

**RED**  
**ELÉCTRICA**  
DE ESPAÑA

## **Edition 2 Adoption – managing the migration towards Edition 2**

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19/10/2016



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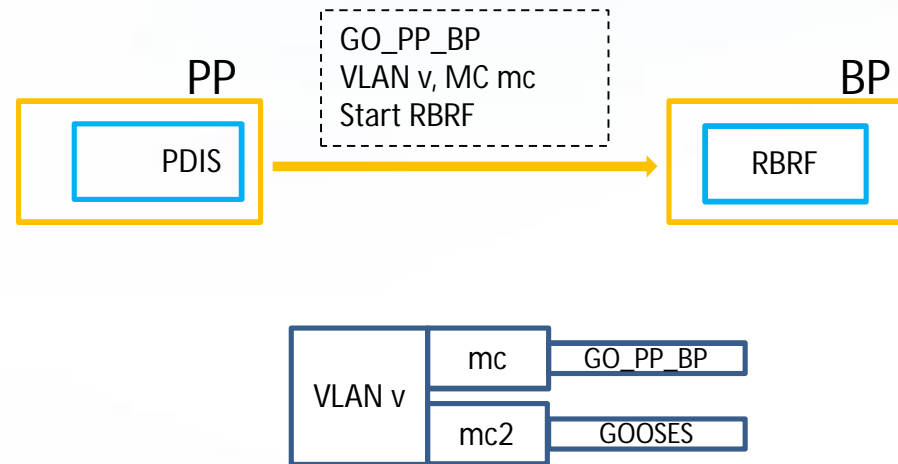
# Status

- Edition 2 is published (except IEC 61850-2 Glossary)
- Amendment 2.1 is ongoing, with changes mainly in IEC 61850-6, 7-x
- Future edition 3 is being outlined inside WG10
- Several products on the market for transmission substations
  - Not all of them implements testing features → interoperability issues at high level
  - Not all of them implements simulation features → can affect your design and engineering solution
- New products in the market? Also utilities have to push IEC 61850

## Drivers

- Full testing features covered in edition 2
- Simulation features covered in edition 2
- Improved and refined data model
- Go ahead with backward compatibility
- GOOSE performance testing under IEC 61850-10
- SCL Implementation Conformance Statement (SICS)
- Local/remote concept improvement (IEC 61850-7-4 Annex B)
- Level A certification process include SCL certification according to SICS
- IEC 61850-100-3 Functional testing (ongoing work)

