05/18/2022

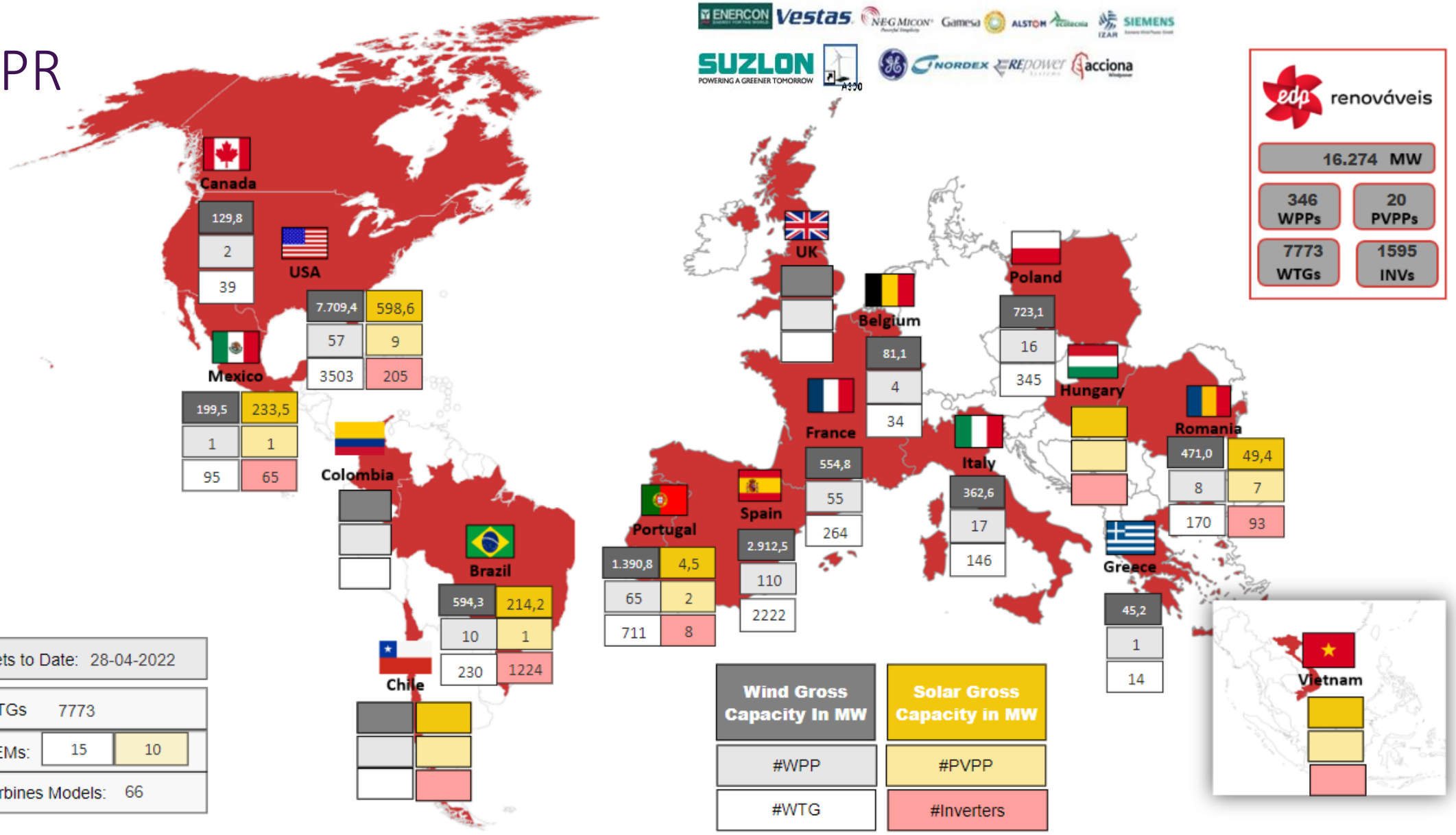
Analyzing Wind Power data in the AVEVA Data Hub (OCS) at EDP Renewables

Sergio Valencia Galán

© 2022 AVEVA Group plc and its subsidiaries. All rights reserved.

EDPR - INTEGRATED FLEET

EDPR



Assets to Date: 28-04-2022		
# WTGs	7773	
# OEMs:	15	10
# Turbines Models:	66	

Wind Gross Capacity In MW	Solar Gross Capacity in MW
#WPP	#PVPP
#WTG	#Inverters

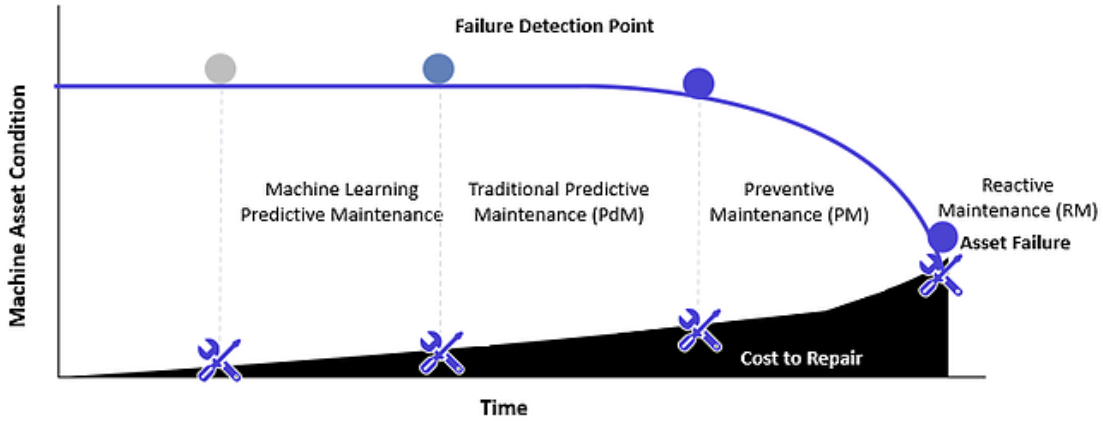
edp renováveis

16.274 MW	
346 WPPs	20 PVPPs
7773 WTGs	1595 INVs

Supervised by EDPR's Dispatch Centers

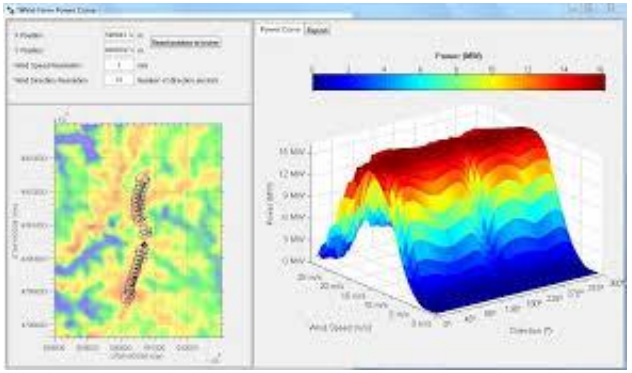
Business Needs -> Big Data Apps and Connections

Machine Learning / Predictive Maintenance

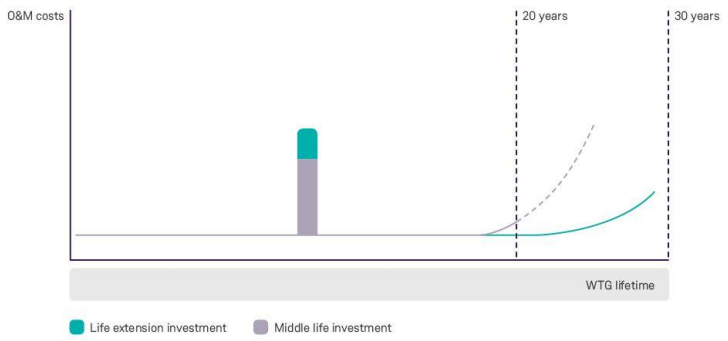


Dashboard on Power BI (Advanced Reporting)

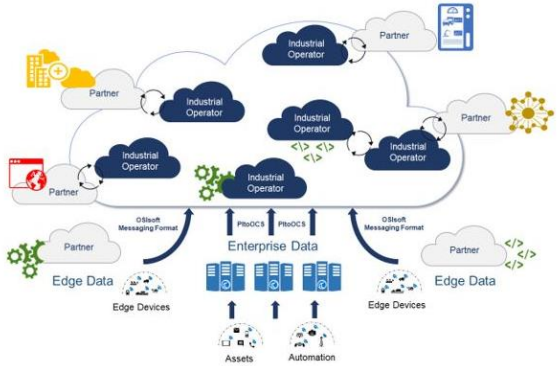
Performance of WTG / INV



Wind Turbine Life Extension



Data Sharing



AVEVA

WHY USE ADH?

