WASA architecture, data representation, bad data detection, and system design

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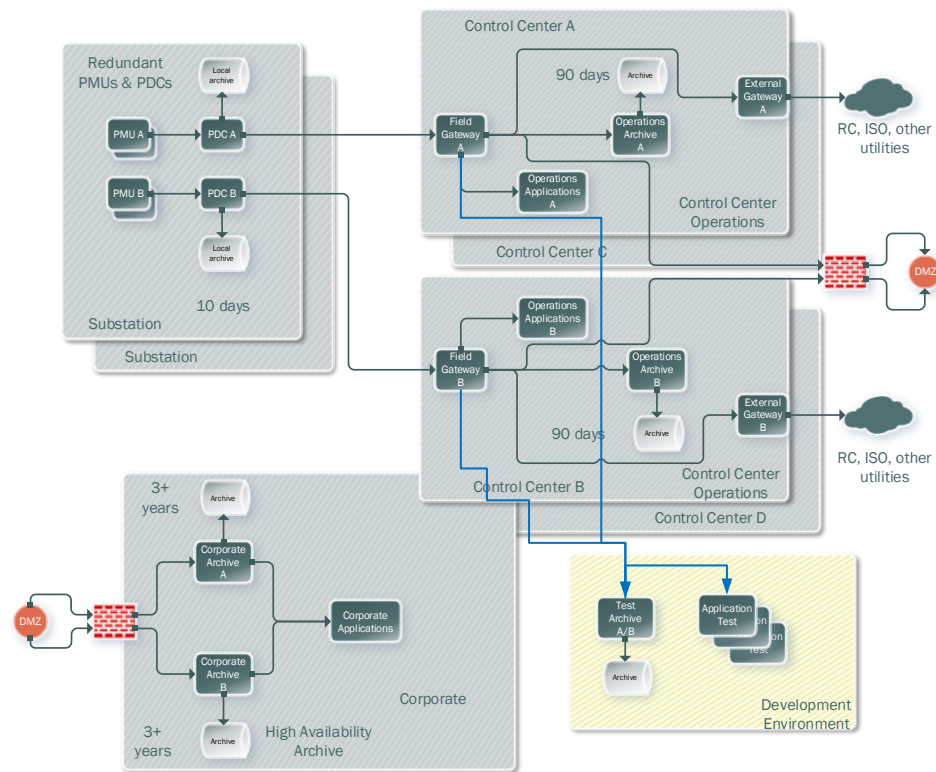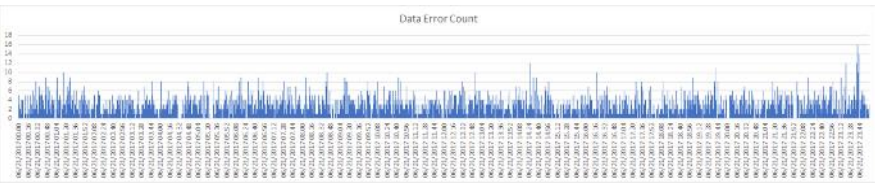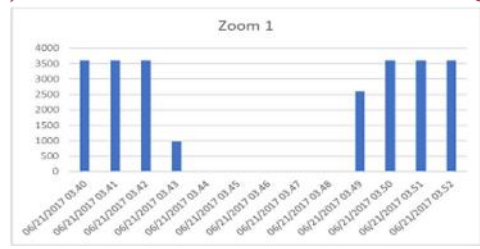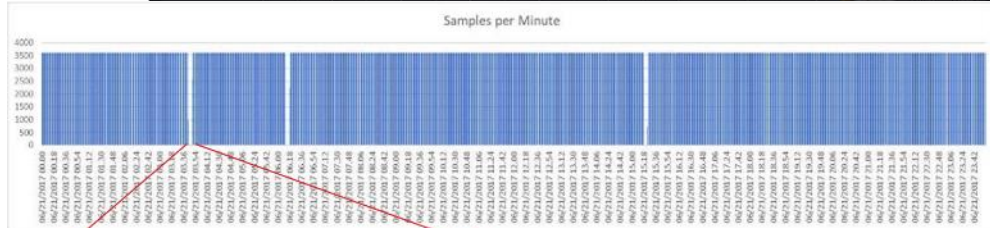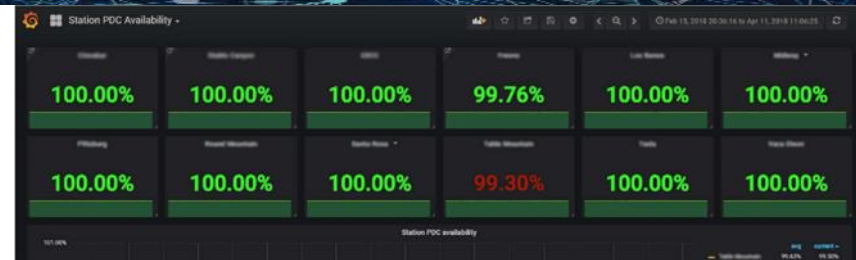
System Architecture

