

Developing accurate and comprehensive IEC 61850 system specifications that support the fluid interchange of multi-vendor devices

IEC 61850 TOP-DOWN DESIGN



IEC 61850 Global
2019

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We provide IEC 61850 System
Engineering Tools

Member TC57 WG10

This Presentation is about

IEC 61850 Global
2019

HELINKS

How Utilities can
efficiently build and
maintain IEC 61850
Power Automation-
Systems !!!

We are going to cover the following topics

IEC 61850 Tools and Process

- SCL files SCD-ICD-SSD

System Specification with SSD Files

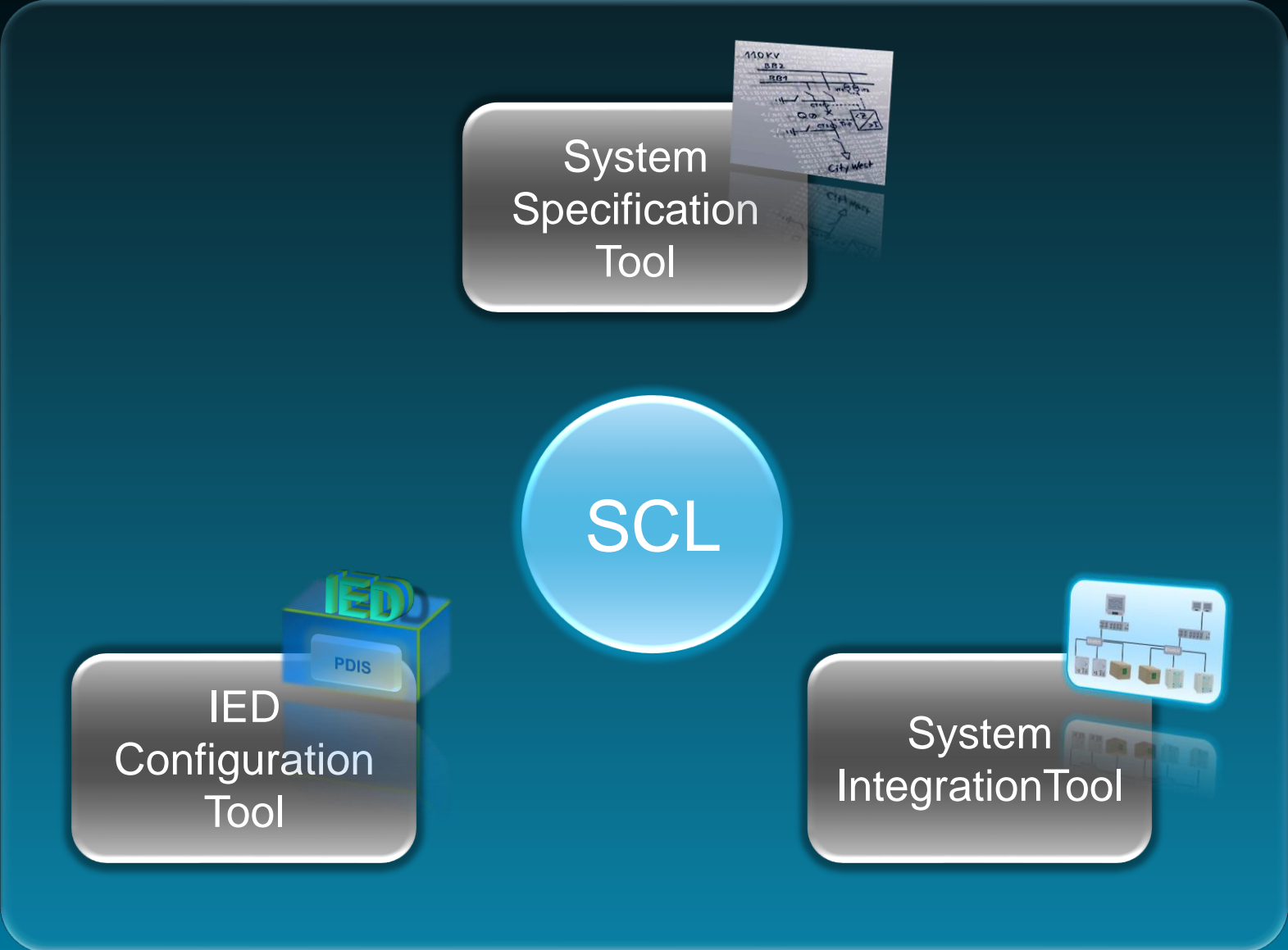
- Why has it nearly not been used?
- Why should it be used?
- How can it be used to improve overall efficiency