EDPR REQUIREMENTS

- **Wind Turbine Life Extension**
- **Data Sharing**
- **Machine Learning**
- **Predictive Maintenance**
- **Dashboard on Power BI**
- **Performance of WTG / INV**

ADH CHARACTERISTICS

- **API to connect to External Sources**
  (Big Data: Azure, Google, Amazon)
- **Multiples Data Sources**
  (PI Server, Adapters,…)
- **Easy Connection with Power BI**
- **Support 2M Tags**
- **Supported by AVEVA**

AVEVA

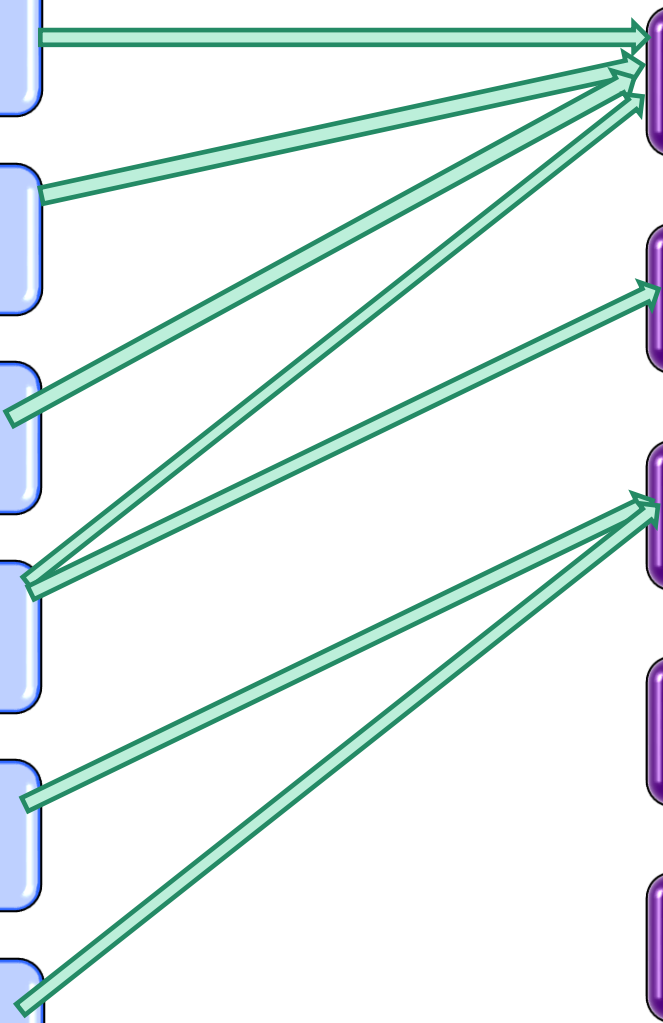
WHY USE ADH?

EDPR REQUIREMENTS

- Wind Turbine Life Extension
- Data Sharing
- Machine Learning
- Predictive Maintenance
- Dashboard on Power BI
- Performance of WTG / INV

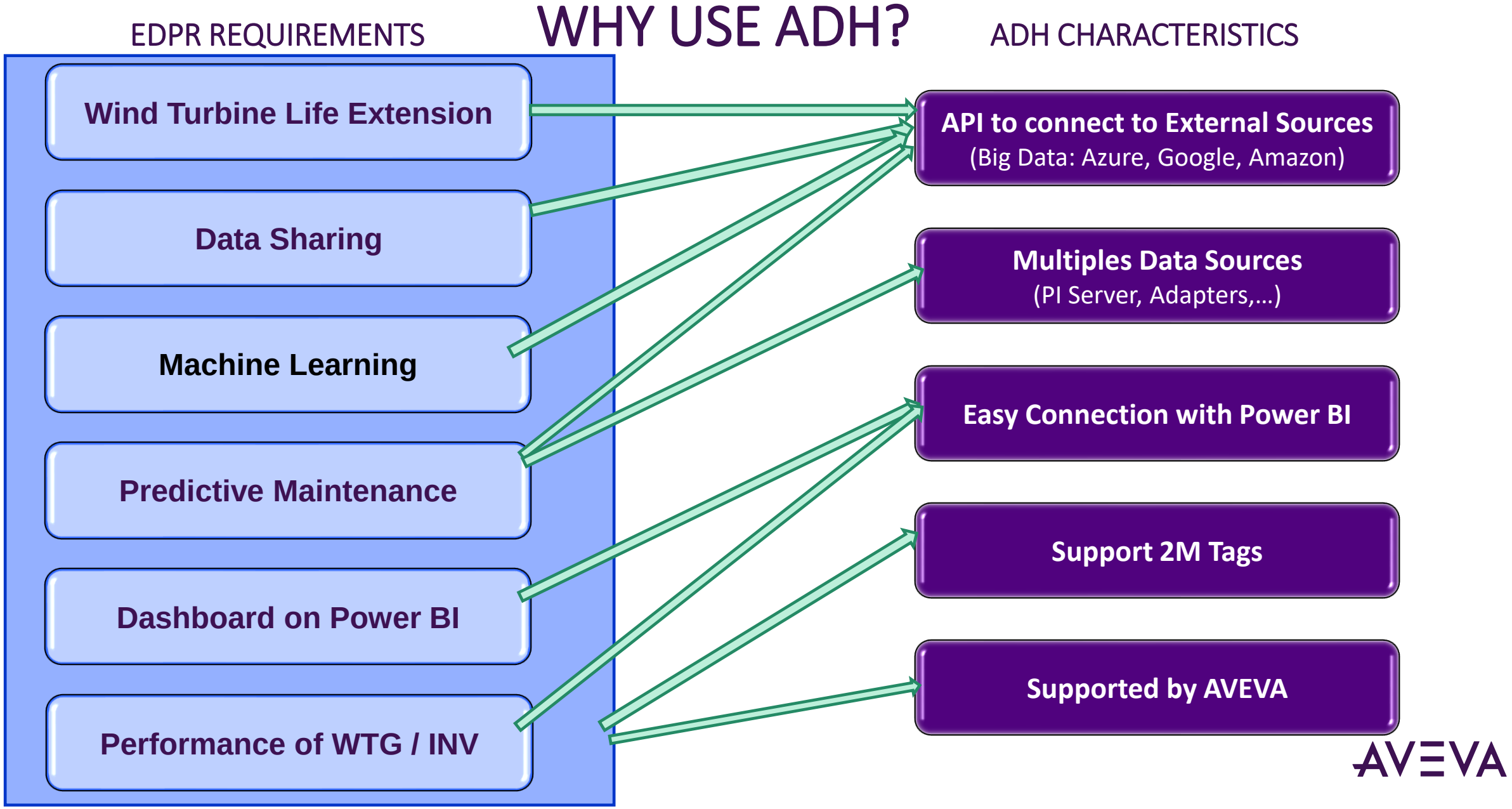
ADH CHARACTERISTICS

- **API to connect to External Sources** (Big Data: Azure, Google, Amazon)
- **Multiples Data Sources** (PI Server, Adapters,…)
- **Easy Connection with Power BI**
- **Support 2M Tags**
- **Supported by AVEVA**

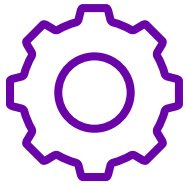


AVEVA

WHY USE ADH?


EDPR REQUIREMENTS
Wind Turbine Life Extension
Data Sharing
Machine Learning
Predictive Maintenance
Dashboard on Power BI
Performance of WTG / INV
ADH CHARACTERISTICS
API to connect to External Sources
(Big Data: Azure, Google, Amazon)
Multiples Data Sources
(PI Server, Adapters,…)
Easy Connection with Power BI
Support 2M Tags
Supported by AVEVA

How to take advantage of the ADH in your organization



Challenge

Improve Key Processes of the Company using 2M of Tags:

- Machine Learning / Predictive Maintenance
- Dashboard on Power BI with PI Data
- Performance of Wind Turbines
- Wind Turbine Life Extension
- Data Sharing

Solution

Using AVEVA Data HUB (OCS) with 2M of tags on a specific Lighthouse program:

- Configure the Agents
- Throubleshooting in the AVEVA part
- Specific configuration of data views

Benefits

- A Solution supported by AVEVA to connect with Cloud systems and external systems
- Include 100% of the Assets
- Increase the analytic tools to improve our processes

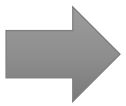
© 2022 AVEVA Group plc and its subsidiaries. All rights reserved.

