

# Azure Databricks Monitoring Solar Farms

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#SAISDD11

# About Us

- Richard Conway Founder and Director of Elastacloud, a UK Cloud Data Analytics Consultancy, Azure MVP/Microsoft Regional Director + Sandy May Cloud Big Data Surgeon
- Microsoft Azure Gold Partner, Cloud Platform and Data Analytics, OSS Partner of the year 2015, Microsoft Partner of the Year nominee 2018
- Co-founder of UK Azure User Group, IoT and Data Science Innovators UK, UK Cloud Infrastructure User Group
- Author of data science degree [academy.microsoft.com](https://academy.microsoft.com)
- Running AzureCraft in UK annually
- Contributors to open source, several Apache projects including Storm, Spark, Libcloud and Parquet
- 50+ people, offices in London, Nottingham and Spain

## What we'll cover in this presentation

- A little about solar and renewables data acquisition
- A little about Azure and how we design things
- Using Databricks in a fun way
- Orchestrating the future

# The Solar Farm



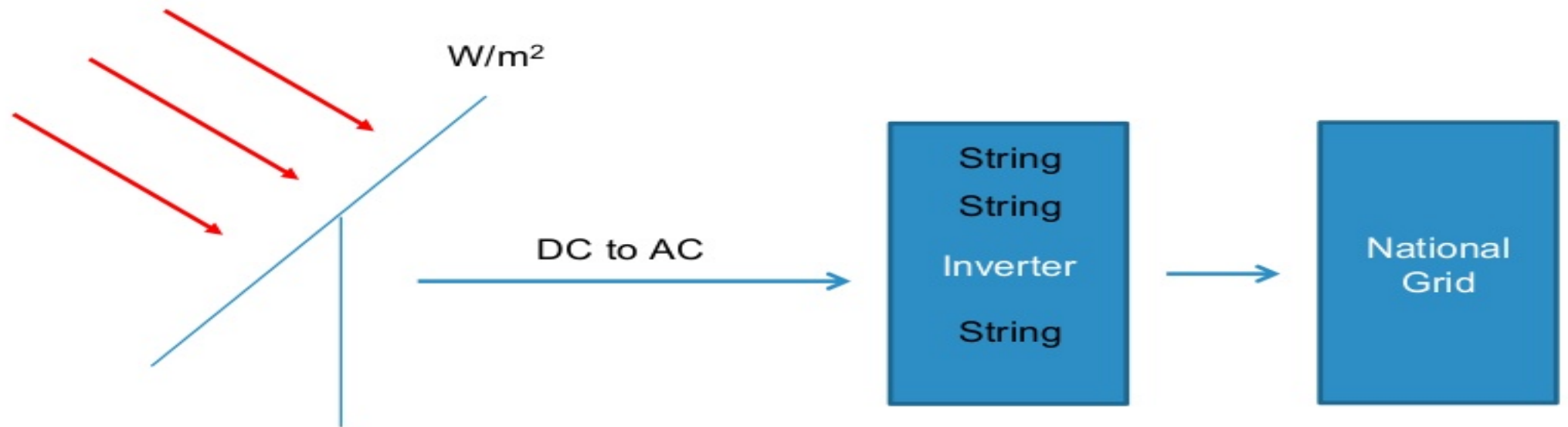
images from mnn.com



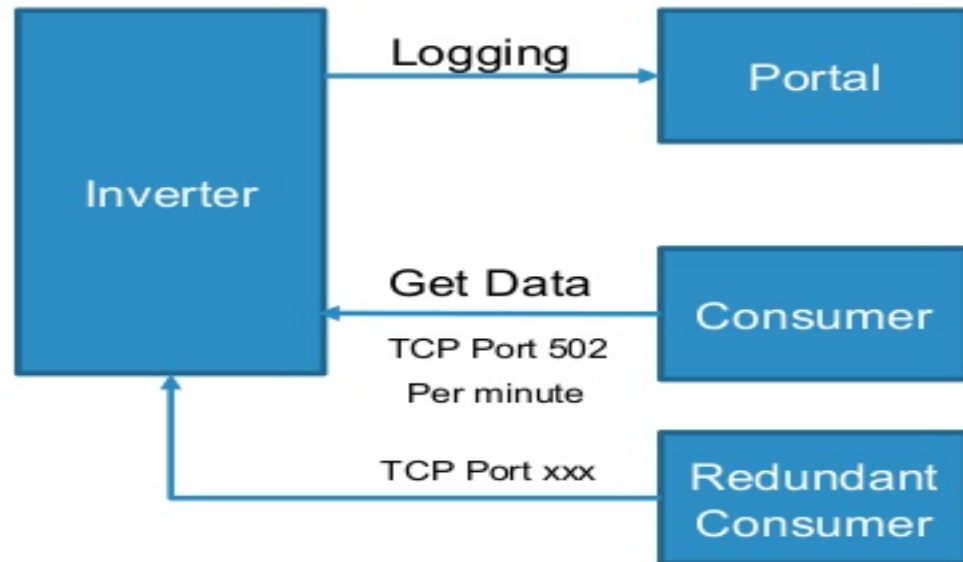
Courtesy Wikipedia – installed UK capacity ~  
< 10GW



# Solar Irradiance



# Modbus Collection of Data



Things to note:

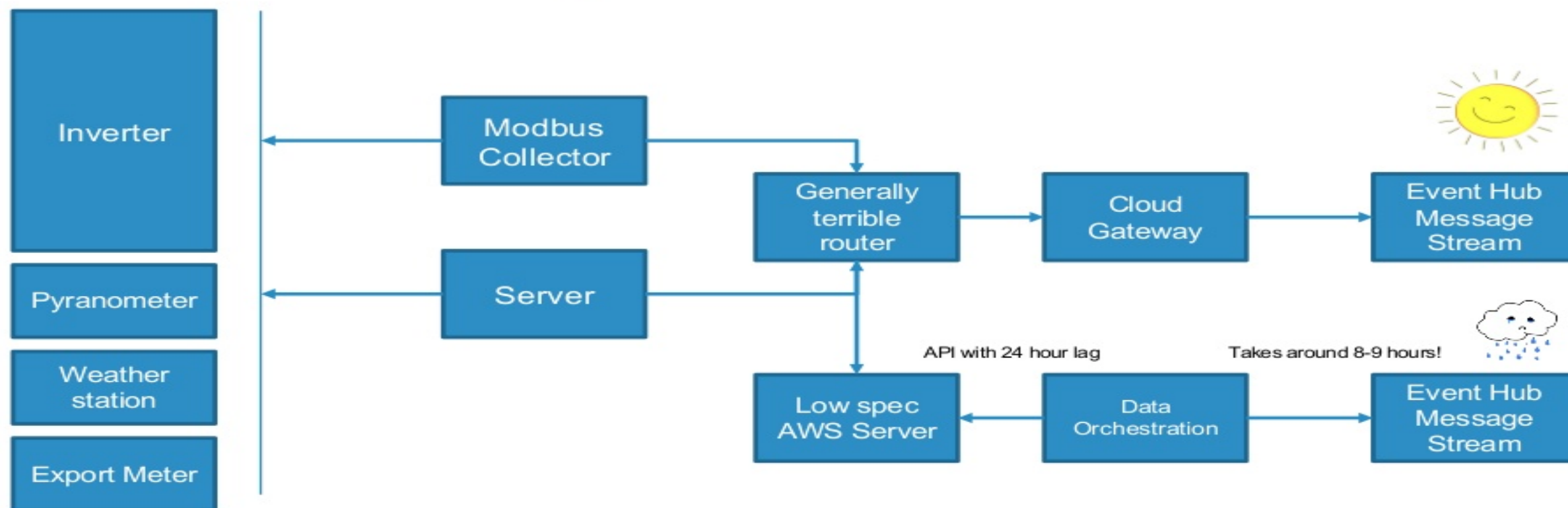
- Inverter can generally only accept a single Modbus TCP connection
- As such usage of Hub and Spoke Models are needed to relay to cloud
- Modbus def example:

