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Olli Aaltonen

Fingrid's Cloud Platform

Enabling scalable, cost-effective and secure IoT analytics

FINGRID

A Bit About Me

Olli Aaltonen

ICT Special Adviser, Business Support Services

History:

- 21 years @ IT infrastructure development and support positions
- 4+ years @ Fingrid

Current work:

- IoT Platform, Edge solution and Cloud
- DevOps Technical Lead
- Robotic Process Automation, RPA
- ICT Architecture

Motto: "Question everything until you can switch to open source"



A Bit About Fingrid

Our Mission

Fingrid is Finland's transmission system operator. We secure reliable electricity for our customers and society and we shape clean, market-oriented power system of the future.



14 300

KILOMETRES OF POWERLINES



TRANSMISSION RELIABILITY ON THE GRID

99,9999 %



114

SUBSTATIONS

68,7 TWh

OF ELECTRICITY WAS TRANSMITTED ON
FINGRID'S GRID IN 2018, REPRESENTING

76 %

OF THE TOTAL TRANSMISSION
VOLUME IN FINLAND



Fingrid Delivers. Responsibly.

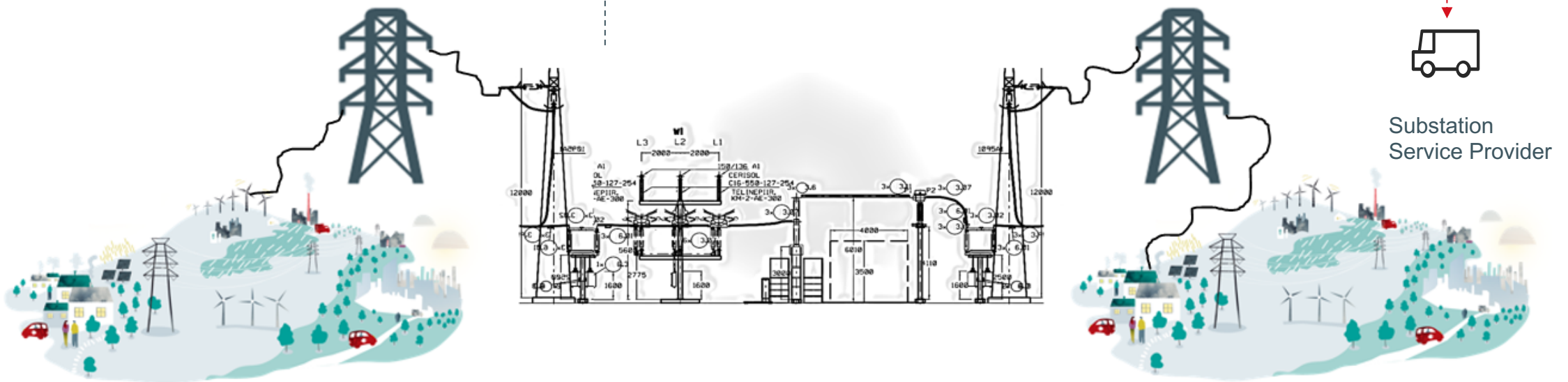
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IoT concept in fifteen minutes

IoT The Logic

Sensors:
-acoustic emission
-RFI
-current
-temperature
-humidity
-water leakages
-etc..



IoT Goals

Why ?

1. Improve know how on assets condition
Securing grid quality
2. Minimise outages of assets condition checks
Improving grid availability
3. Allocate service action need basis on correct assets
Improving cost effectiveness

What it means

1. Time based measurements will be replaced by sensor monitoring
2. New models for service contracts
3. Need for training and orientation / change management project.



Switching device monitoring

Disconnectors, Earthing switches, and Breakers

Switching device monitoring

Earlier: Switching device maintenance every tenth year, in one day.

