

# IoT Virtual Bootcamp

December  
12 – 14, 2017





# Microsoft Azure Stream Analytics

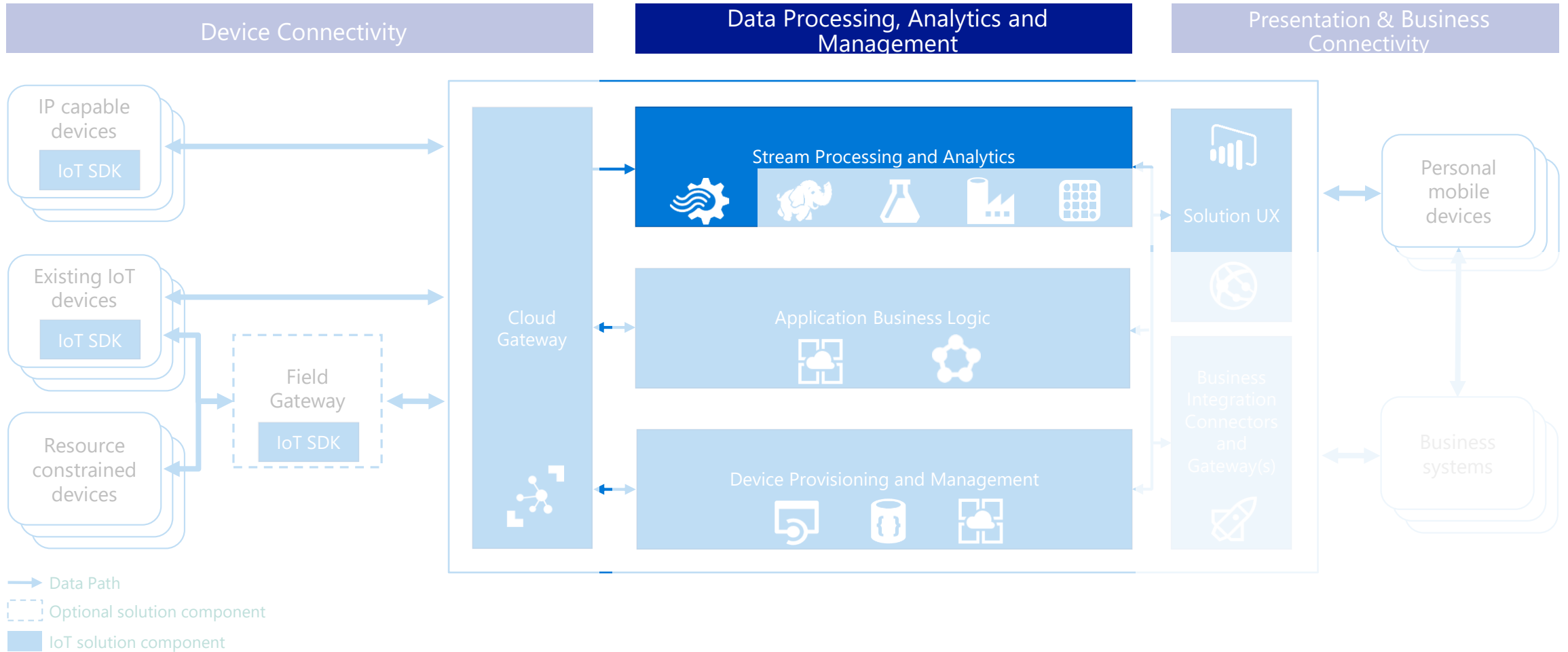
Kevin Saye

Event Processing  
Azure Stream Analytics



# Azure IoT Hub

## Azure IoT Hub



# Real time event processing

## Uncover real time insights

Perform real time analytics across multiple streams

## Rapid Deployment

Use simple SQL syntax, auto distributed for scale

## Mission critical reliability

Fully managed, low latency, high throughput

## Create real time alerts

Flag alerts and alarms for attention

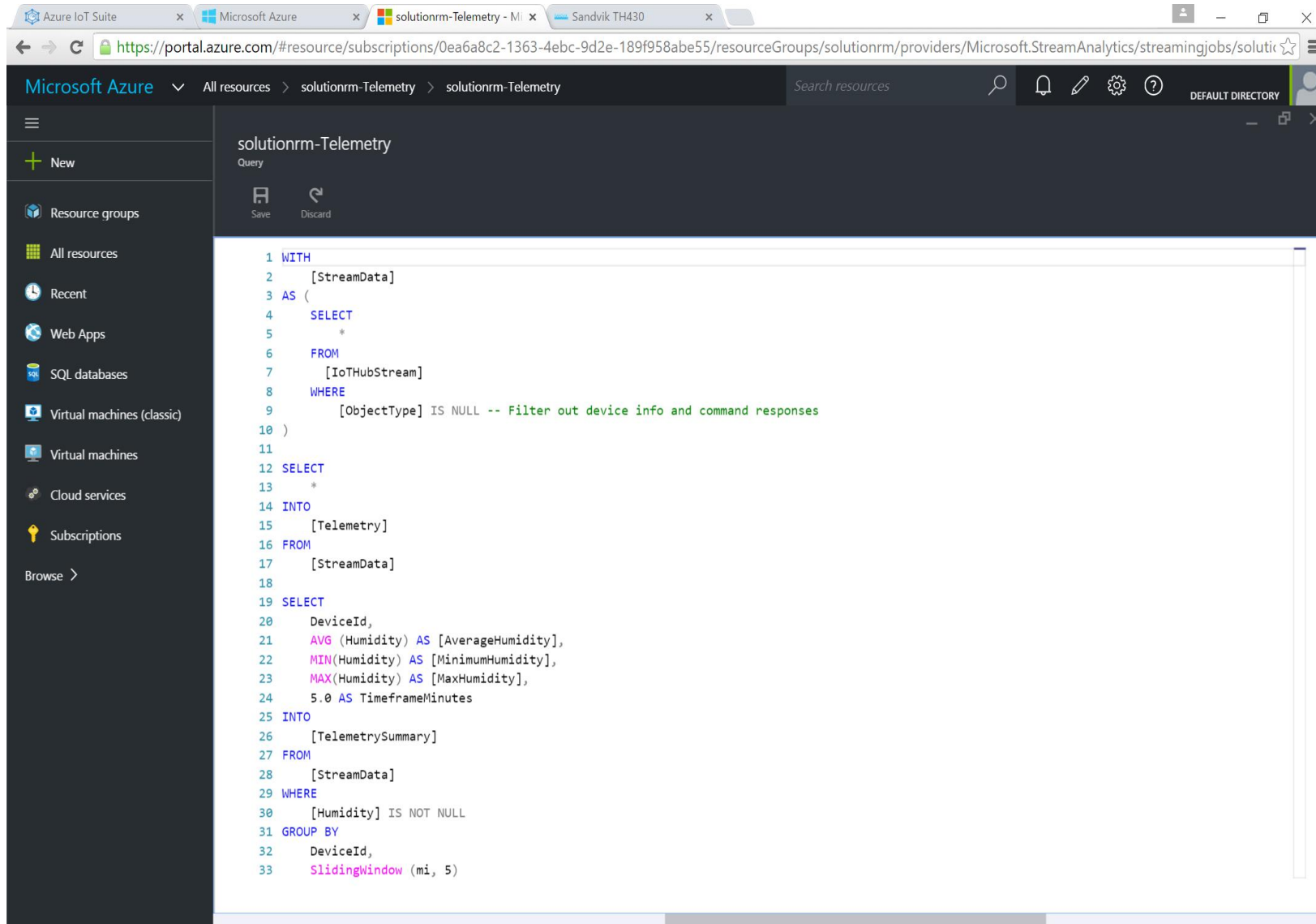
## High volume

Analyze millions of data points per second

## Highly scalable

Enterprise grade, predictable solution

# Add or edit jobs using simple ASA interface



The screenshot shows the Microsoft Azure portal interface for managing Stream Analytics jobs. The left sidebar contains navigation options like 'New', 'Resource groups', 'All resources', 'Recent', 'Web Apps', 'SQL databases', 'Virtual machines (classic)', 'Virtual machines', 'Cloud services', and 'Subscriptions'. The main area displays the 'solutionrm-Telemetry' job configuration. At the top, there are 'Save' and 'Discard' buttons. Below them is a query editor with a SQL-like query for processing IoT Hub stream data. The query includes a CTE for filtering out device info and command responses, followed by a summary query that calculates average, minimum, and maximum humidity values over a 5-minute sliding window.

```
1 WITH
2   [StreamData]