Challenge

Requirements of EDPR's:

- Machine Learning
- Predictive Maintenance
- Dashboard on Power BI
- Performance of Wind Turbines
- Wind Turbine Life Extension
- Data Sharing

AVEVA Challenge to Adapt ADH for 2M Tags

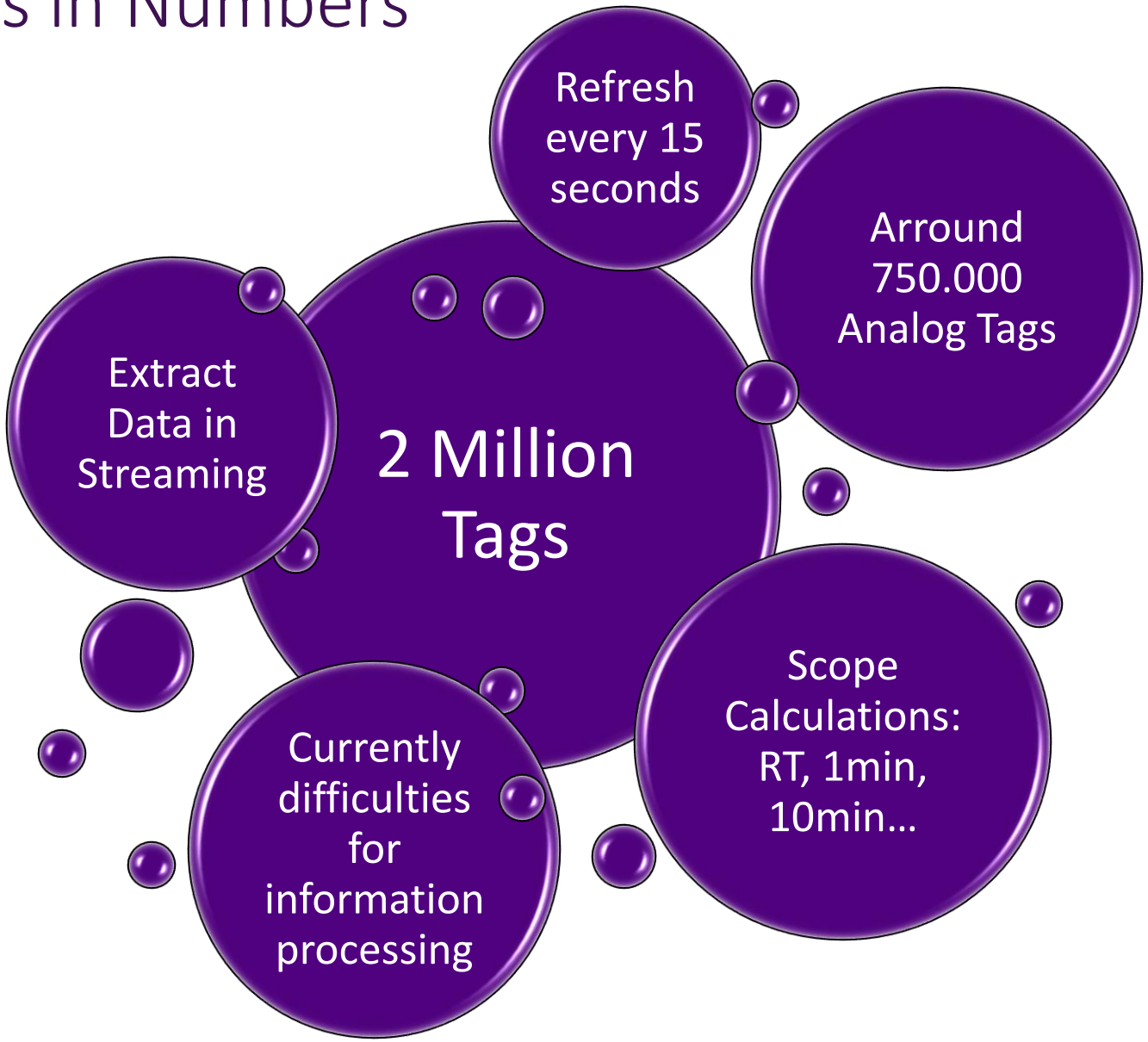


Create an Interface based on AVEVA Solution for Digital Transformation needs

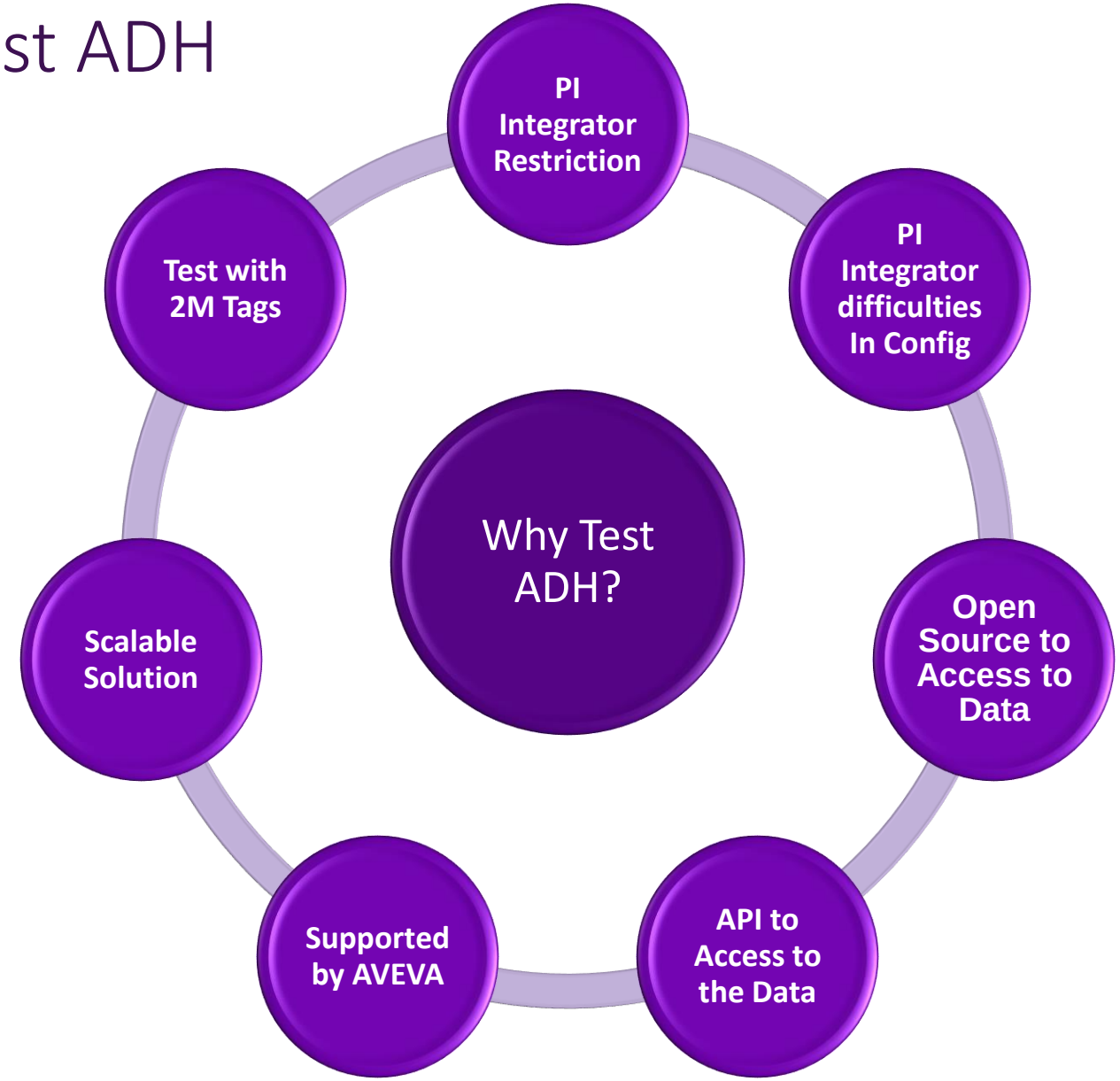
Scope: How to Use ADH capabilities with 2 Millions of Tags