## Drivers: an example

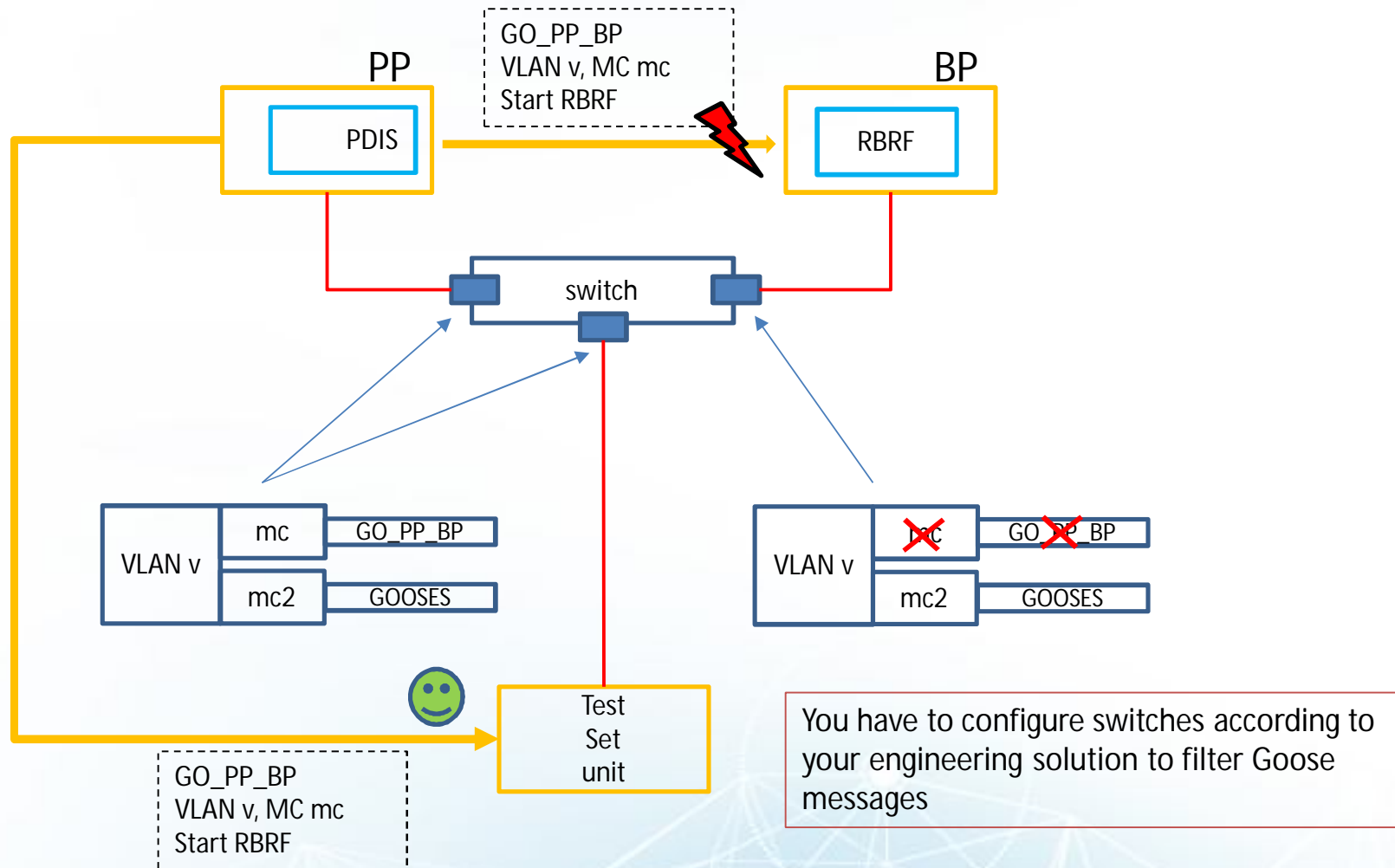


How can I test the PP IED without starting RBRF function in BP IED and without physical isolation?

- IEC 61850 edition 1, no test feature implementation
- IEC 61850 edition 2, test feature implementation

