PARIS 2022

GROUP REF. : B5

COUNTRY : USA

PREF. SUBJECT : PS2
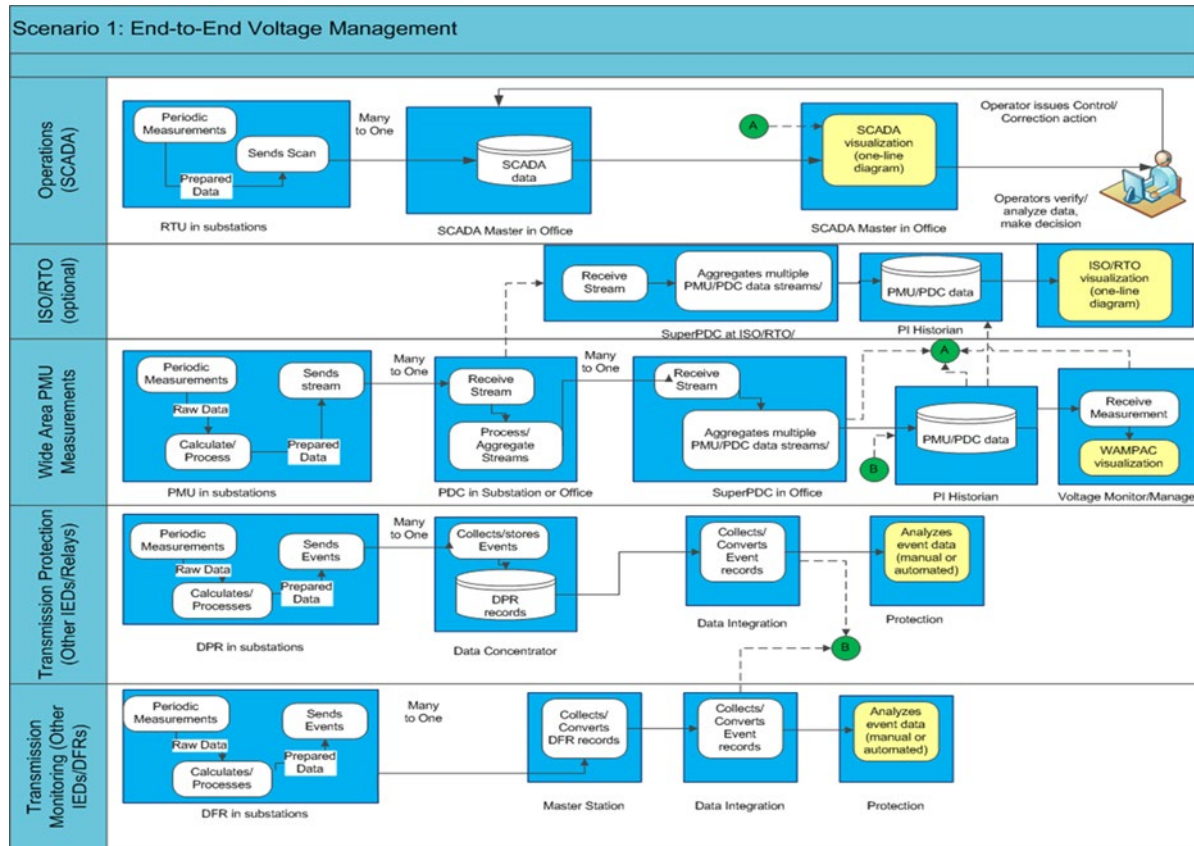
REGISTRATION NUMBER : 5052

QUESTION N° : 2.03

Slide 1: Options for Fault Detection and Analysis

Figure 1 (left hand side) illustrates various options in use today :

- Remote Terminal Untis (RTUs) of SCADA
- Phasor Measurement Units (PMUs)
- Digital Protective Relays (DPUs)
- Digital Fault Recorders (DFRs)

Slide 2 : Using PMUs for Fault Detection and Analysis

PMUs have several advantages (listed on the slide) since DFRs and DPRs only capture local events, SCADA does not provide accurate time-synchronized measurements, and automated analysis of events using data from DFRs, DPRs and SCADAs takes time to allign the events in time.

At the same time there are challenges when using PMUs for automated faut detection and analysis (listed on the slide) because PMUs are not widely deployed, they are streaming data all the time, have standardization issues, and field deployment practices are inconsistent, which results in data that is insuficently labeled and may have poor data quality.

Slide 3 : Machine Learning Solution

We provide several recommendations based on huge ammount of PMU data inspected and processed from all three interconnection in the USA (listed on the slide) during a two-year DOE project, and illustrate how combining field recorded data with simulated data can improve accuracy of ML algorithms for fault characterization (two figures on the slide).