AVEVA

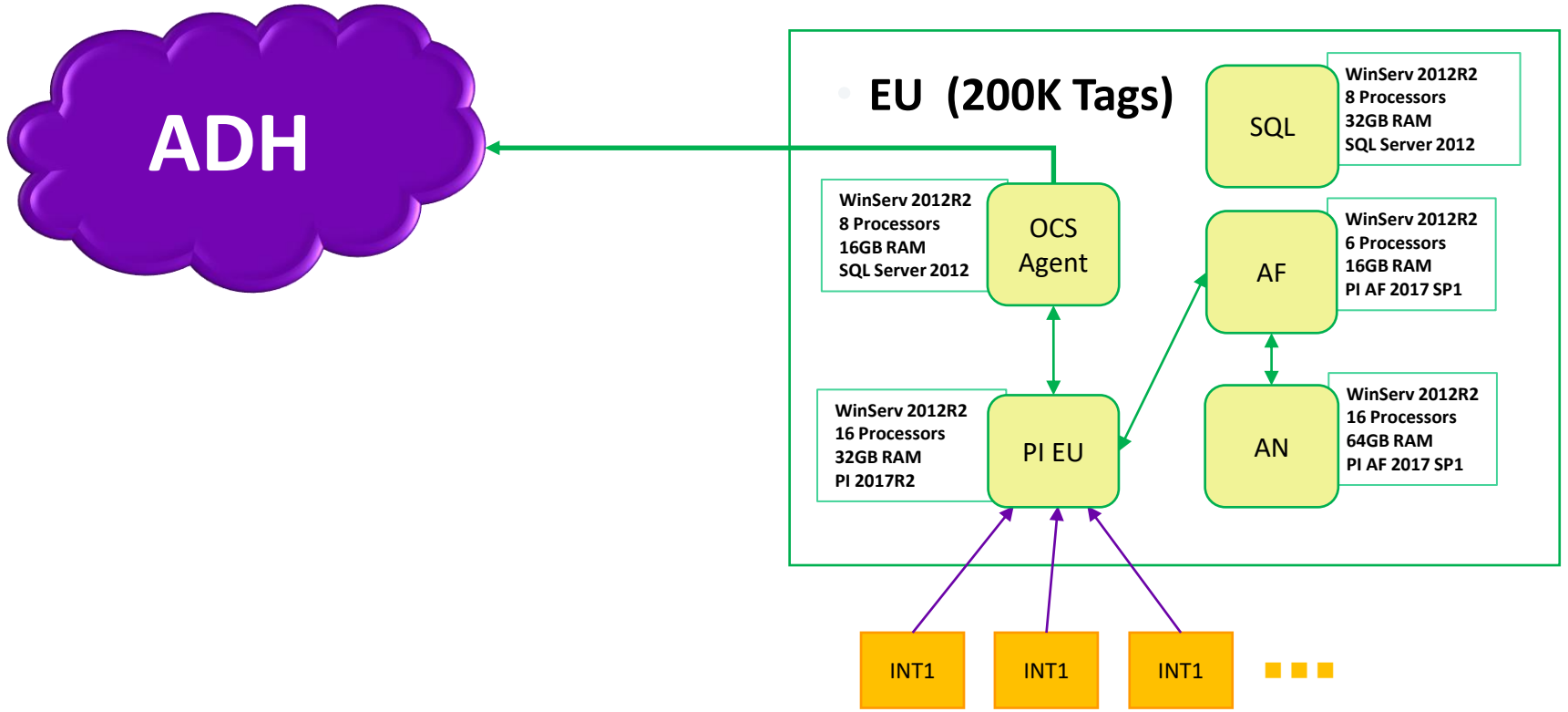
Requirements in Numbers



Reasons to test ADH



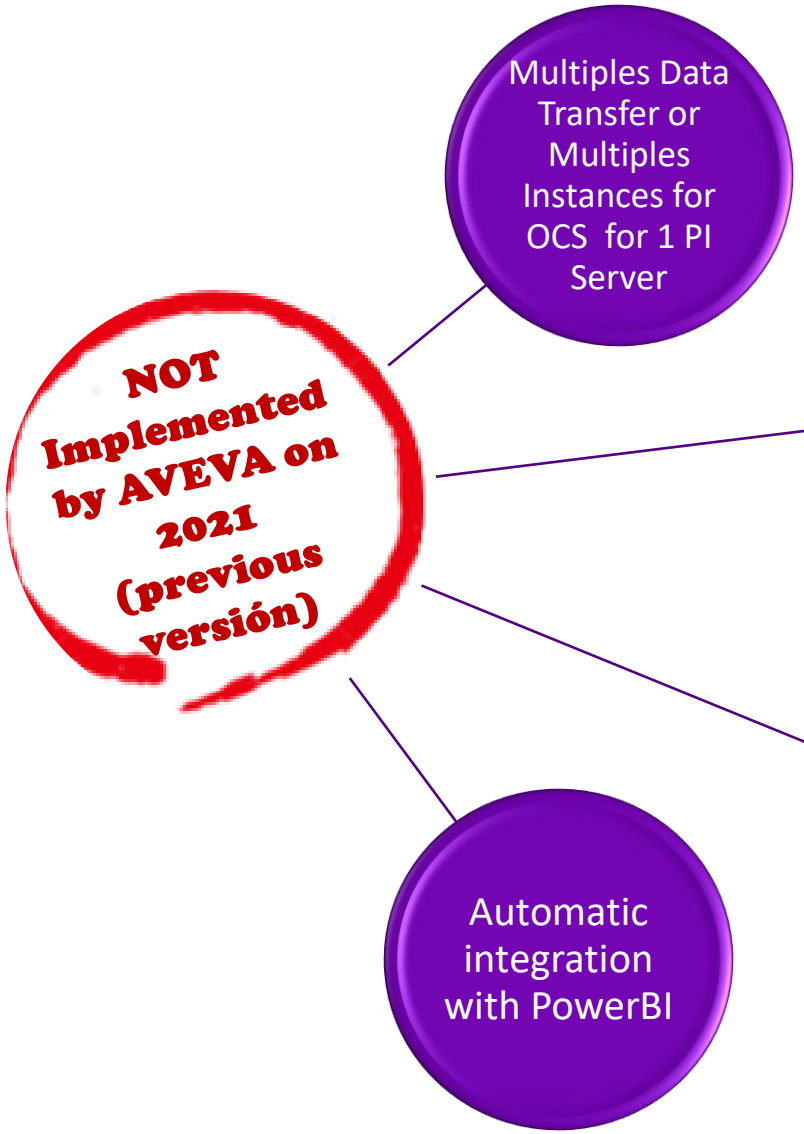
LightHouse with 200K tags on early 2021 (Previous Version)

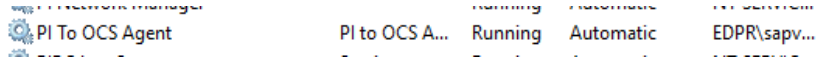


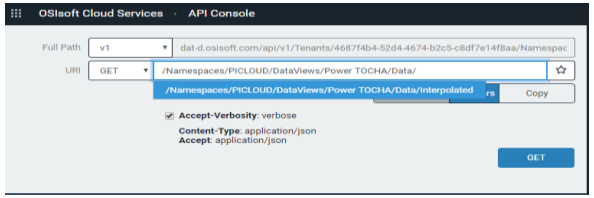
LightHouse with 200K tags on early 2021 (Previous Version)

#	Required Criteria	Results	Pass
1	Speed of data streaming ingress into OCS	Average Delay15”	✓
2	Speed of Data Archive ingress into OCS	Average Delay 15”	✓
3	Volume	200,000 Tags	✓
4	Historical availability	Historical Recovery in different situations properly	✓
5	Data egress speed availability	For 300 Tags Query on Power BI 7”	✓
6	Historical data egress availability	For 300 Tags Query on Power BI 7”	✓
7	Direct Connectivity using PI Adapters for OPC UA into OCS	Integration problems between PI Adapter and EDPR’s OPC UA	✘

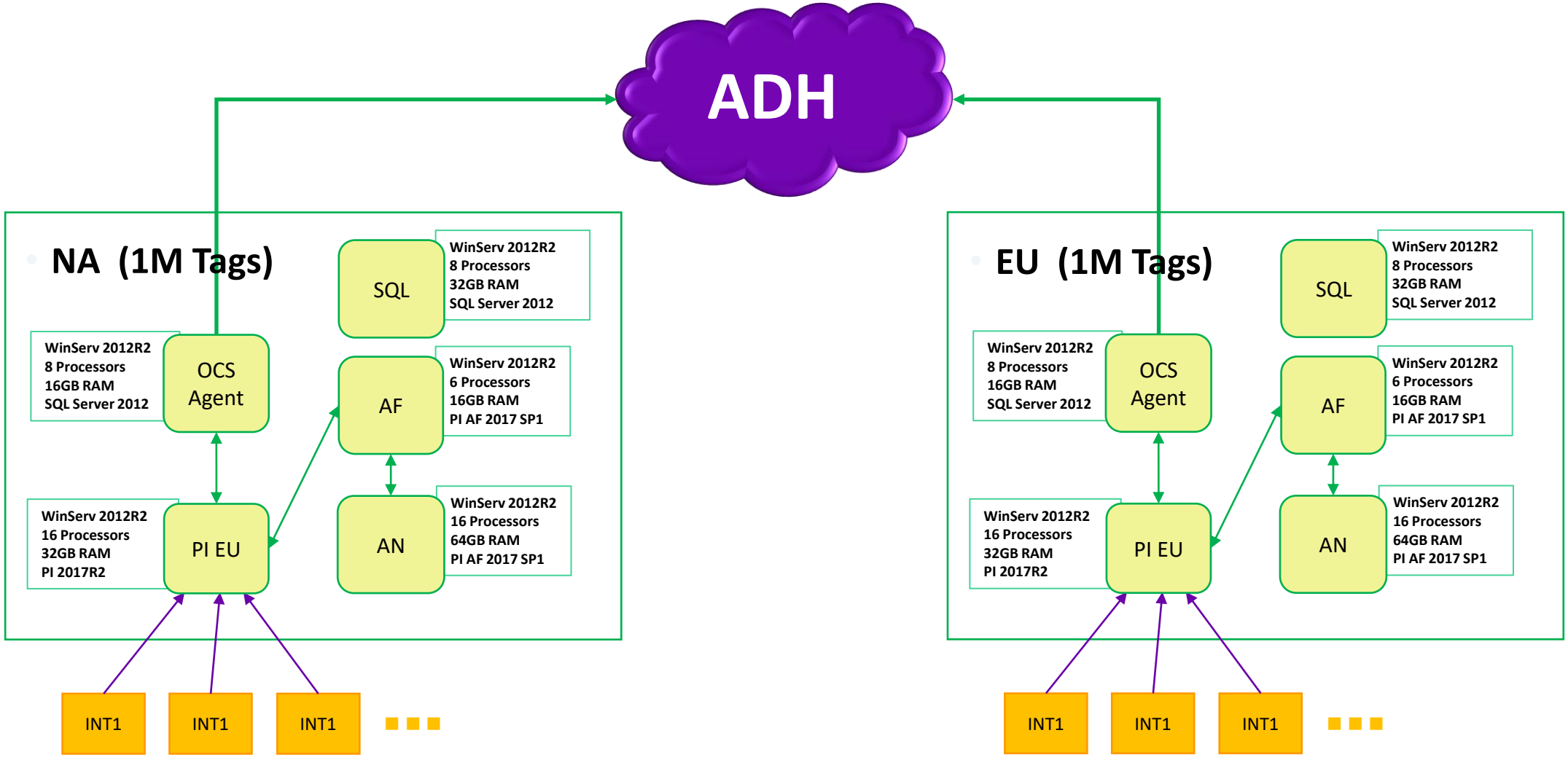
LightHouse with 200K tags on early 2021 (Previous Version)