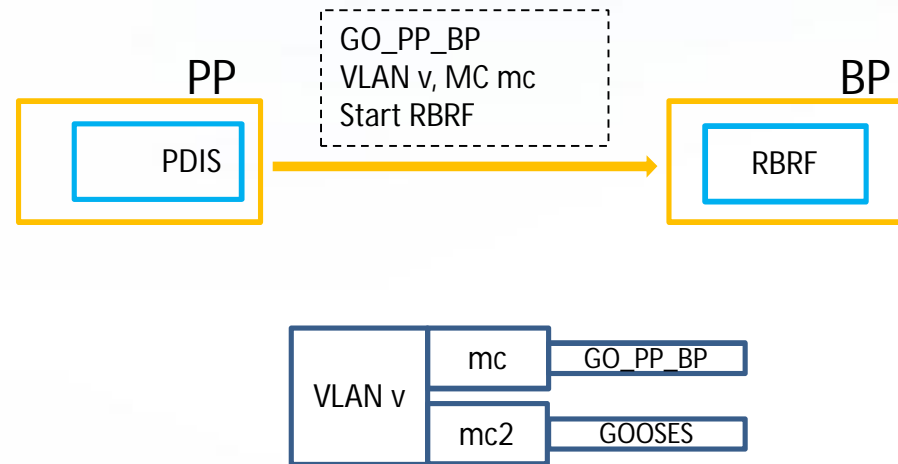
# Drivers: an example

IEC 61850 edition 1





## Drivers: an example



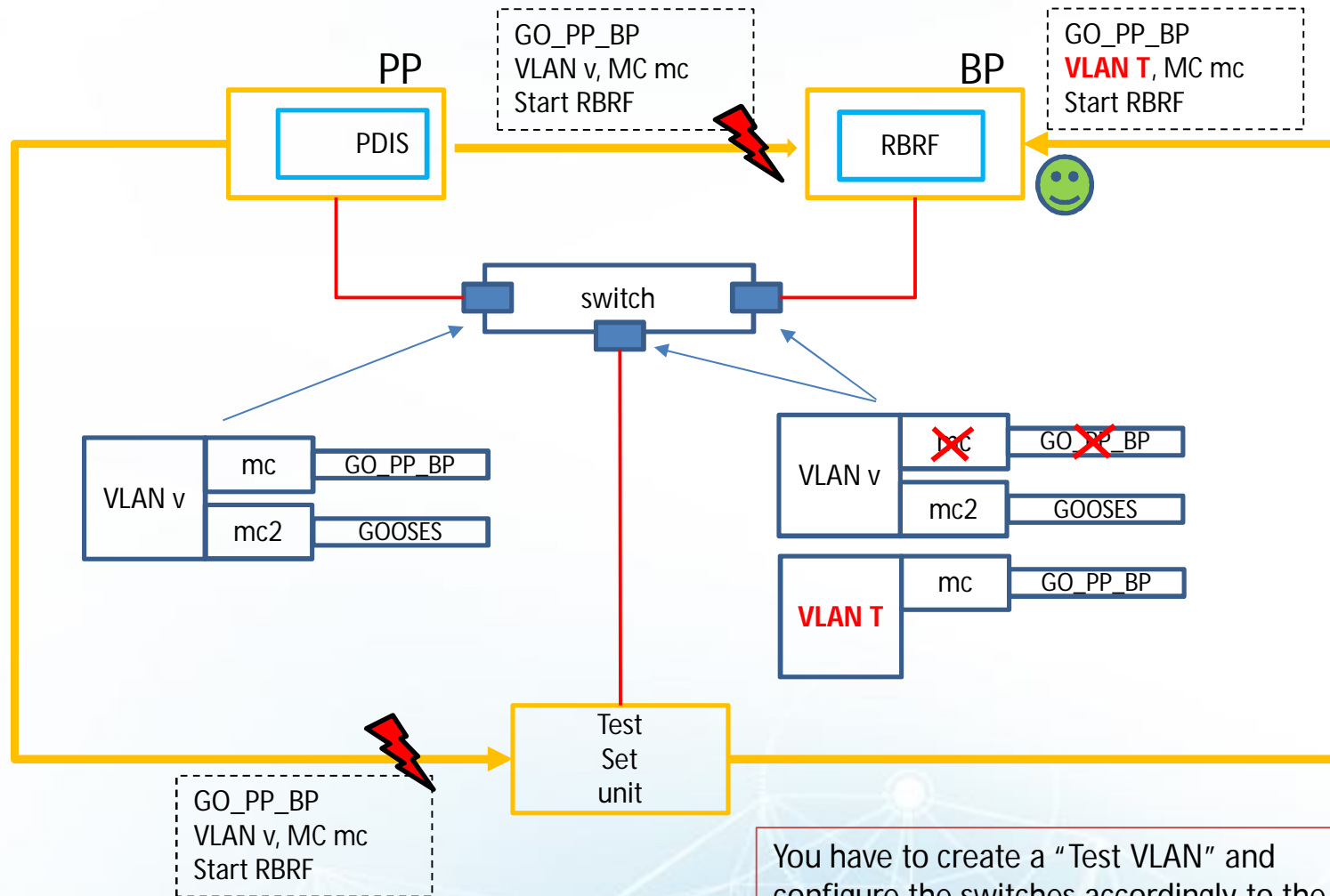
How can I test the RBRF function without physical isolation?

- IEC 61850 edition 1
- IEC 61850 edition 2, test and simulation feature implementation



