

# Maximizing IEC 61850 Value With Software Tools

Joe Stevens  
Marketing Manager  
Triangle MicroWorks  
[jstevens@trianglemicroworks.com](mailto:jstevens@trianglemicroworks.com)

# A Tale of Two Cities

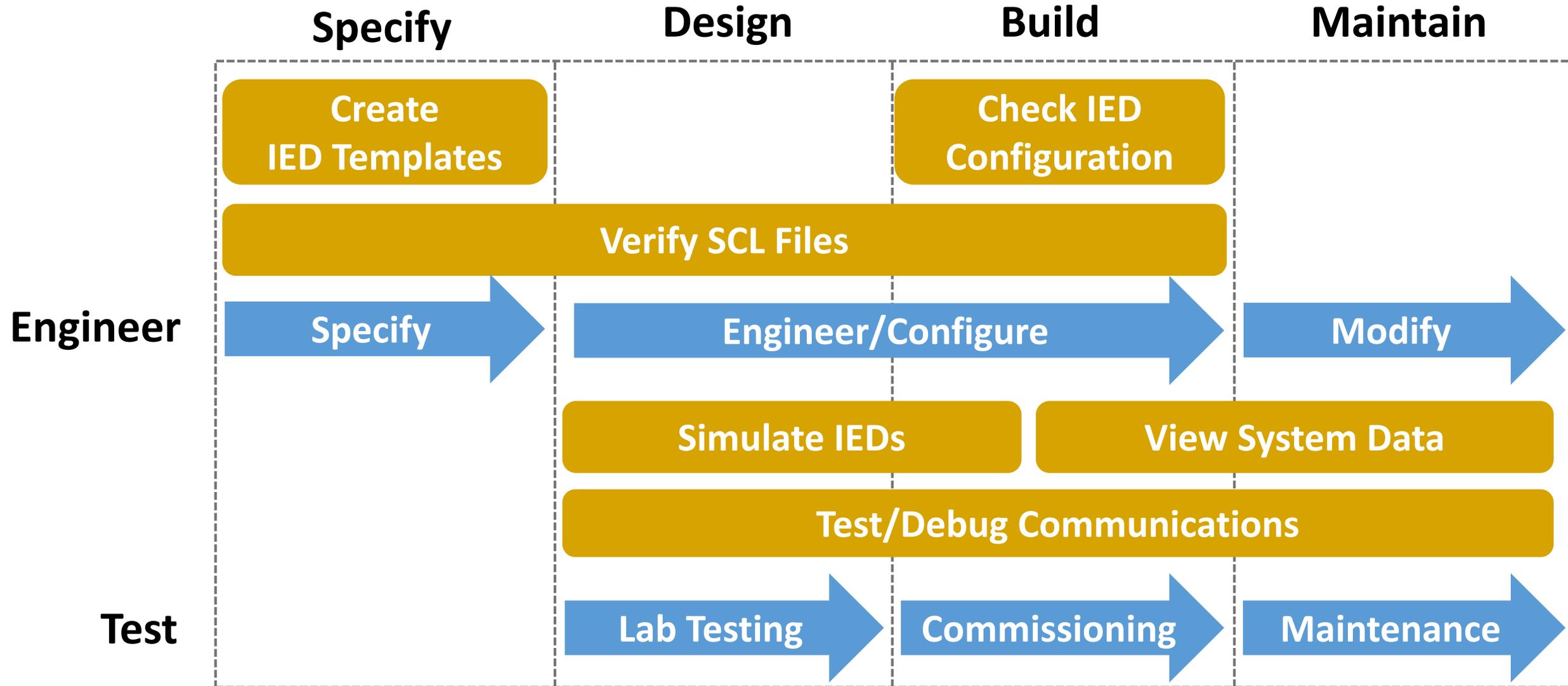


The Value of IEC 61850

Counter point of view

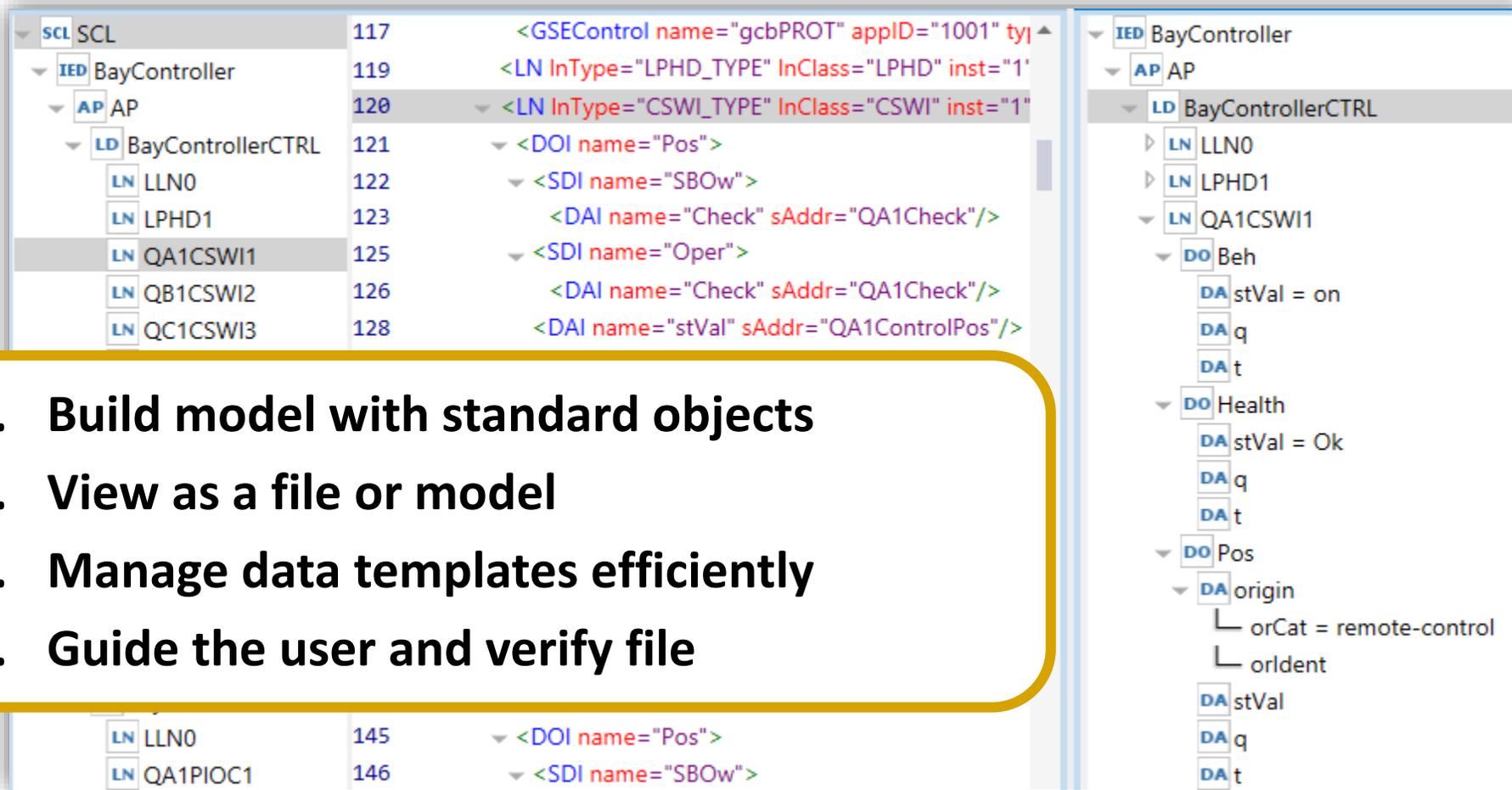
The good news: these counter views can be addressed