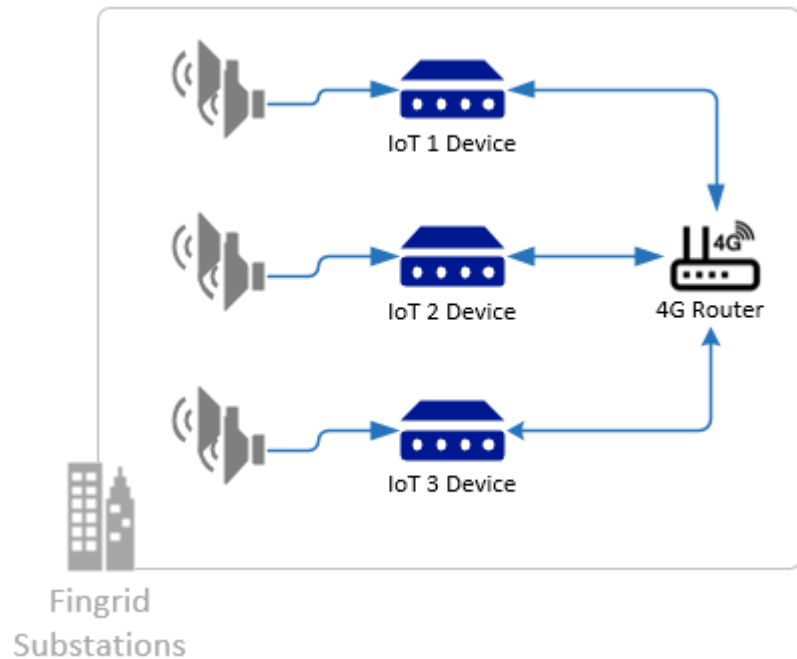
Future: Traditional maintenance once in asset life cycle. Realtime asset condition monitoring.

The monitoring system is based on the measurement of electronic parameters and sound during operation

The sound profile can be used to detect control deviations by comparing measurements of the same device type and enriching them with current, temperature and humidity data.



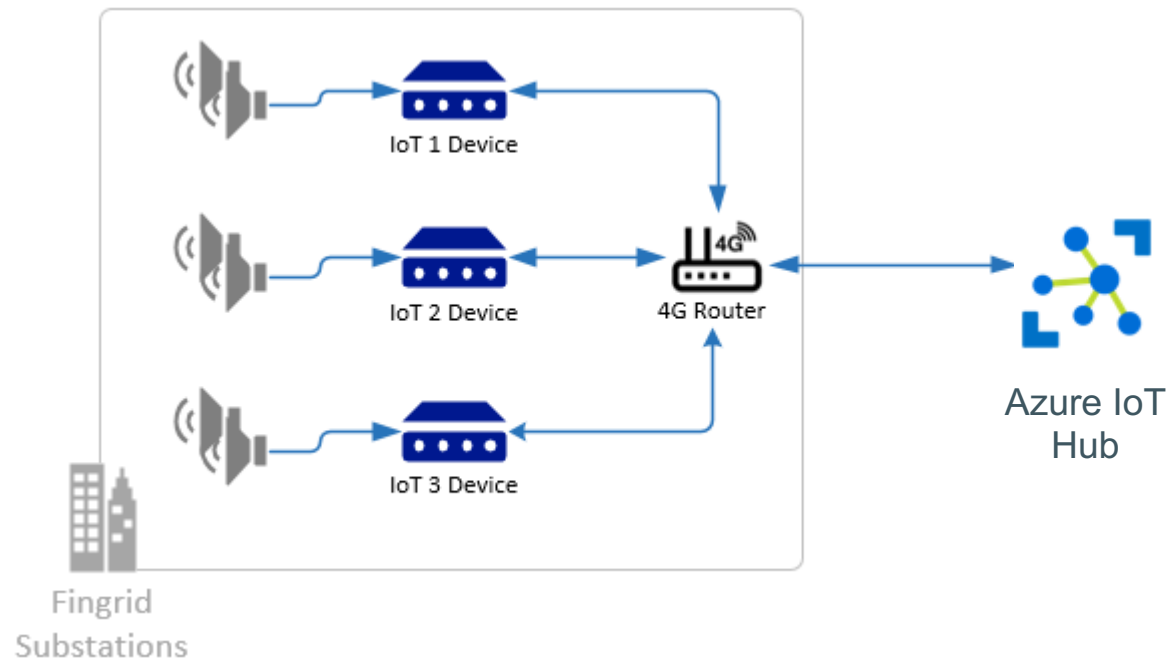
Switching device monitoring



- IoT devices detached from substation control buses and actuators
- External audit
- Operating system minimization
- Container based solution
- Sending messages and connecting to the cloud starts from the end of the device

Smart sensors: Less vulnerable devices.

