

Paris Session 2022



Real-time monitoring of the Protection, Automation and Control system -
PAC of an IEC 61850 substation

B5 Protection and Automation

PS2 - Applications of emerging technology for protection, automation
and control

Q2.05 What are the experiences to improve the practical application
and verification of the protection in a real substation project?

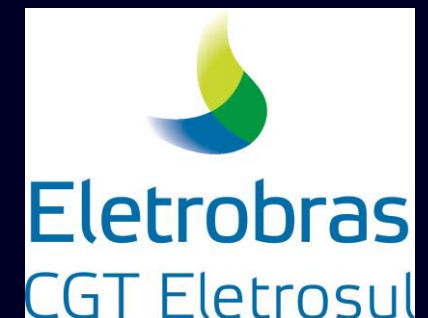
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Group Discussion Meeting

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Question 2.05 What are the experiences to improve the practical application and verification of the protection in a real substation project?

- **Electrical cables x Ethernet network and electronic devices**
 - **Improves availability:**
 - **Alternative paths for signals (redundancy)**
 - **Ability to monitor infrastructure and functionality**
 - **Application of files defined in the standard (SSD, SCD) ensuring compatibility**
- **Real-time monitoring basically includes:**
 - **Diagnostics of each device: hardware failure, communication failure, power failure**
 - **Signal Diagnostics: loss or degradation of SV, GOOSE, MMS**
 - **Ethernet Network Diagnostics: Traffic volume on each network segment, jitter and latency of data packets**
 - **Configuration diagnosis: Correct application SCD in real time - IEDs and communication**
 - **Cybersecurity Diagnosis: services and accesses on the network**
 - **Monitoring of time synchronization: IEDs, GNSS, PTP**

Question 2.05 What are the experiences to improve the practical application and verification of the protection in a real substation project?

- **Strategies for monitoring defined in the project**
 - **Local SCADA, Asset management system and a cyber security system**
 - **Integrated work of distinct teams**
 - **Report information to Power System Operation Center, Cyber Security Operation Center and Maintenance Center**
- **Information collected in requests**
 - **Firmware versions**
 - **Protection settings**
 - **Last change date**
 - **Hardware performance**
 - **Depends on the resources of the IED itself or communication equipment (Switch, Router, GNSS)**

Question 2.05 What are the experiences to improve the practical application and verification of the protection in a real substation project?

- **More features and requirements on Network Devices (Switches, Redboxes, etc.)**
 - **Functional core of the Ethernet network**
 - **Availability, IEC 61850 compatibility, network functionalities (VLAN, RSTP, HSR, PRP)**
 - **Intelligent monitoring and communication capability for different purposes**
 - **SNMP for Asset Management**
 - **MMS for PAC System Monitoring**
- **Same reasoning could be applied to time servers**
 - **Key element for process bus**
 - **Availability, Master Clock, Clock Class and Accuracy, etc.**
 - **Intelligent monitoring and communication capability (SNMP and MMS)**