# Tools throughout the IEC 61850 Lifecycle



# Build Effective IED Templates

**Challenge: vendors need to build clean IED templates for engineering process**



SCL	SCL	117	<GSEControl name="gcbPROT" appID="1001" ty
IED	BayController	119	<LN InType="LPHD_TYPE" InClass="LPHD" inst="1"
AP	AP	120	<LN InType="CSWI_TYPE" InClass="CSWI" inst="1"
LD	BayControllerCTRL	121	<DOI name="Pos">
LN	LLN0	122	<SDI name="SBOw">
LN	LPHD1	123	<DAI name="Check" sAddr="QA1Check"/>
LN	QA1CSWI1	125	<SDI name="Oper">
LN	QB1CSWI2	126	<DAI name="Check" sAddr="QA1Check"/>
LN	QC1CSWI3	128	<DAI name="stVal" sAddr="QA1ControlPos"/>
LN	LLN0	145	<DOI name="Pos">
LN	QA1PIOC1	146	<SDI name="SBOw">

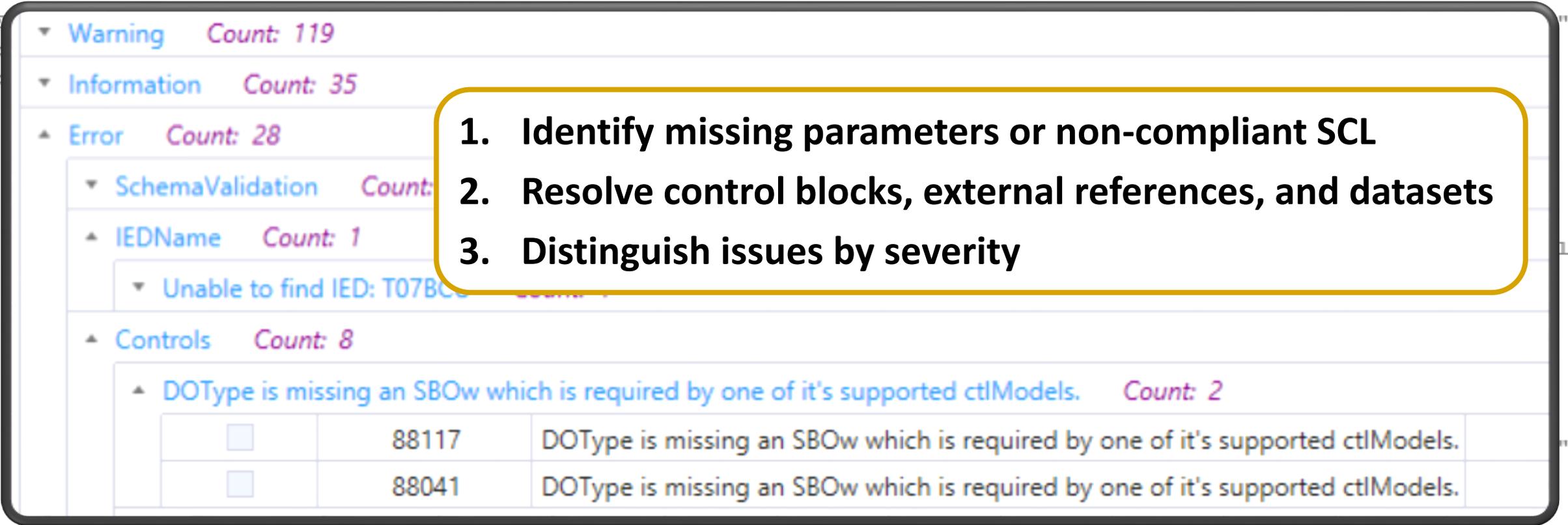
1. Build model with standard objects
2. View as a file or model
3. Manage data templates efficiently
4. Guide the user and verify file

**Value Created: avoid future headaches during the engineering process**

# Verify SCL Files

**Challenge: verify that SCL files are interoperable**

1. Identify missing parameters or non-compliant SCL
2. Resolve control blocks, external references, and datasets
3. Distinguish issues by severity



The screenshot shows a software interface with a tree view of error and warning counts. The 'Error' section is expanded to show 'SchemaValidation' and 'Controls'. Under 'Controls', there are two entries for 'DOType is missing an SBOw which is required by one of it's supported ctlModels.' with counts of 2. A table below this entry shows the details of these errors.