Switching device monitoring

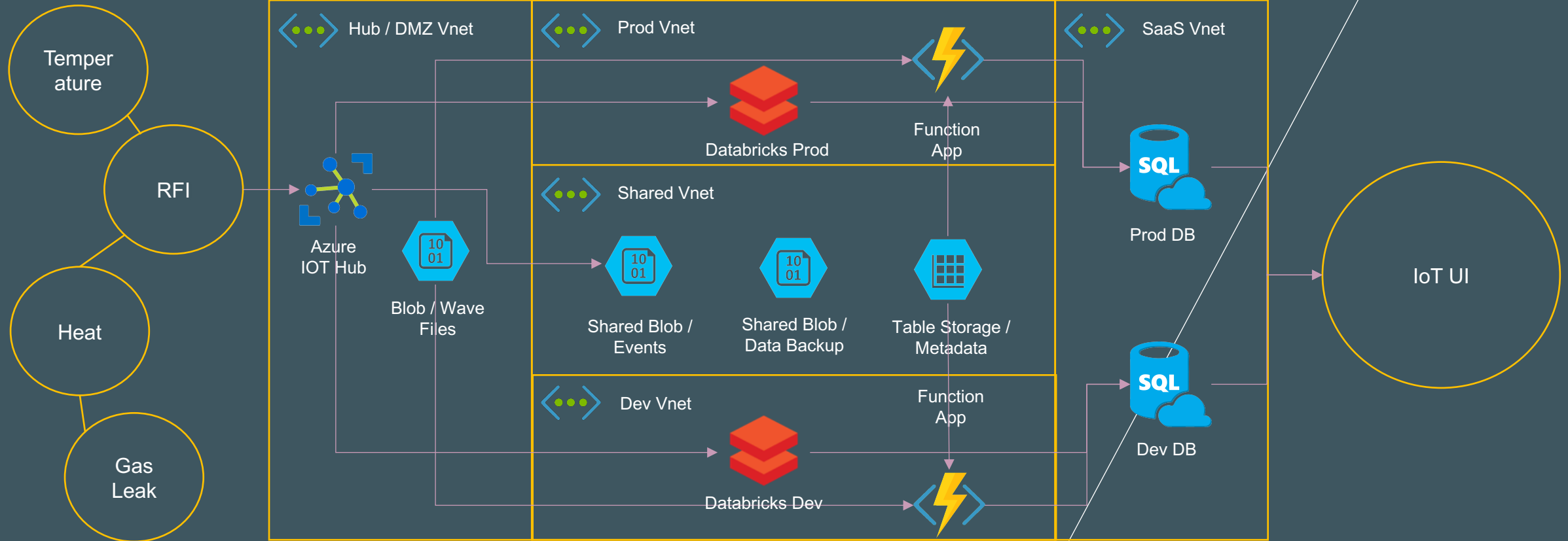


- Telemetry, message ingestion
- Device Management
- Connection keys
- Data routing
- Metadata
- User rights - Azure AD B2B

Sensors

Realtime Data-platform

IoT UI Visualizations



Some benefits and findings

- Running your own platform you can control costs. E.g. shut down / pause dev if not needed.
- Running cloud native paas components do not need traditional maintenance, updates, etc.
- Standard message format. It's easy to add new analytics.
- Vendor management, component separation.
- Scalability. You can start with free components.
- Everything can be fully automate. Code development, platform configuration, using DevOps.