29 1;INV\_EFFICIENCY;3;2;29;;;0.1;0;%2

Register No.      Min/Max/Avg      Units      Msg Type

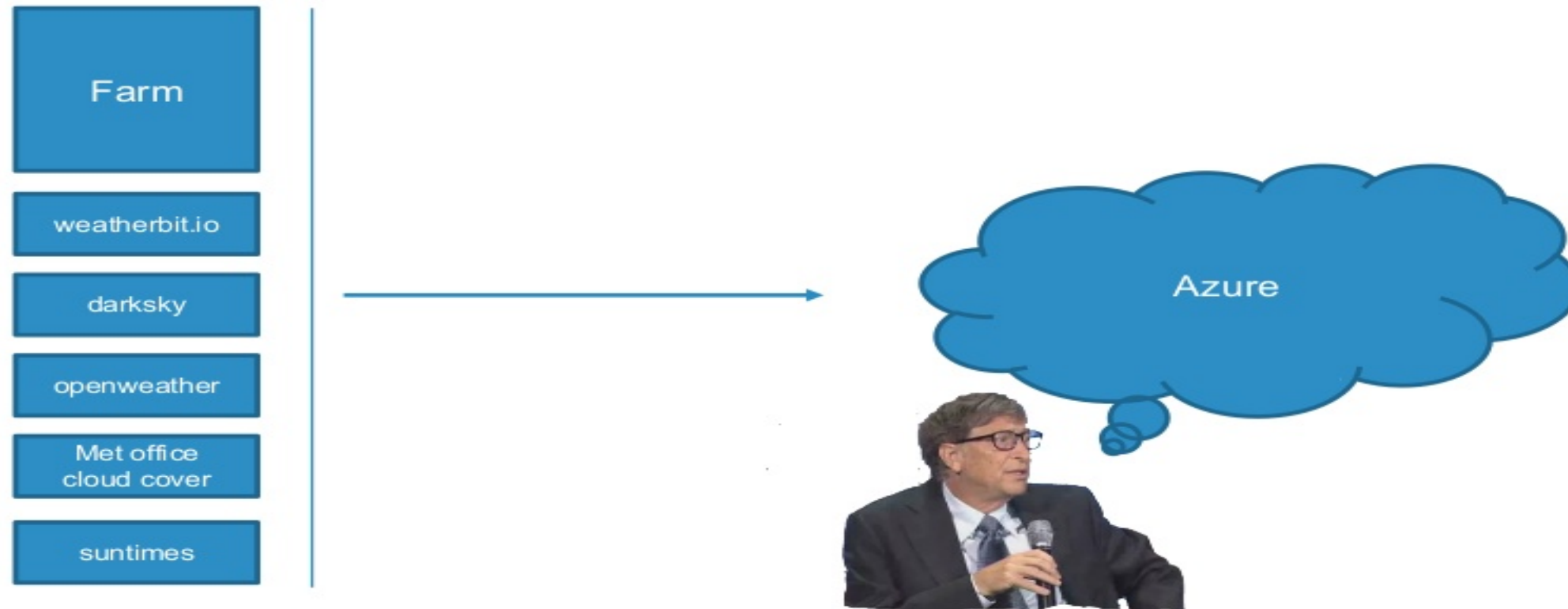
The diagram shows a Modbus definition example: `29 1;INV_EFFICIENCY;3;2;29;;;0.1;0;%2`. The components are labeled as follows: `29` is the Register No., `1` is the Min/Max/Avg value, `INV_EFFICIENCY` is the Units, `3` is the Msg Type, `2` is the Min/Max/Avg value, `29` is the Register No., `;` is the separator, `0.1` is the Units, `0` is the Msg Type, and `%2` is the Units.