Severity	Count	Message
Warning	119	
Information	35	
Error	28	
SchemaValidation	Count: 28	
IEDName	Count: 1	
Unable to find IED: T07BC		
Controls	Count: 8	
DOType is missing an SBOw which is required by one of it's supported ctlModels.	Count: 2	
<input type="checkbox"/>	88117	DOType is missing an SBOw which is required by one of it's supported ctlModels.
<input type="checkbox"/>	88041	DOType is missing an SBOw which is required by one of it's supported ctlModels.

**Value Created: avoid SCL issues that can slow down the engineering process**

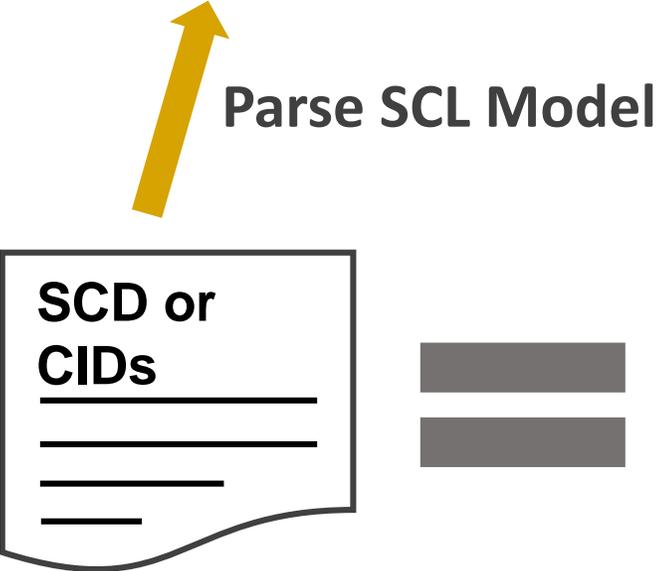
# Check IED Configuration

**Challenge: verify that IEDs are configured according to design**

Object	Value
Pos	
ctlModel	sbo
sboTimeout	30000

Object	Value
Pos	
ctlModel	status-only
sboTimeout	30000

**Highlight Differences**



**Value Created: reduce test time by finding misconfigurations earlier**

# Debug Process Bus

**Challenge: debug multiple publishers in a complex network**

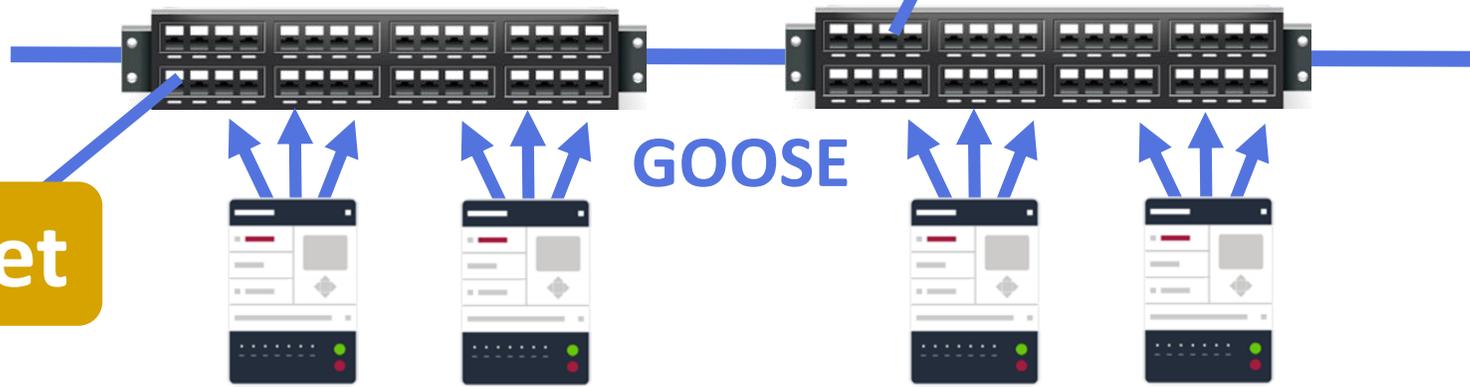
## SCL

```
<GSEControl name="gcb1" appID="L02BPU/gcb1">  
<GSEControl name="gcb2" appID="L03BPU/gcb2">  
<GSEControl name="gcb3" appID="L04BPU/gcb3">  
<GSEControl name="gcb4" appID="L05BPU/gcb4">
```