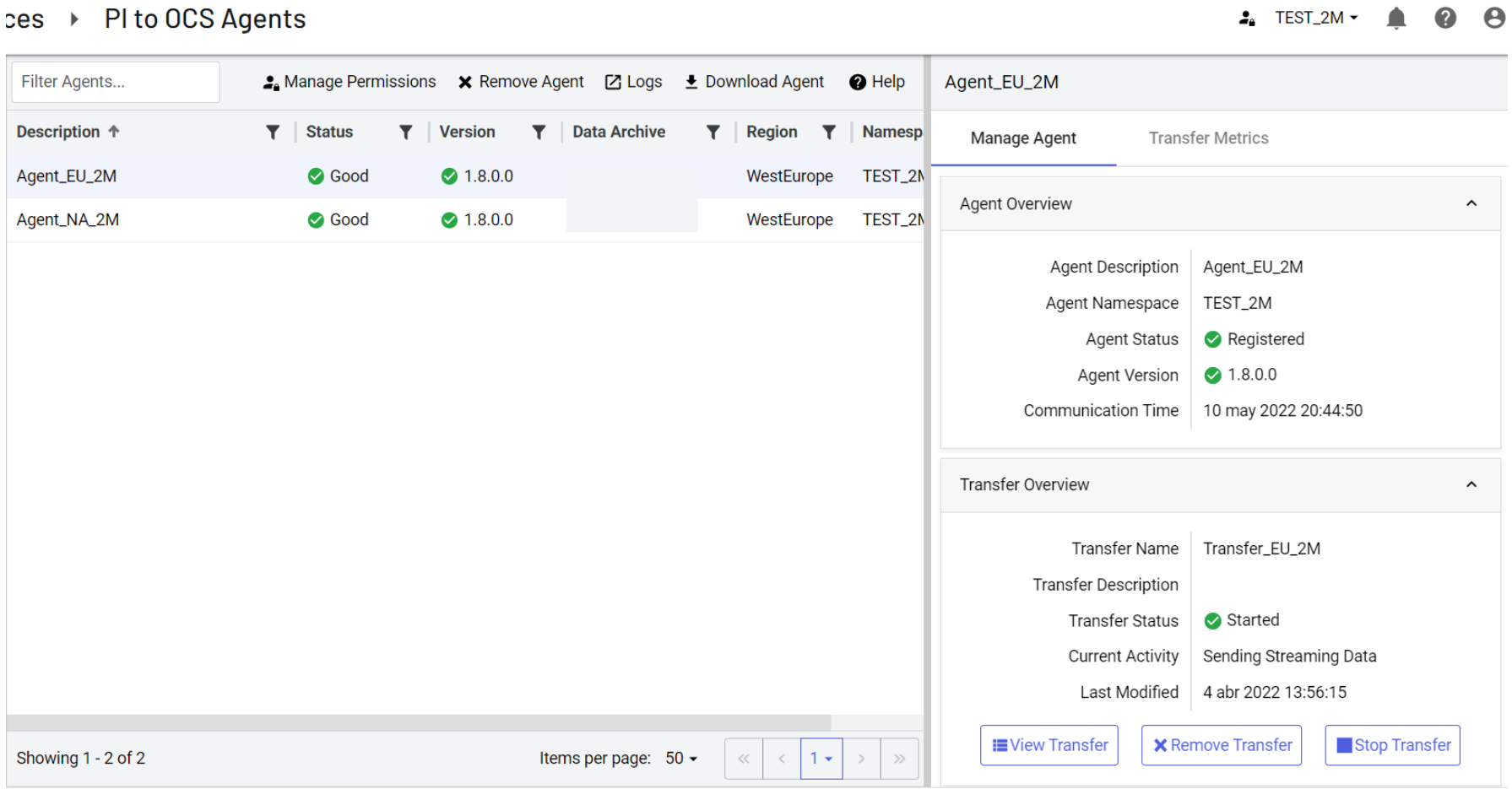
LightHouse with 2M tags on 2021-2022

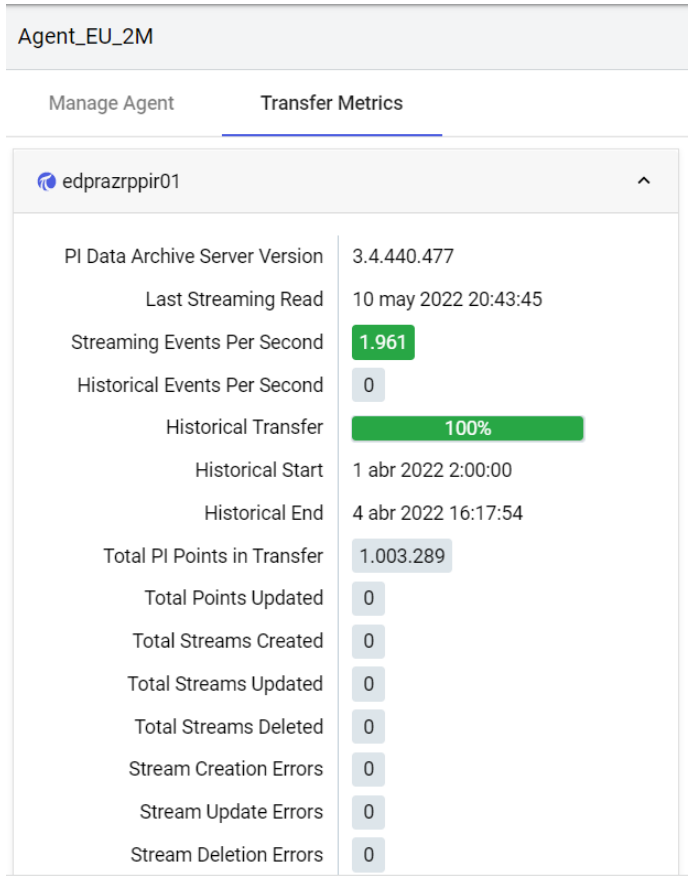


LightHouse with 2M tags on 2021-2022

#	Required Criteria	Results	Pass
1	Speed of data streaming ingress into OCS		✓
2	Volume	2,000,000 Tags	✓
3	Multiples Data Transfer or Multiples Instances for OCS for One PI Server		
4	Connect with AF Models		
5	Historical availability	Historical Recovery in different situations properly	✓
6	Possibility to have Raw Data, Calculated Data in Data View / API		✓
7	Historical data egress availability		✓
8	Automatic client connectivity with PowerBI		✓
9	Direct Connectivity using PI Adapters for OPC UA into OCS	Integraton problems between PI Adapter and EDPR's OPC UA	