- Fully Redundant
- Data should originate in operations secure zone
- Data should be delivered to the operations control center
- Data should move through a DMZ to the corporate network

Data Availability

- Some synchrophasor applications are more sensitive to missing data
- Constant report rate of synchrophasor data makes it easier to setup KPI Dashboards
- Simple daily availability percentages can be misleading
- 98% availability during a 1-day period sounds great but not if the missing data spans a continuous 28 minutes

Data Sharing

- Develop and Adopt a naming convention as soon as possible
- Avoid thinking it will easily be fixed later
- Leverage existing naming conventions
- Involve Engineers, Operators, and IT in the development of the naming convention
- While not technically either Data Archive or Networking issue using a naming convention can significantly improve data use
- PMU and Signal names require different organization for use inside a utility vs. use by an RC or ISO
- Original naming conventions were simple. Deployment was typically bus voltage and line current. Now other equipment is being monitored with PMUs e.g. SynCon, Reactors, etc.

Phasor Data Concentrators

Pros

- Simplify Firewall rules
- Local Storage
- Accurately Measure Latency
- Perform simple calculations
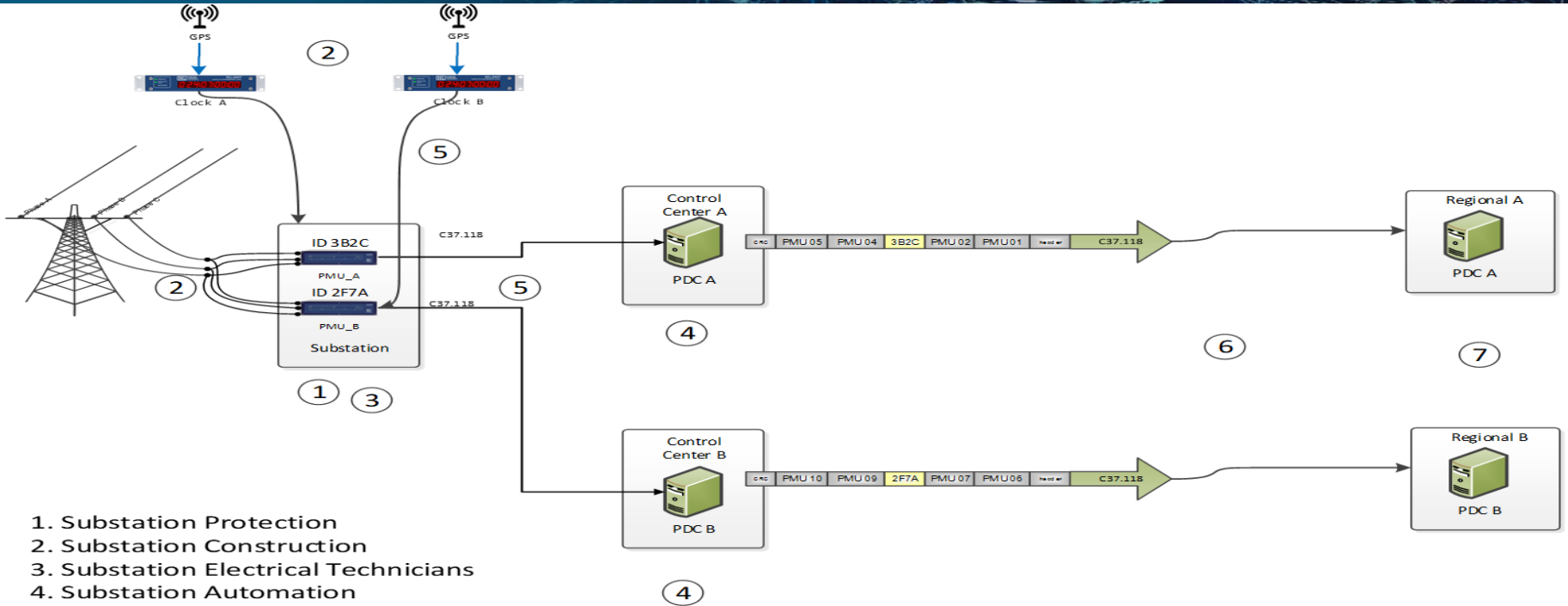- Protocol Translation

Cons

- Add latency
- 1 bad PMU can delay all PMUs
- Another piece of equipment to maintain

- Can't always rely on PMU and PDC status flags
- Clocks reporting incorrect time will not create easily identifiable status errors
- Perform reasonability checks on measured vales and Date-Time stamps
- Compare RMS vales to SCADA measurements
- Compare Angle measurements to common reference
- Compare angle measurements to state estimated values
- Setup automated processes and tools to continuously check for reasonability

1. Substation Protection
2. Substation Construction
3. Substation Electrical Technicians
4. Substation Automation
5. Substation Network Technicians
6. WAN Communications Technicians
7. IT (Corporate and Operations)

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