# Drivers: an example

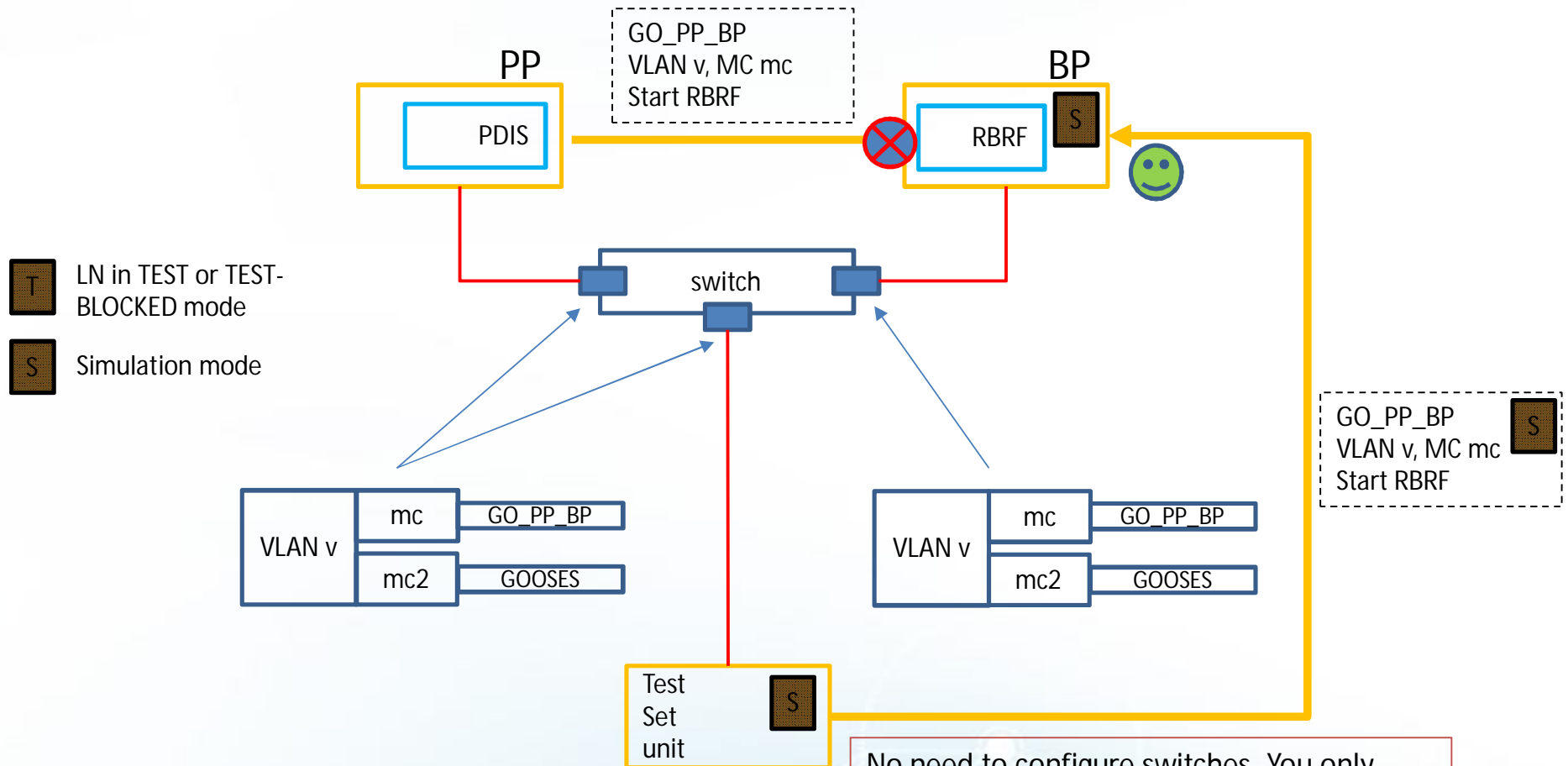
IEC 61850 edition 1, no test feature implementation



You have to create a "Test VLAN" and configure the switches accordingly to the test