3 AS (
4   SELECT
5     *
6   FROM
7     [IoTHubStream]
8   WHERE
9     [ObjectType] IS NULL -- Filter out device info and command responses
10 )
11
12 SELECT
13   *
14 INTO
15   [Telemetry]
16 FROM
17   [StreamData]
18
19 SELECT
20   DeviceId,
21   AVG (Humidity) AS [AverageHumidity],
22   MIN(Humidity) AS [MinimumHumidity],
23   MAX(Humidity) AS [MaxHumidity],
24   5.0 AS TimeframeMinutes
25 INTO
26   [TelemetrySummary]
27 FROM
28   [StreamData]
29 WHERE
30   [Humidity] IS NOT NULL
31 GROUP BY
32   DeviceId,
33   SlidingWindow (mi, 5)
```

## Rule based interface

Simple implementation and rule development using ASA UI

## Multi-channel

Analyze multiple channels of information simultaneously, in real time

# Demonstration and Discussion

## Cold, Hot and Warm Path

Using logic to determine path and escalate when needed.

## Components

- Inputs (show)
- Outputs (show)
- Query
- Functions, both ML and JavaScript

## Built in Functions

Math, Array, Date/Time, Conversion, Geospatial, String, Record, Lag

## External Functions

- JavaScript (UDF)
- Azure Machine Learning

## Windowing

- Tumbling Window (non overlapping)
- Hopping Window (overlapping)
- Sliding Window (changes only)

## Consumer Groups

Partitions for application / service consumption.

# Determine where to send data

## Relational (SQL and etc)

- When speed of application access is needed
- Compatibility
- Most expensive

## Non Relational (Blob, DataLake, Cosmos, Tables, and NoSQL)

- Big Data
- No schema forced
- Future data access