## Sniffer

GoID	IED	Timeout	Match SCL	Simulate	ConfRev
gcb1	L02BPU	No	SCL	False	14
gcb1	-----	No	Wire	False	13
gcb3	L04BPU	No	Match	False	14
gcb3	L04BPU	No	Match	True	14

**Test Set**



- ✓ Misconfigured
- ✓ Simulated
- ✓ Timed out
- ✓ Network Config

**Value Created: identify process bus issues earlier and faster**

# Find and View System Data

**Challenge: find data and configuration info in large systems**

## 1. Support huge SCL files

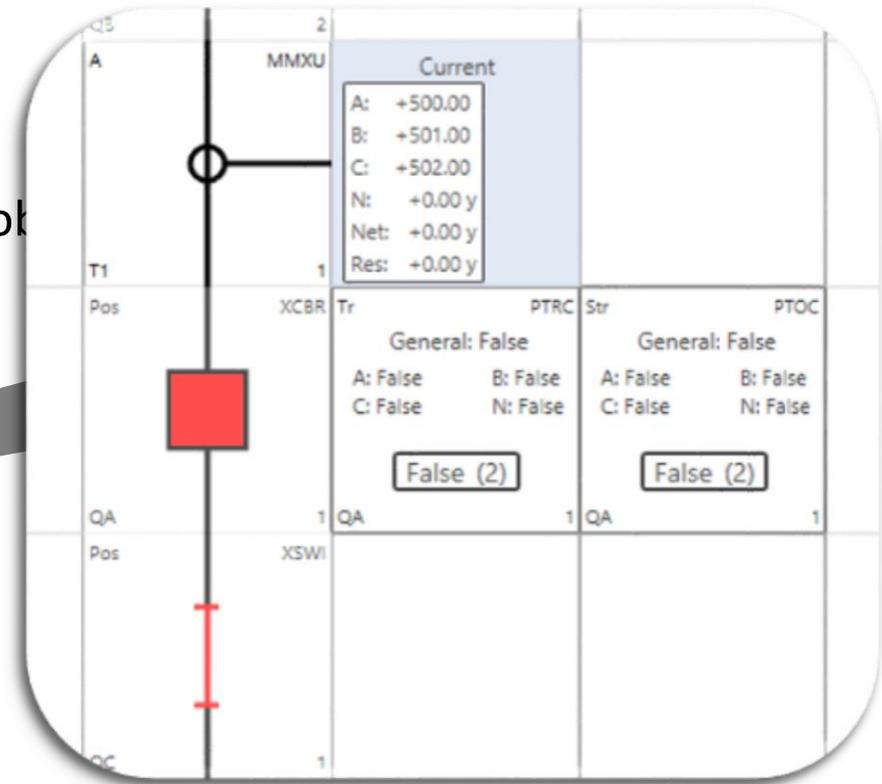
- ✓ Parse entire SCD files and show the “necessary” data by job