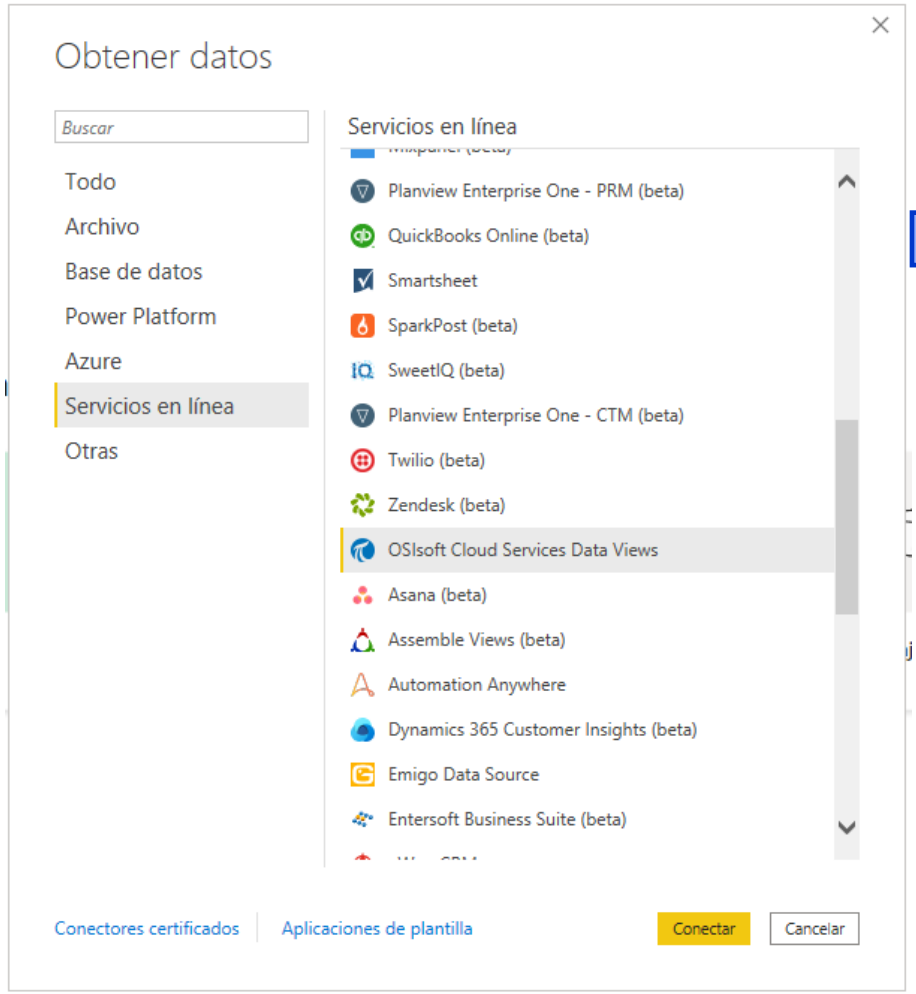
Configue Data Transfers

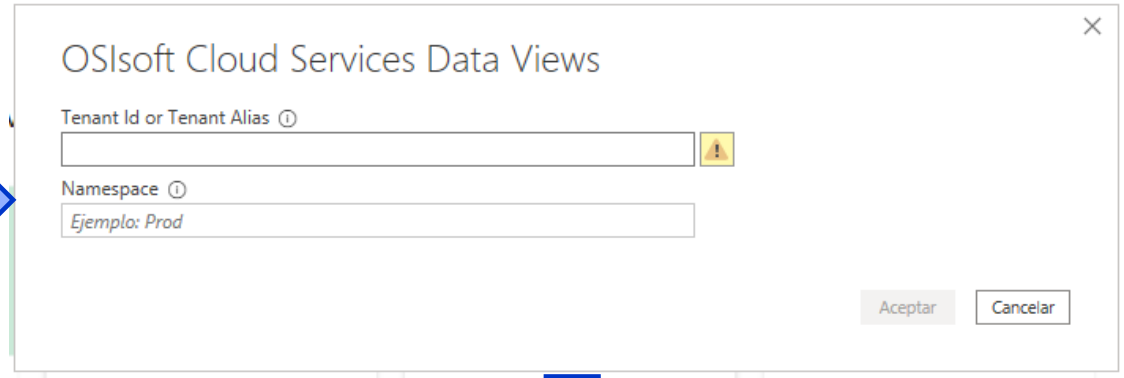


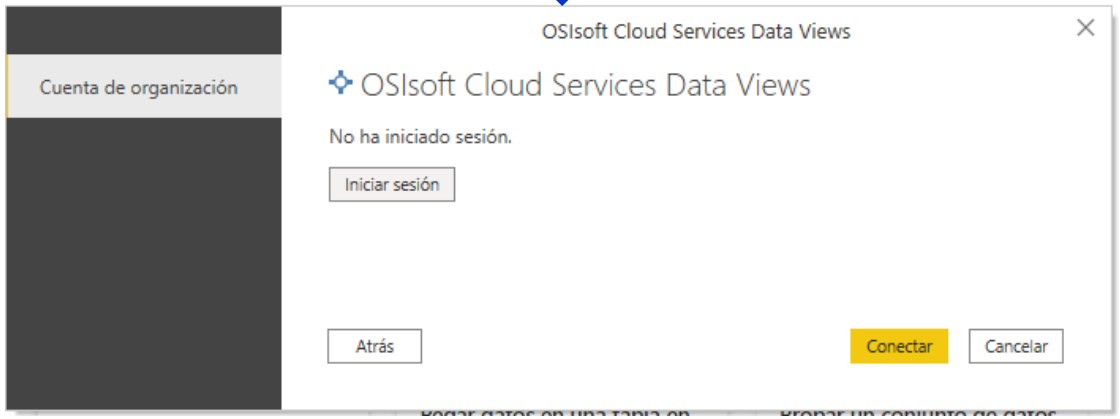


POWER BI Integration

OSIsoft-Cloud-Services-Power-BI-Connector_1.1.0.140.exe

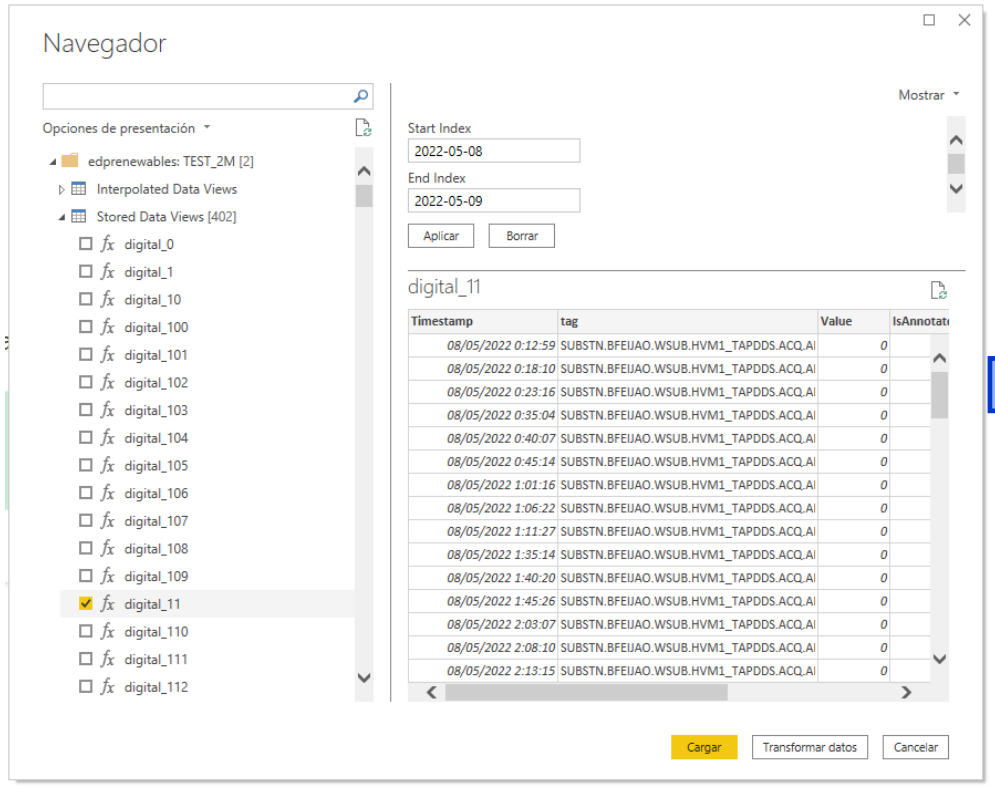


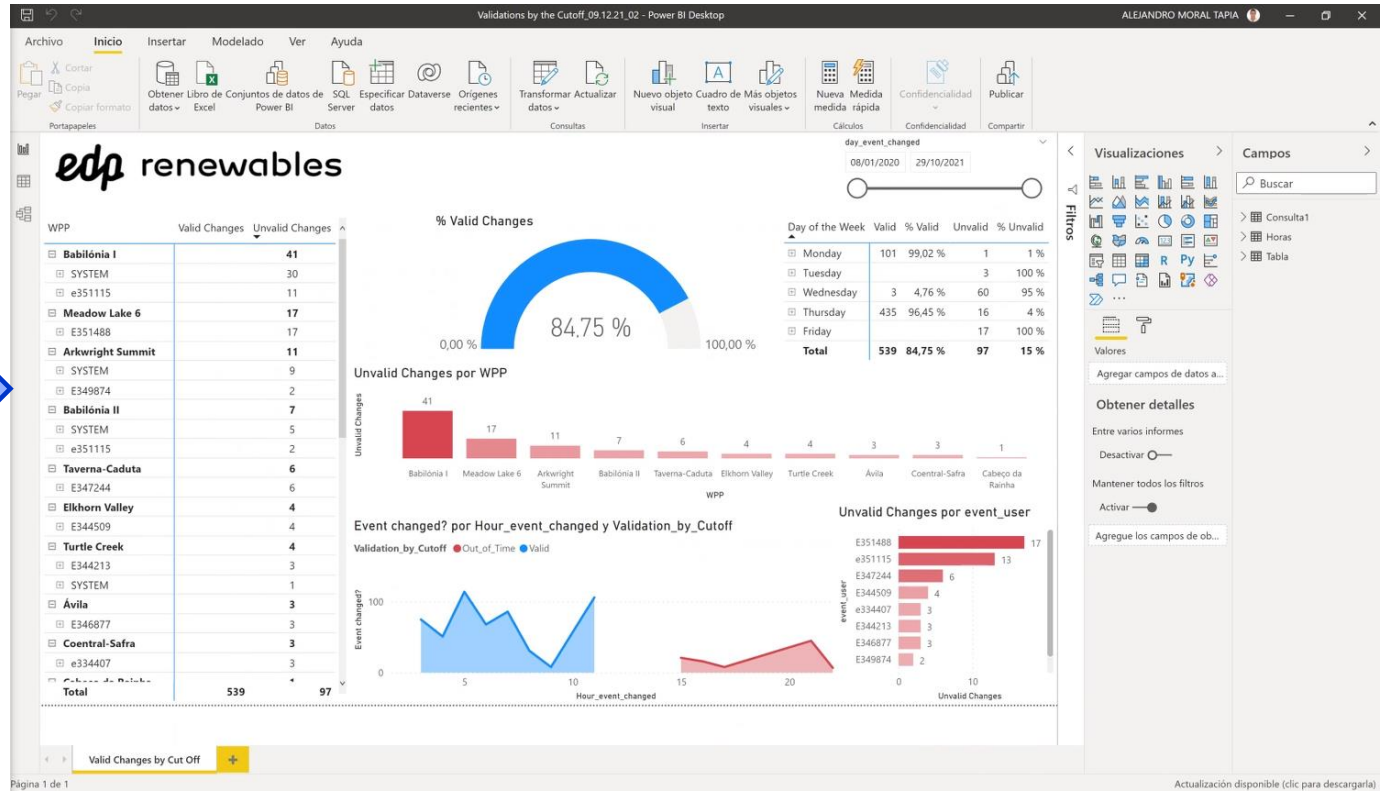




