



TA² (Transmission Asset Analytics): PoC Using High Resolution Data

Data & Analytics

05/01/19

Proof of Concept – Focus Area

Situational Awareness

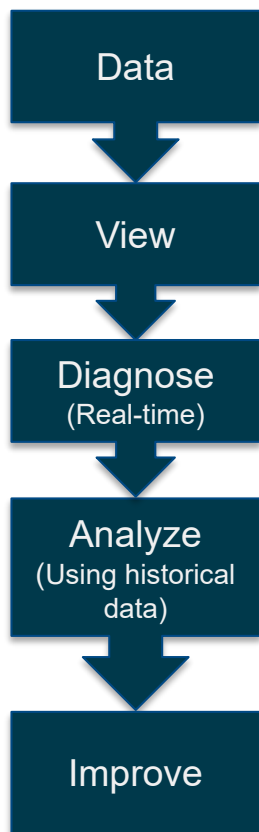
- Wide-area visualization
- Oscillation detection
- ★ • **Equipment failure monitoring** ★
- Phase angle monitoring
- Voltage stability monitoring
- Trending
- Event replay
- Alarms and alerts
- Linear state estimation
- Fault location

Offline Analysis

- NERC standard compliance
- Forensic event analysis
- Model validation (equipment, generation, power system)
- Identify equipment problems and mis-operations
- Field equipment commissioning

Develop capability to enable the use of high resolution data for identifying, analyzing, and proactively mitigating equipment failures

Our Approach



- Provision **high resolution data** from **multiple data sources** for a **specific time period** after the occurrence of a transmission event
- Provide capability for **cleansing, normalizing, mapping, validation** checks
- Provide an **integrated view** of high res data analytics on a **comprehensive analytics platform**
- Data can be used for **visualization** using business intelligence tools (e.g. PowerBI or Tableau)
- **Real-time** signal processing/streaming
- Anomaly detection using **advanced pattern recognition**
- Provide advanced analytics capability that allow for **statistical analysis, trending and predicting** equipment failure
- Provide a platform that allows the use of **artificial intelligence** and **machine learning** for future analysis
- Use the **insights** from analysis **for decisions** that can be worked into business processes to proactively manage costs, reliability, performance, and workforce

The Databricks Solution



Unified Analytics Platform

One platform that encompasses development-to-production lifecycle – from preparing datasets, feature engineering, model development, training models, to deployment of models into production.

Integrated Workspace

Notebooks Dashboards

BI Tools

 Power BI  + a b l e a u

Your Custom Spark Apps

Production Jobs

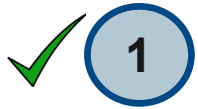
Orchestrated Apache® Spark™ in the Cloud

Open Source  +  databricks™ Managed Services

Your Storage

 Cloud Storage | Data Warehouses | Data Lakes

The PoC in Steps



1

PICK A USE-CASE

Identify a use-case that will bring value

2

ALLOW SECURE DATA ACCESS TO CLOUD

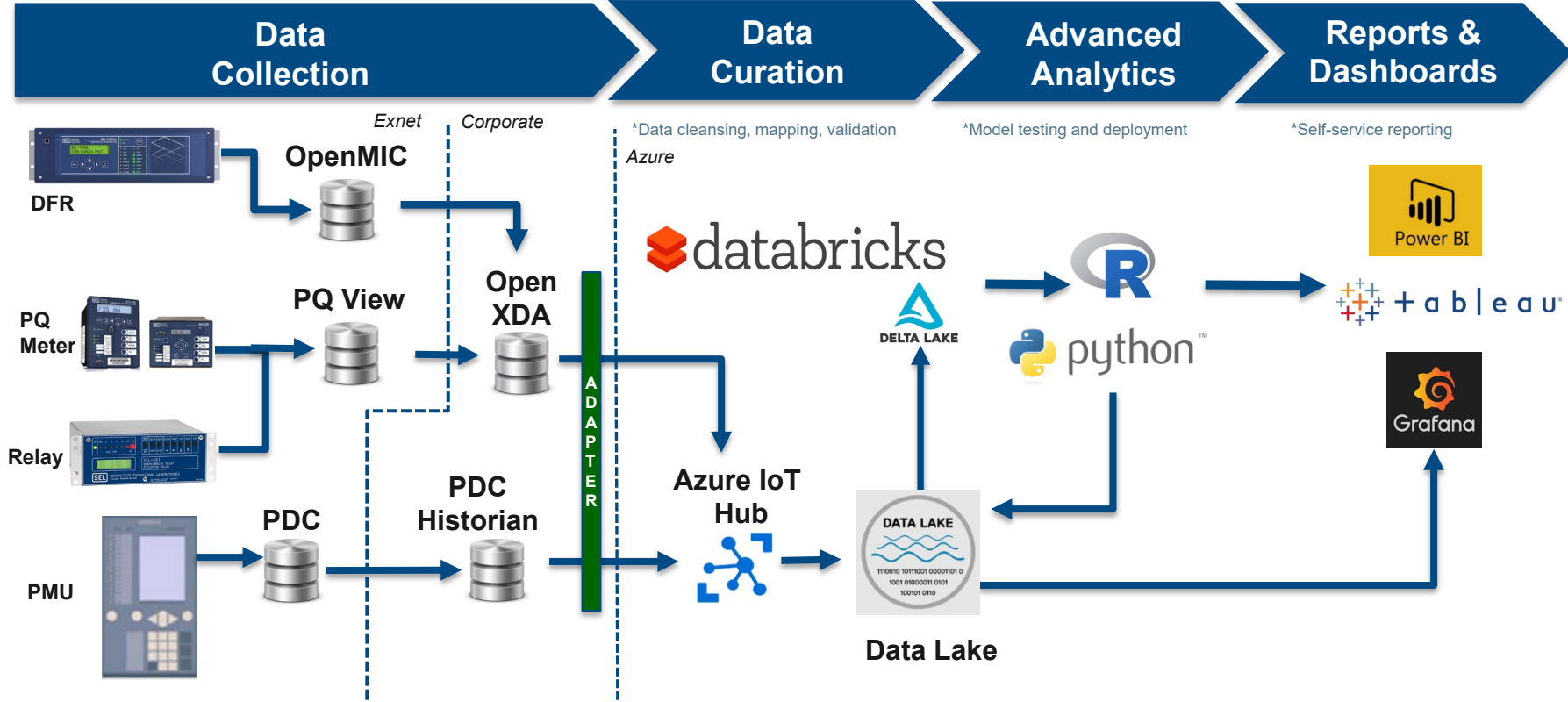
Ensure datasets are in a secure cloud environment or can be accessed securely from the cloud

3

CO-DEVELOP AND DELIVER PROOF-OF-CONCEPT

TVA team (Data & Analytics, TOPS) to work with Databricks to deliver use case and show value over time

Architecture Overview



- PMUs
- DFRs, Relays, PQ Meters

Future Transmission Asset Management Analytics Possibilities

