Wind Energy Generation Data Space
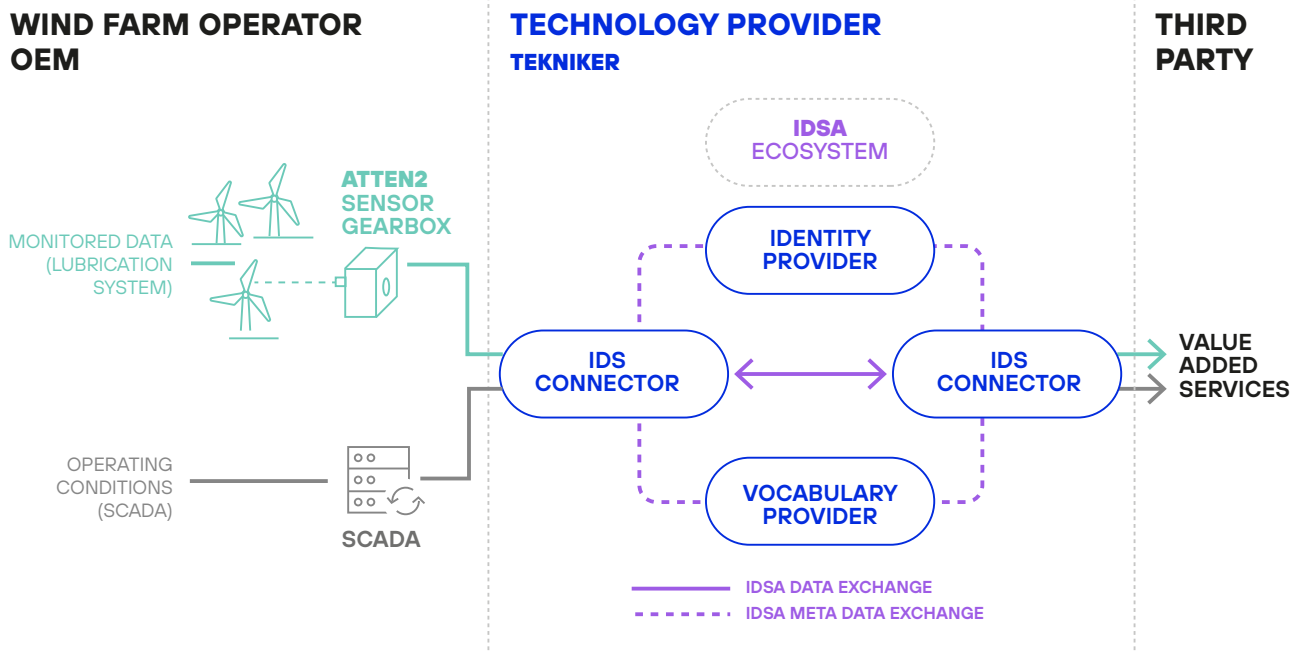

Unsplash / CharlieChesvick

Motivation

The wind farm competitiveness is closely connected with the maintenance of wind turbines. Therefore, analysing and learning from the data collected from the wind turbine operation is of the utmost importance.

Challenges

Due to current reluctance to share data, the data collected from wind turbine operation is retained by wind farm operators and Original Equipment Manufacturers (OEMs). As the data owners, they are the only actors who extract added value. Thus, other stakeholders in the value chain such as component suppliers and third-party service providers are missing the opportunity to analyse and learn from wind turbine operation data.

In this regard, the International Data Spaces Association (IDSA) provides a Reference Architecture Model (RAM) to drive the development of data spaces that boost data sharing through three main pillars: Interoperability, trust, and data sovereignty.

WIND FARM OPERATOR OEM

TECHNOLOGY PROVIDER TEKNIKER

THIRD PARTY

MONITORED DATA (LUBRICATION SYSTEM)

ATTEN2 SENSOR GEARBOX

OPERATING CONDITIONS (SCADA)

SCADA

IDSA ECOSYSTEM

IDENTITY PROVIDER

IDS CONNECTOR

VOCABULARY PROVIDER

IDS CONNECTOR

VALUE ADDED SERVICES

—— IDSA DATA EXCHANGE
---- IDSA META DATA EXCHANGE

Solution

To promote trusted data sharing along the wind energy data space, Tekniker deploys the following components from the IDSA RAM:

Vocabulary Provider
Manages and provides a certified Wind Farm Ontology (WFOnt) that describes the resources that can shared by DataSpace Connectors through the data space.

Identity Provider
Creates, maintains, manages, monitors, and validates the security level of the components deployed in the data space.

Dataspace Connectors
Responsible for correct data sharing through the data space. Interoperability is ensured through the IDSA Information Model (IM) and the Vocabulary Provider. Trust is provided through the Identity Provider. Data sovereignty is granted through a distributed usage control solution.

Benefits

Sensor information (particles in lubrication system) can only be fully understood in synergy with windmill operational regime.

Cooperation between different data & service providers (operational data, IoT sensor data, diagnostic services) provides insight in the windmill gearbox status (accurate diagnostics).

The use of adequate data control mechanism for sharing data facilitates trust and data related businesses (allows O&M optimization, leads to improved component design).

ATTEN2
Advanced Monitoring Technologies

INTERNATIONAL DATA SPACES ASSOCIATION

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