# Cloud Gateway Patterns from Farm

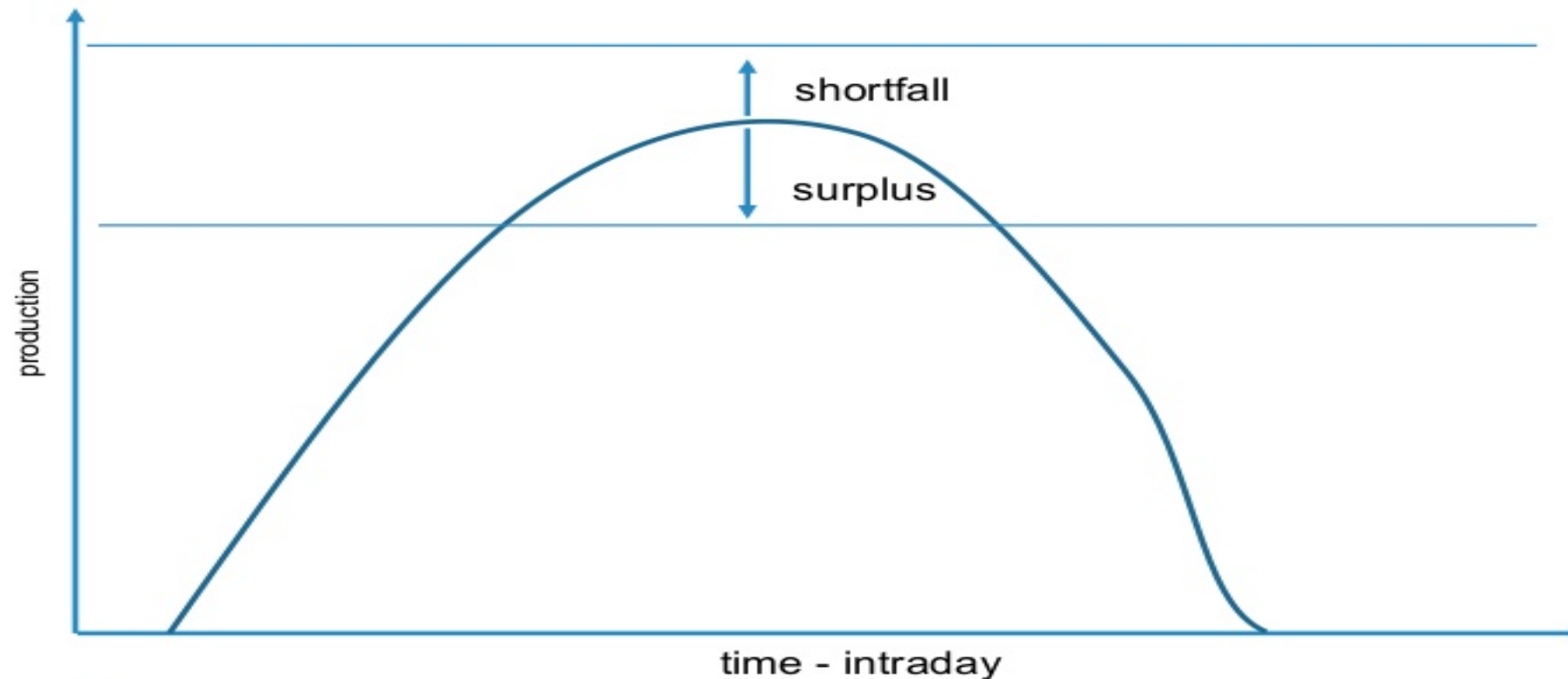




# All sources of information

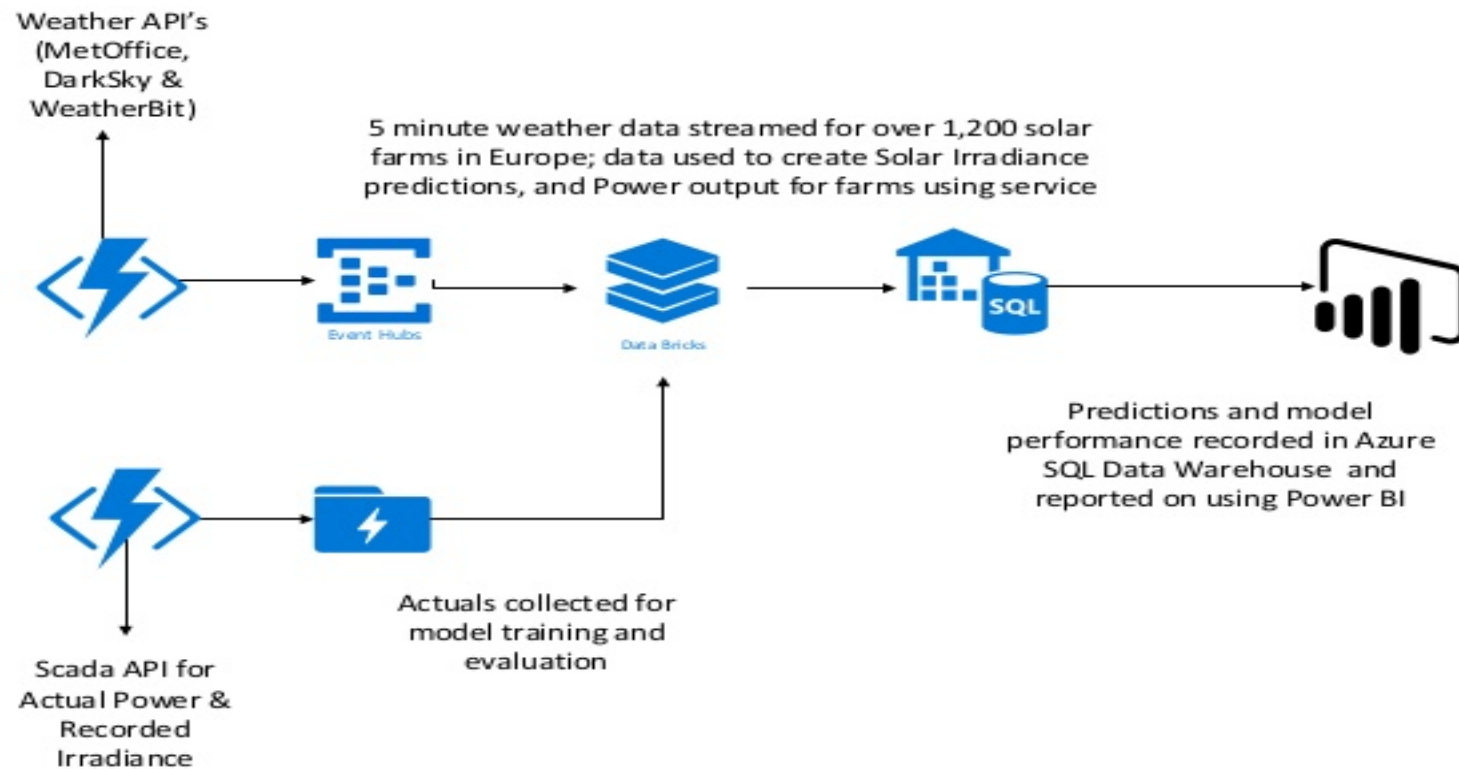


# Balancing Energy



- Shortfalls lead to buy back to fulfil contracts
- Surpluses need selling
- Grid needs to be balanced at all times
- Need to understand intraday pricing market to understand exposure
- Insure risk through PPAs for lower returns
- National Grid has balancing cost
- Internal transactions need balancing too
- Need to understand interconnects

# Our Azure Architecture



# Demos and Code!

# Thanks and Questions?