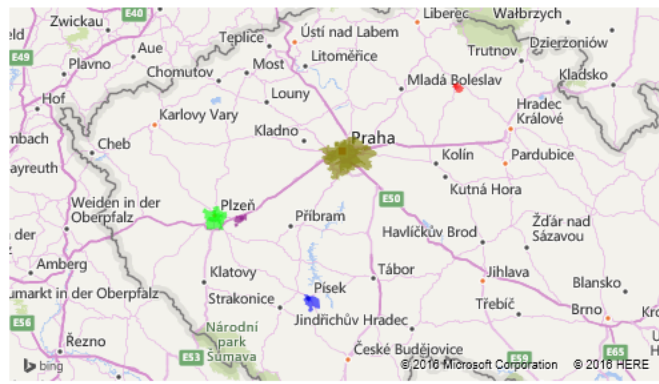
Count of time, tempdiff, temperature

BY NODEID



Temperature

BY CITY



Temperature, id

BY UTCTIMESTAMP, GATEWAYNAME, NODEID

GatewayName	RPiIqrGw	id	Temperature
21.5.2016	1		
21.5.2016	7,00	654	11,00
21.5.2016			15,00
21.5.2016	6,00	659	12,00
21.5.2016			16,00
21.5.2016	7,00	664	11,00
21.5.2016			16,00
21.5.2016	5,00	660	

time, tempdiff, gatewayname, nodeid

time	tempdiff	gatewayname	nodeid
21.5.2016	20,00	RPiIqrGw	2
21.5.2016	21,00	RPiIqrGw	2
21.5.2016	20,00	RPiIqrGw	5
21.5.2016	20,00	RPiIqrGw	5
21.5.2016	21,00	RPiIqrGw	1
21.5.2016	20,00	RPiIqrGw	1
21.5.2016	20,00	RPiIqrGw	1
21.5.2016	20,00	RPiIqrGw	1
21.5.2016	20,00	RPiIqrGw	2
21.5.2016	22,00	RPiIqrGw	2
21.5.2016	22,00	RPiIqrGw	2
21.5.2016	19,00	RPiIqrGw	1
21.5.2016	21,00	RPiIqrGw	2
21.5.2016	20,00	RPiIqrGw	3
21.5.2016	21,00	RPiIqrGw	1
21.5.2016	19,00	RPiIqrGw	3
21.5.2016	19,00	RPiIqrGw	4

More information

Windows 10 IoT

- <http://microsoft.com/en-us/WindowsForBusiness/windows-iot>
- <http://WindowsOnDevices.com>

Azure IoT

- <http://www.InternetofYourThings.com>
- Azure IoT Dev Center – <http://aka.ms/azureiotdev>

Power BI

- <http://powerbi.microsoft.com>

Continue learning

- Microsoft Virtual Academy – <http://mva.ms>



Thank you!

Martin Šimeček
martin.simecek@microsoft.com

Backup Slides

Azure Services for IoT



Azure IoT Hub

Connect, secure, communicate, monitor and manage billions of devices



Azure Stream Analytics

Real time stream processing for billions of IoT devices



Azure Storage

Blob, SQL, DocumentDB, Data Lake. Storage to meet every need at the scale of IoT



Azure App Service

Web and mobile apps for any platform on any device



Power BI

Dashboards and data connectors to visualize any data



Logic Apps

Powerful workflows to automate business processes

And More...

IoT Hub Limits

Common

256 kB message size from device to cloud

64 kB message size from cloud to device

Free

8 000 messages/day

500 device identities

S1

400 000 messages/day/unit

200 units via portal (more through Support)

S2

6 000 000 messages/day/unit

200 units via portal (more through Support)

Stream Analytics Limits

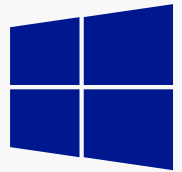
Throughput

1 MB/s per unit

12 units per region & subscription, can be larger via Support

Microsoft IoT

Comprehensive solutions from device to cloud



Windows



Azure IoT

IoT Editions Power a Broad Range of Devices

25 years of history in embedded devices

One Windows platform for all devices

Enterprise-ready, OEM-ready, Maker-friendly

Designed for today's IoT environments

Scalable solutions from free Windows IoT Core to Windows IoT Enterprise on PC-Like Devices

Cloud-Based IoT Services & Solutions

Easy to provision, use and manage

Pay as you go, scale as you need

Global reach, hyper scale

End-to-end security & privacy

Windows, Mbed, Linux, iOS, Android, RTOS support