

# Paris Session 2022



Effort for compatibility verification of domestic  
device according to IEC 61850 in station bus and  
process bus

Study Committee B3  
PS 3/ Q4

Keisuke NAKAMURA, Japan



# Question and our contribution

## *Question PS3 Q4*

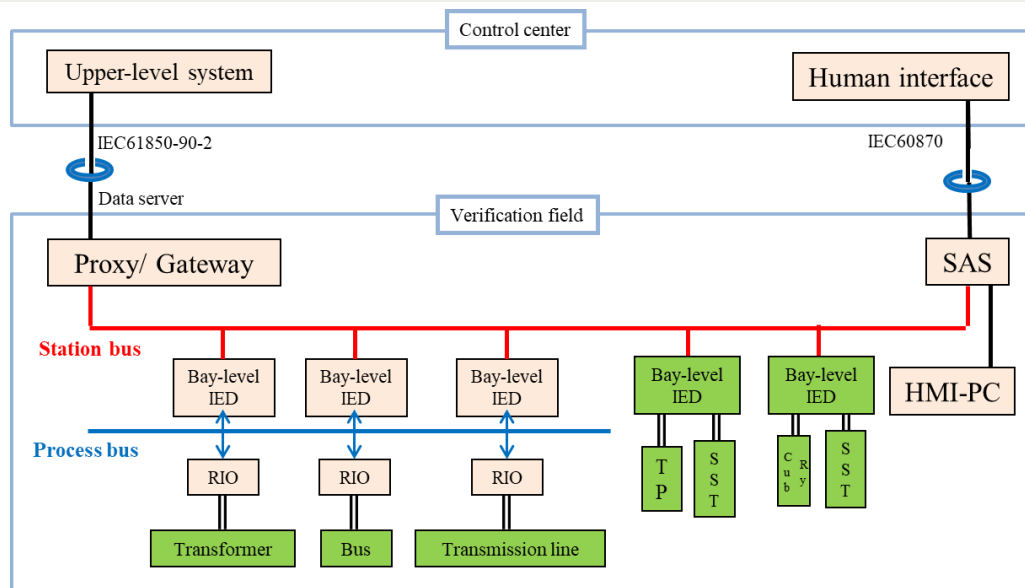
- What are other experiences to improve the specification, engineering, testing and maintenance to address the challenges in our industry ?

## *Answer*

- We present a effort for compatibility verification of domestic device according to IEC 61850 in station bus and process bus in order to realize multi-vendor and cost reduction in the future.
- The verifications clarify many issues and make it possible to connect devices from different manufacturer's devices by unifying the configuration standards of each manufacturer's devices.

# Overview of verification

- Compatibility testing of the station bus (red line) has been conducted in FY2020, and verification of the process bus (blue line) has been conducted in FY2021.
- The tests concerning about connection and transmitting the information such as status of device are mainly conducted.



**Legends:**

- Control power supply
- ≡ Communication line
- Equipment
- Communication device

**Abbreviations:**

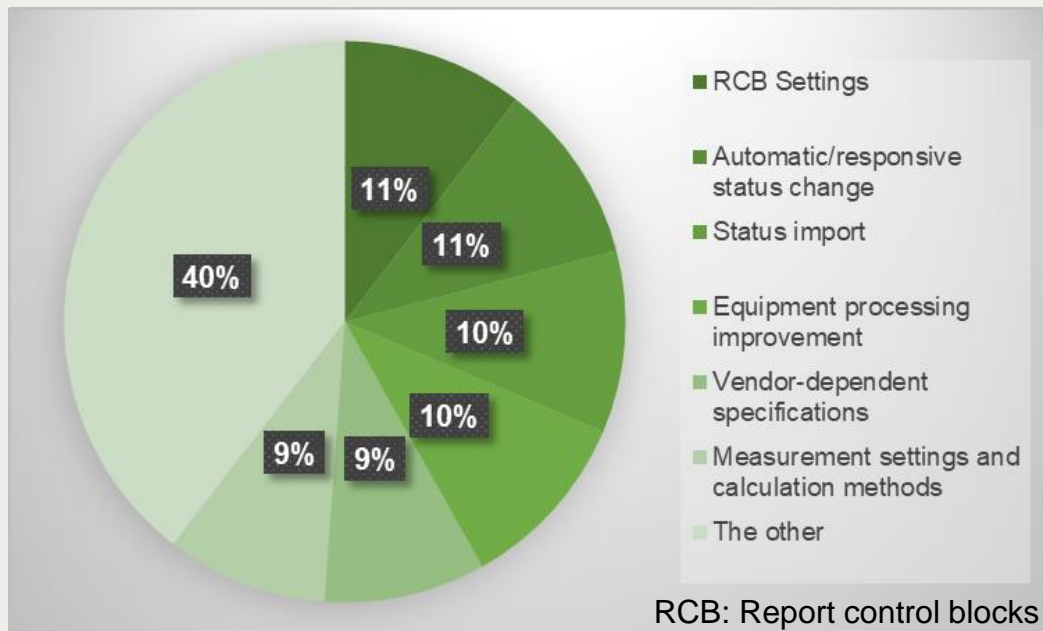
- SAS : Substation Automation System,
- IED : Intelligent Electronic Device,
- PIU: Process Interface Unit,
- SST: Station Service Transformer