Azure Active Directory
B2B



Azure Security Center



Azure Monitor

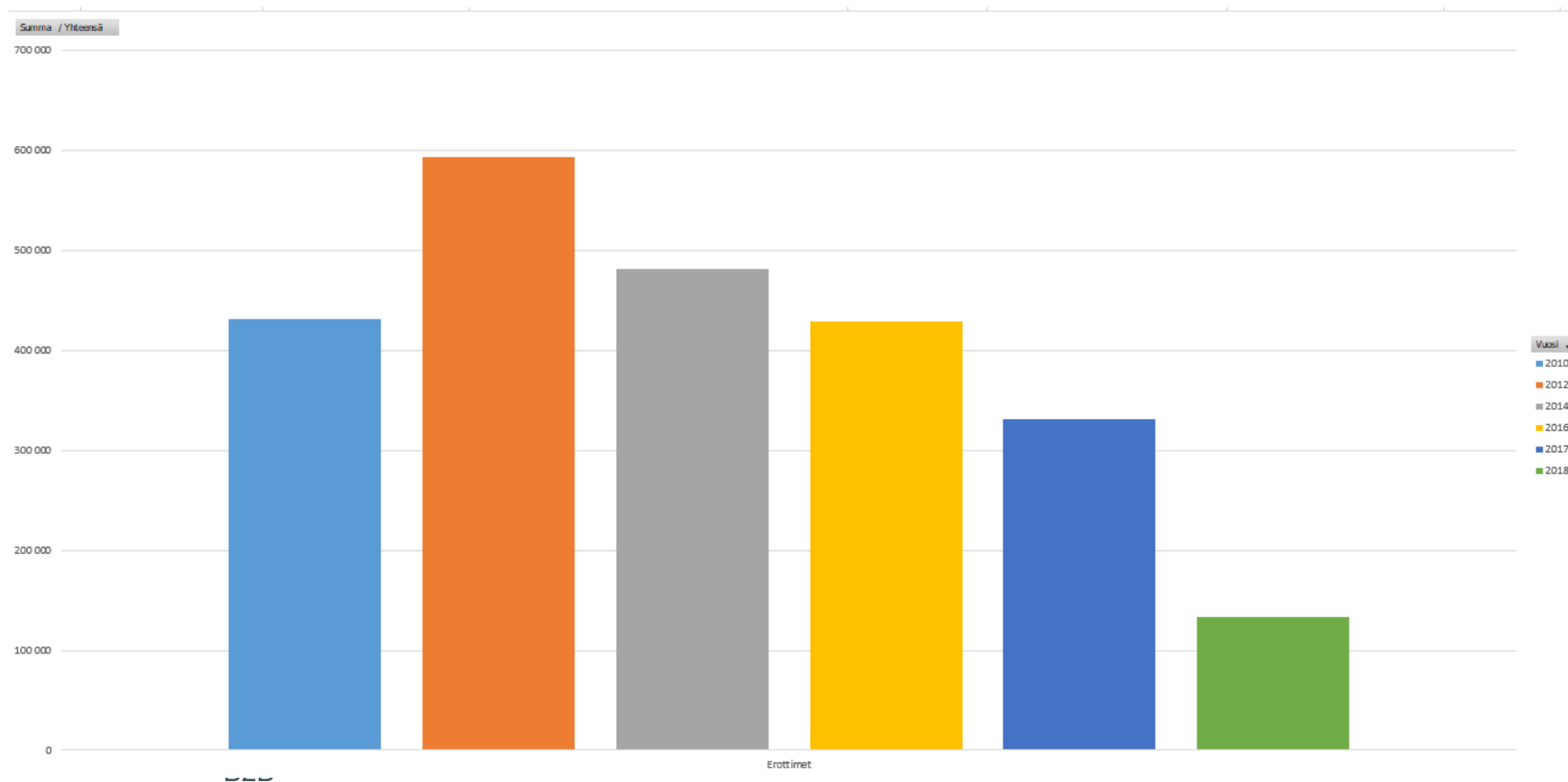


Azure Key Vault



GitHub

Some benefits and findings



**Example,
change in tbm
costs -
disconnectors**

Thank you!

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