POWER BI Integration

OSIsoft-Cloud-Services-Power-BI-Connector_1.1.0.140.exe



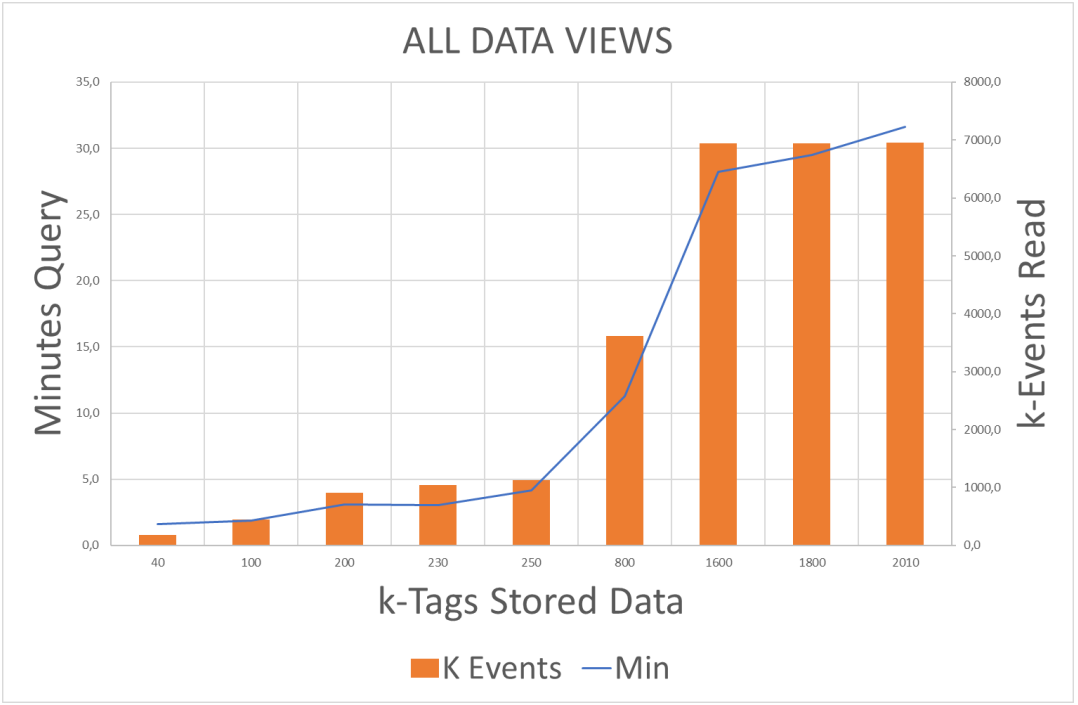


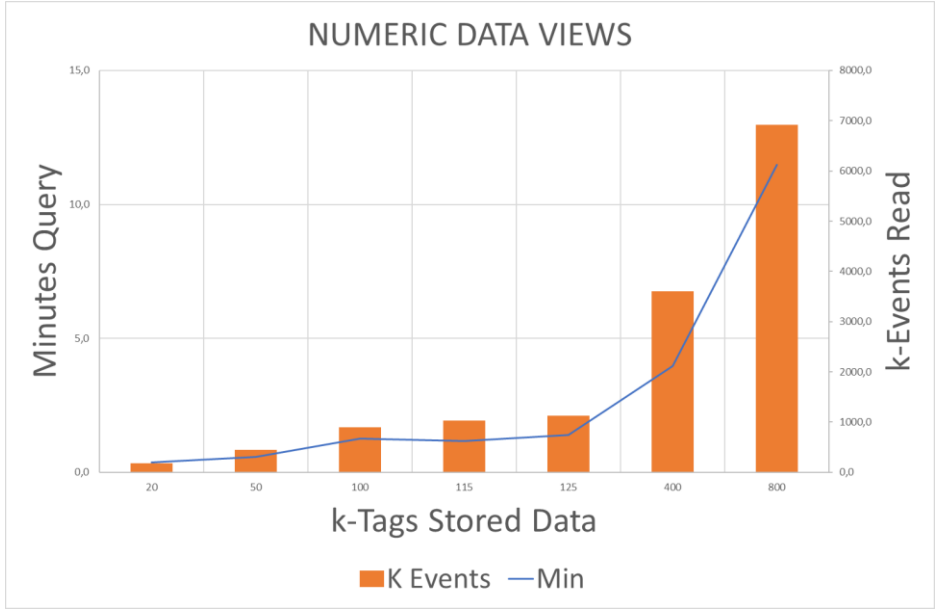
AVEVA

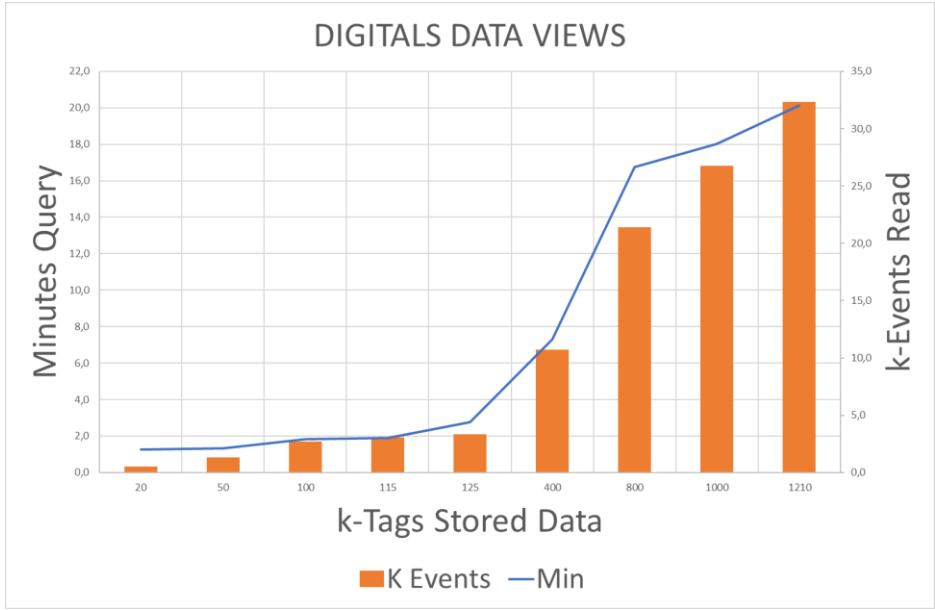
Data Views Queries

AVEVA Recommendations for EDPR's requirements:

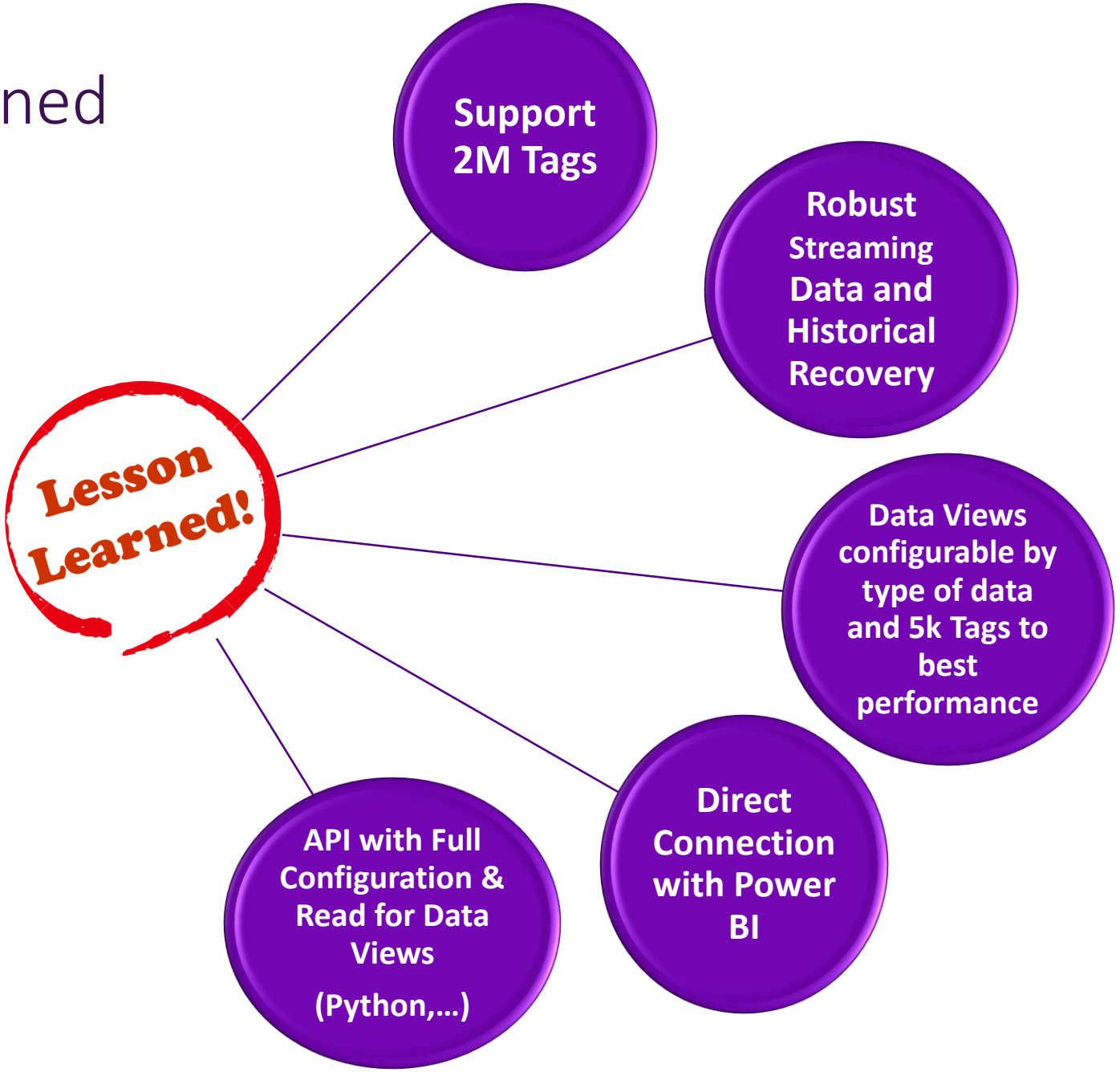
- Data Views with stored values 5kTags (50K data streams for interpolated values)
- Data Views with type of data (Some for Digitals and some for Numeric)
- Test query 1 hour of data



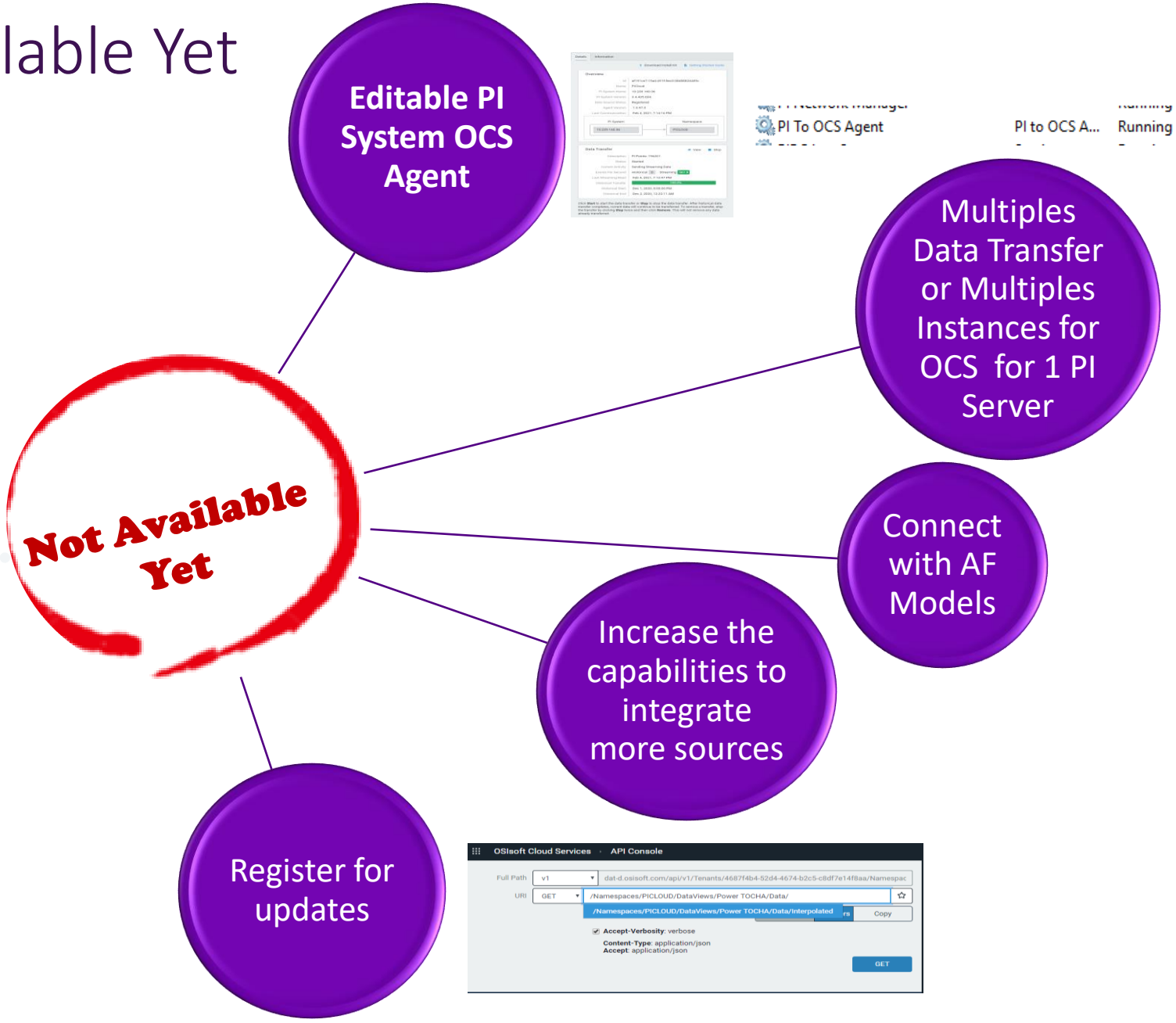




Lesson Learned



Not Available Yet



EDPR GOALS

GOALS
Reduce Computation Time (750k Calc <5s)
Advanced Reporting and new KPIs
Analytics Capabilities (R, Python)
Shared Information third Parties
Improve Regulation Algorithms
Improve Predictive Maintenance Algorithms
Improve Life Extension Process

How to take advantage of the ADH in your organization

edp renováveis

Challenge

Improve Key Processes of the Company using 2M of Tags:

- Machine Learning / Predictive Maintenance
- Dashboard on Power BI with PI System Data
- Performance of Wind Turbines
- Wind Turbine Life Extension
- Data Sharing

Solution

Using AVEVA Data HUB (OCS) with 2M of tags on a specific Lighthouse program:

- Configure the Agents
- Throubleshooting in the AVEVA part
- Specific configuration of data views

Benefits

- A Solution supported by AVEVA to connect with Cloud systems and external systems
- Include 100% of the Assets
- Increase the analytic tools to improve our processes

© 2022 AVEVA Group plc and its subsidiaries. All rights reserved.

AVEVA

“The price of light is less than the cost of darkness”

Arthur C. Nielsen

©2022 AVEVA Group plc and its subsidiaries. All rights reserved.

Sergio Valencia

ROPI Technical Services Manager (PI Manager)

- EDP Renewables
- svalencia@edp.com

© 2022 AVEVA Group plc and its subsidiaries. All rights reserved.

Questions?

Please wait for the microphone

- State your name and company

Please remember to…

Complete the survey!

- Navigate to this session in the mobile agenda for the survey

© 2022 AVEVA Group plc and its subsidiaries. All rights reserved.

© 2022 AVEVA Group plc and its subsidiaries. All rights reserved.

This presentation may include predictions, estimates, intentions, beliefs and other statements that are or may be construed as being forward-looking. While these forward-looking statements represent our current judgment on what the future holds, they are subject to risks and uncertainties that could result in actual outcomes differing materially from those projected in these statements. No statement contained herein constitutes a commitment by AVEVA to perform any particular action or to deliver any particular product or product features. Readers are cautioned not to place undue reliance on these forward-looking statements, which reflect our opinions only as of the date of this presentation.

The Company shall not be obliged to disclose any revision to these forward-looking statements to reflect events or circumstances occurring after the date on which they are made or to reflect the occurrence of future events.

© 2022 AVEVA Group plc and its subsidiaries. All rights reserved.

linkedin.com/company/aveva

@avevagroup

ABOUT AVEVA

AVEVA is a global leader in industrial software, driving digital transformation and sustainability. By connecting the power of information and artificial intelligence with human insight, AVEVA enables teams to use their data to unlock new value. We call this Performance Intelligence. AVEVA's comprehensive portfolio enables more than 20,000 industrial enterprises to engineer smarter, operate better and drive sustainable efficiency. AVEVA supports customers through a trusted ecosystem that includes 5,500 partners and 5,700 certified developers around the world. The company is headquartered in Cambridge, UK, with over 6,500 employees and 90 offices in over 40 countries.

Learn more at www.aveva.com

© 2022 AVEVA Group plc and its subsidiaries. All rights reserved.

AVEVA