- Least expensive

## Calculated

- Action only
- Get data based on data (part lookup, etc)
- Calculated data has real value

## Presentation / Reporting



# Additional References:

- [www.InternetofYourThings.com](http://www.InternetofYourThings.com)
- <https://blogs.msdn.microsoft.com/streamanalytics/>
- <https://azure.microsoft.com/en-us/services/stream-analytics/>
- <https://docs.microsoft.com/en-us/azure/stream-analytics/>

# Summary:

Azure Stream Analytics is an in memory streaming solution for real time processing of data

Stream can read from event or reference data and write to relational, non relational and API targets

Stream is SQL based in language with rich support for windowing, calculations and functions



[www.InternetofYourThings.com](http://www.InternetofYourThings.com)

© 2017 Microsoft Corporation. All rights reserved. Microsoft, Windows, Windows Vista and other product names are or may be registered trademarks and/or trademarks in the U.S. and/or other countries. The information herein is for informational purposes only and represents the current view of Microsoft Corporation as of the date of this presentation. Because Microsoft must respond to changing market conditions, it should not be interpreted to be a commitment on the part of Microsoft, and Microsoft cannot guarantee the accuracy of any information provided after the date of this presentation. MICROSOFT MAKES NO WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AS TO THE INFORMATION IN THIS PRESENTATION.