No.	Verification items of process bus	Check
1	Initial Connection	✓
2	Status Request	✓
3	Status indication/failure indication	✓
4	Independent/responsive status change	✓
5	Measurement (scale over)	*1
6	TM monitoring information (fault meter)	*2
7	Selective control	✓
8	Monitoring timer	✓

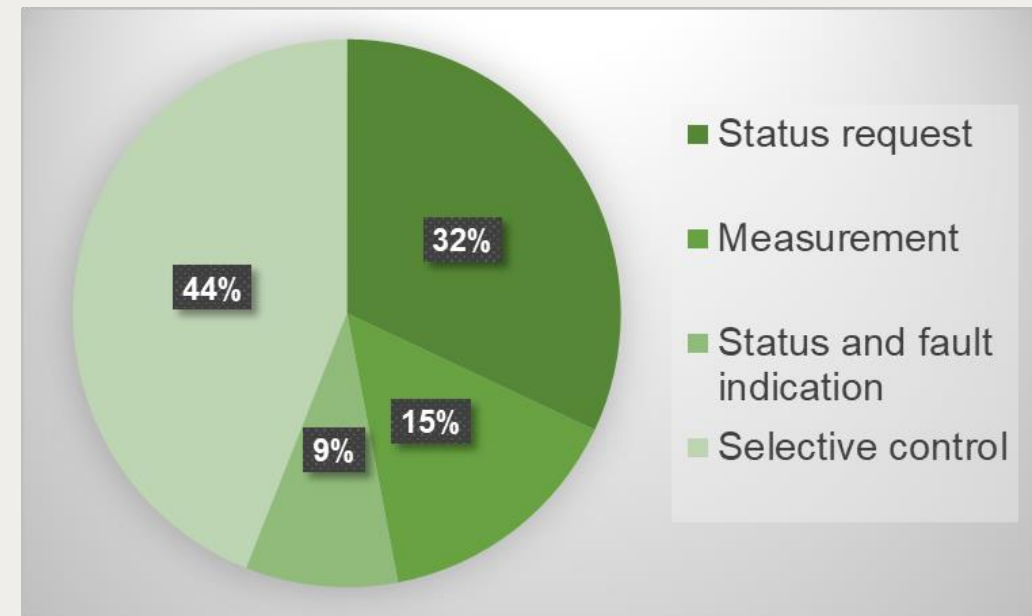
1. Sampling value(SV) information of current and voltage for protection and control measured by the VT and CT is transmitted by metal cables because of accuracy.
2. TM information is treated from upper station bus in our system.

## Result of the verification

- Differences in recognition between manufacturers can be corrected and realization of communication between devices of different manufacturer can be confirmed by changing settings and other measures.
- Items that should be specified to ensure compatibility include unification or specification of units that cause scale over, response at power off, command holding time, and other items.



Error items confirmed in compatibility testing of station bus



Error items confirmed in compatibility testing of process bus

## Conclusions and future work

- This verification clarifies many issues and makes it possible to connect with devices from different manufacturers by unifying the setting standards of each manufacturer's device.
- A digital substation, Chiba-Inzai Substation consisting of control systems from different manufacturers is scheduled to start operation in April 2024.
- Future efforts will include verification of SV transmission for protection control and connection compatibility verification with upper-level systems.
- We will discuss network redundancy and standardization with the manufacturers in order to apply the system to actual substations.

Thank you for you kindness.