## 2. View data at the system level

- ✓ Navigate data across multiple IEDs in the system

## 3. Visualize data

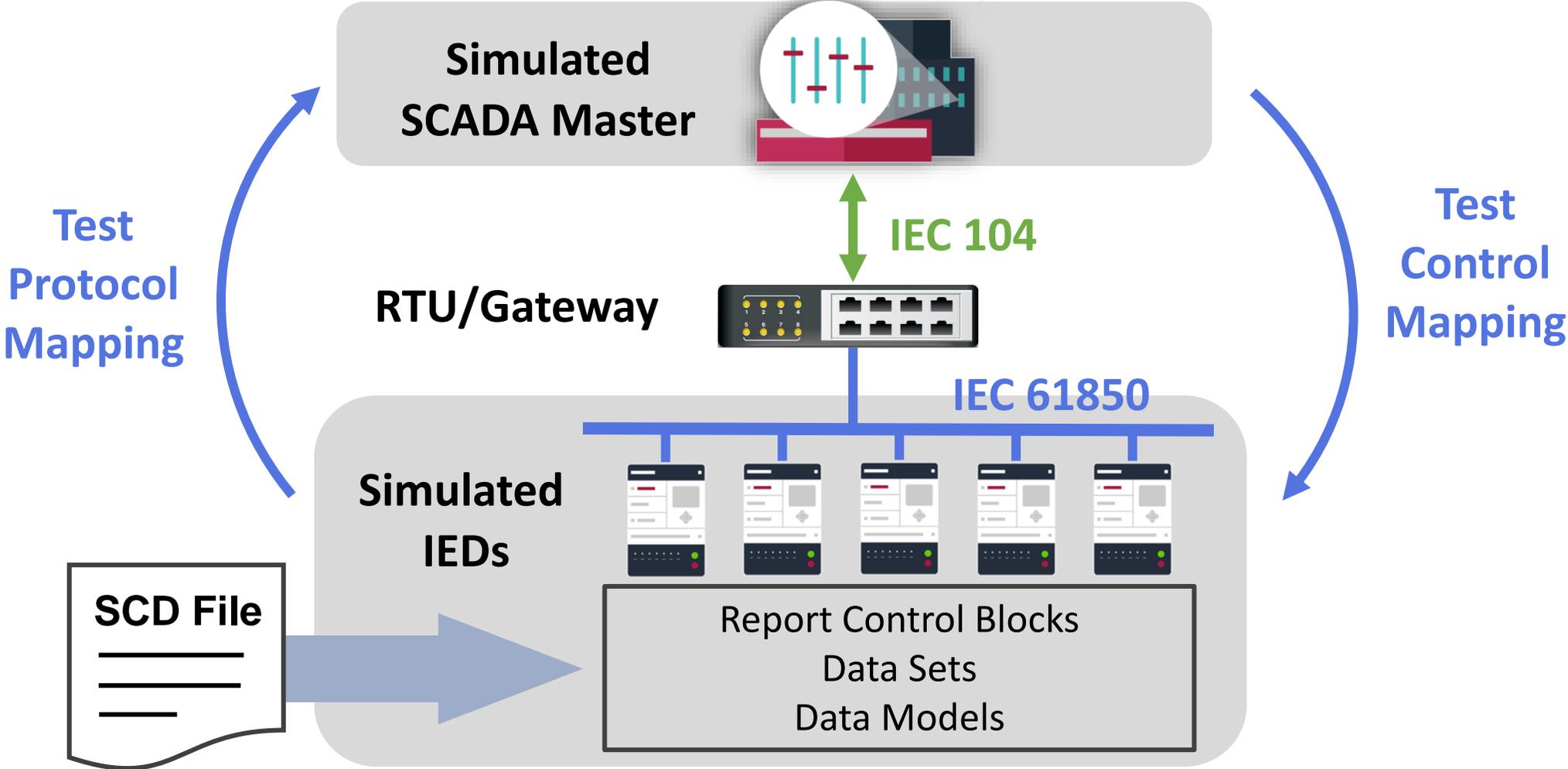
- ✓ Show objects in a way that power engineers understand



**Value Created: make data accessible to all users (design, build, maintenance)**

# Simulate IEDs

**Challenge: perform system level tests without real IEDs**



**Value Created: avoid costly issues during commissioning by testing in the lab**

# Key Takeaways

## Find Issues Earlier

- Test earlier with software tools
- Discover misconfigurations when they are cheaper to fix

## Take Advantage of the Value of SCL

- Leverage a design which is machine readable
- Compare to SCL to find misconfigurations

## Tackle The Complexity

- Make IEC 61850 accessible to all users