# Drivers: an example

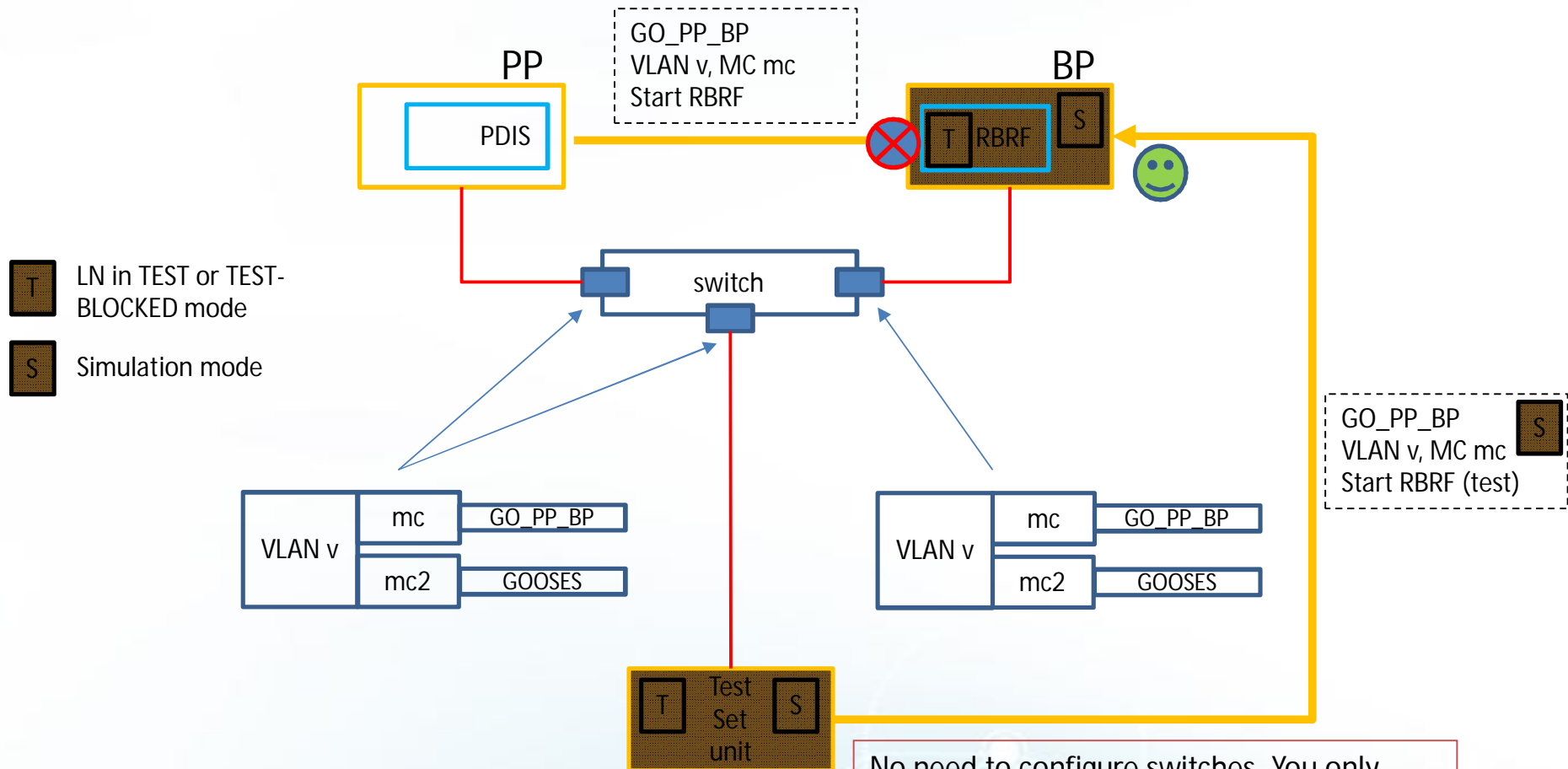
IEC 61850 edition 2, simulation feature implementation



No need to configure switches. You only have to activate "Simulation mode" in the BP IED and send simulated Goose message from the Test set unit

# Drivers: an example

IEC 61850 edition 2, simulation and test feature implementation



No need to configure switches. You only have to activate "Simulation mode" in the BP IED and send simulated Goose from the Test set unit

# Drivers

- Edition 1 testing features were develop
  - Most of the IEDs simply dropped the test Goose message
  - No action at all in the device when receiving a Test goose message
  - No way of functional testing
  - No managing of quality test bit (not defined in the standard)
- Edition 2 testing and simulation features improving edition 1
  - Completely defined
  - Goose messages can be simulated sharing the same network space
  - IEDs can decide to use the real Goose message or the simulated one
  - Functional testing
  - Quality test bit to be used for each data object to have functional testing

Utilities have a good driver to  
move to Ed.2: Testing!

## Mixed environment

- No big impact expected on communication services
- Testing
  - Interoperability problems
- SCD/CID/IID files
  - Migration from ed.2 to ed.1 SCD to handle ed.1 IEDs
  - Services section of SCL incompatibility → ed.2 to ed.1 special handling
- SCT dilemma
  - One SCT for the complete system configuration? → One ed.2 SCD for the whole system, ed.1 SCD views for IEDs
  - One ed.1 SCT and one ed.2 SCT? → More than one SCD file, doubling the work
- Data model
  - Could affect to backward compatibility

## Inconsistencies between ed. 1 and ed. 2

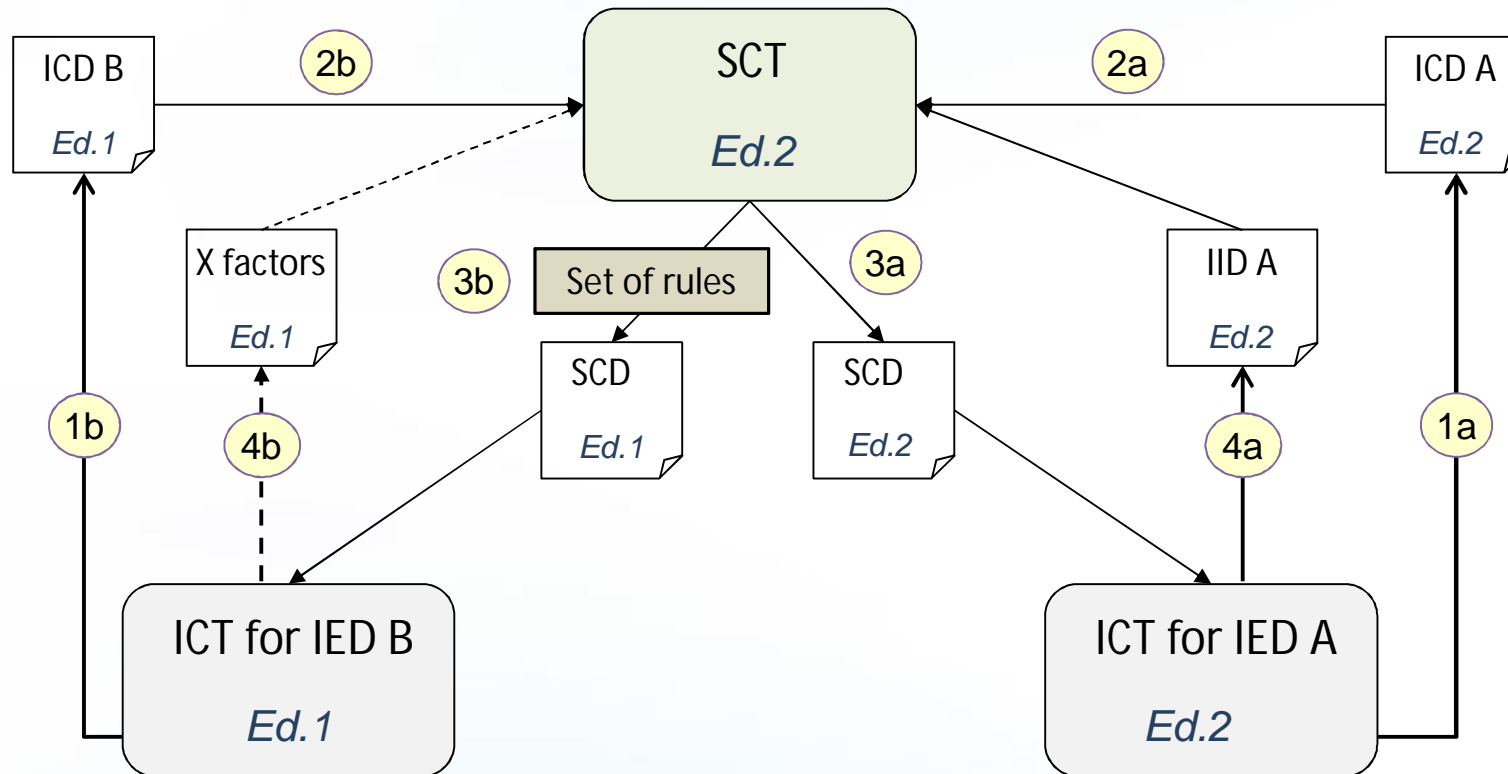
- Testing features not compatible
- Simulation feature new in edition 2 → difficult to apply in mixed solutions
- Data type names can be longer → SCD for ed.1 devices need to be adapted
- Logical node data object names changed → SCD for ed.1 devices need to be adapted (not always possible)
- Statistical data model → Changed, although not big impact is expected (not widely used)
- IID file does not exist in ed.1 → how can we feed SCT with an updated version of an ed.1 IED? → X Factors file defined in IEC 61850-6 amendment 2.1

## Working together

- Utilities have the functional know-how of their systems
- System integrators (role) have system configuration know-how and IEC 61850 performance and behavior of used IEDs
- Manufacturers have the know-how of the technology and their products

Let's work together to get the most of us

# Tooling strategy





# Training

- Internal specific training courses developed
  - For technical engineering staff
  - For maintenance staff
  - Station bus and process bus concepts and architectures
- Collaboration between all technical departments
- Brainstorming about IEC 61850 and its possibilities
  - Maintenance change of mind (condition based maintenance)
  - Reduction of outages
- Train the complete teams → Not to create a small group of experts → It will not work in the future
- Flexibility and adaptability to new technology and developing cutting times



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Thank you for your attention