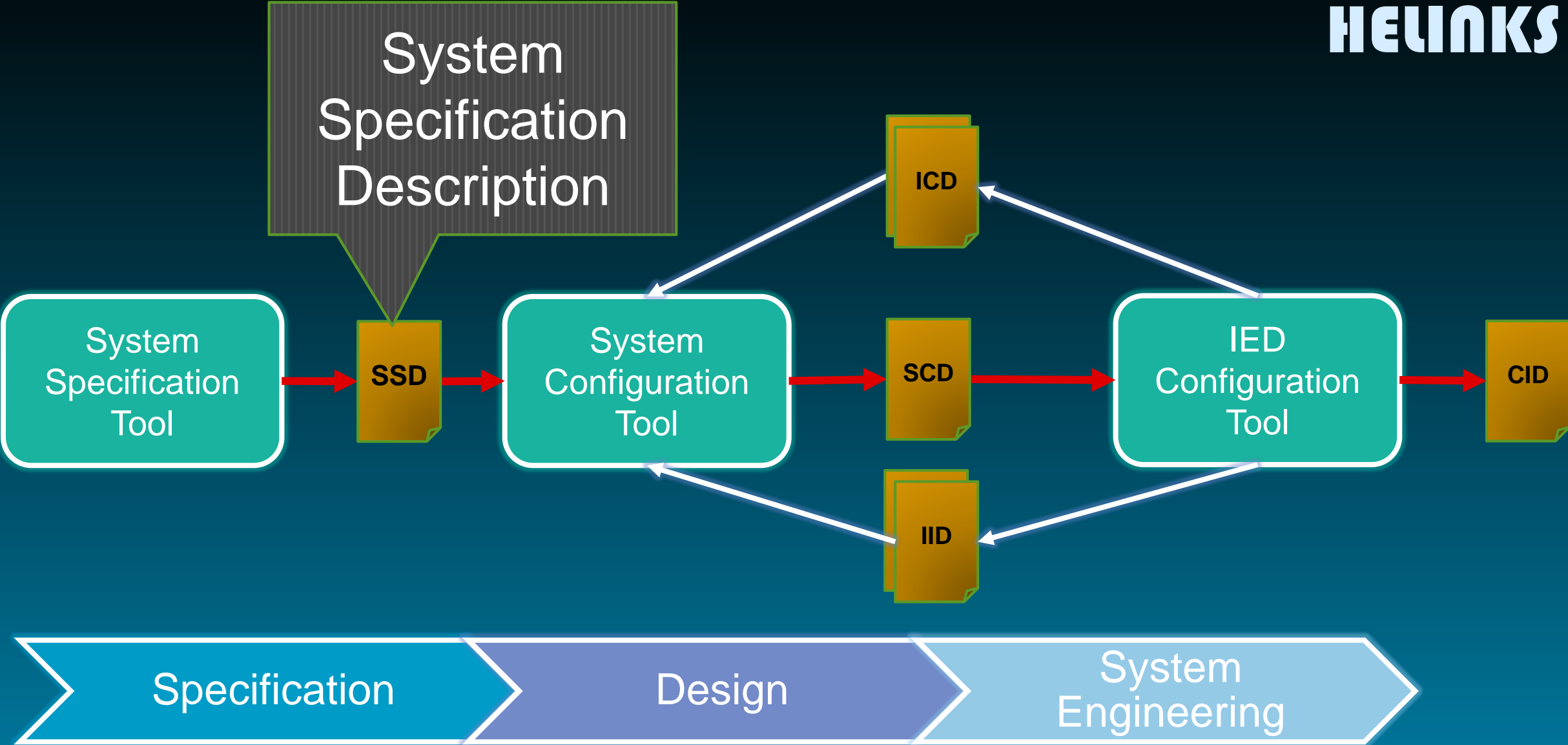
Different approaches on system specification

- Impose IEC 61850 IED data model to supplier.
- Impose formalized, detailed design to supplier.

Lookout

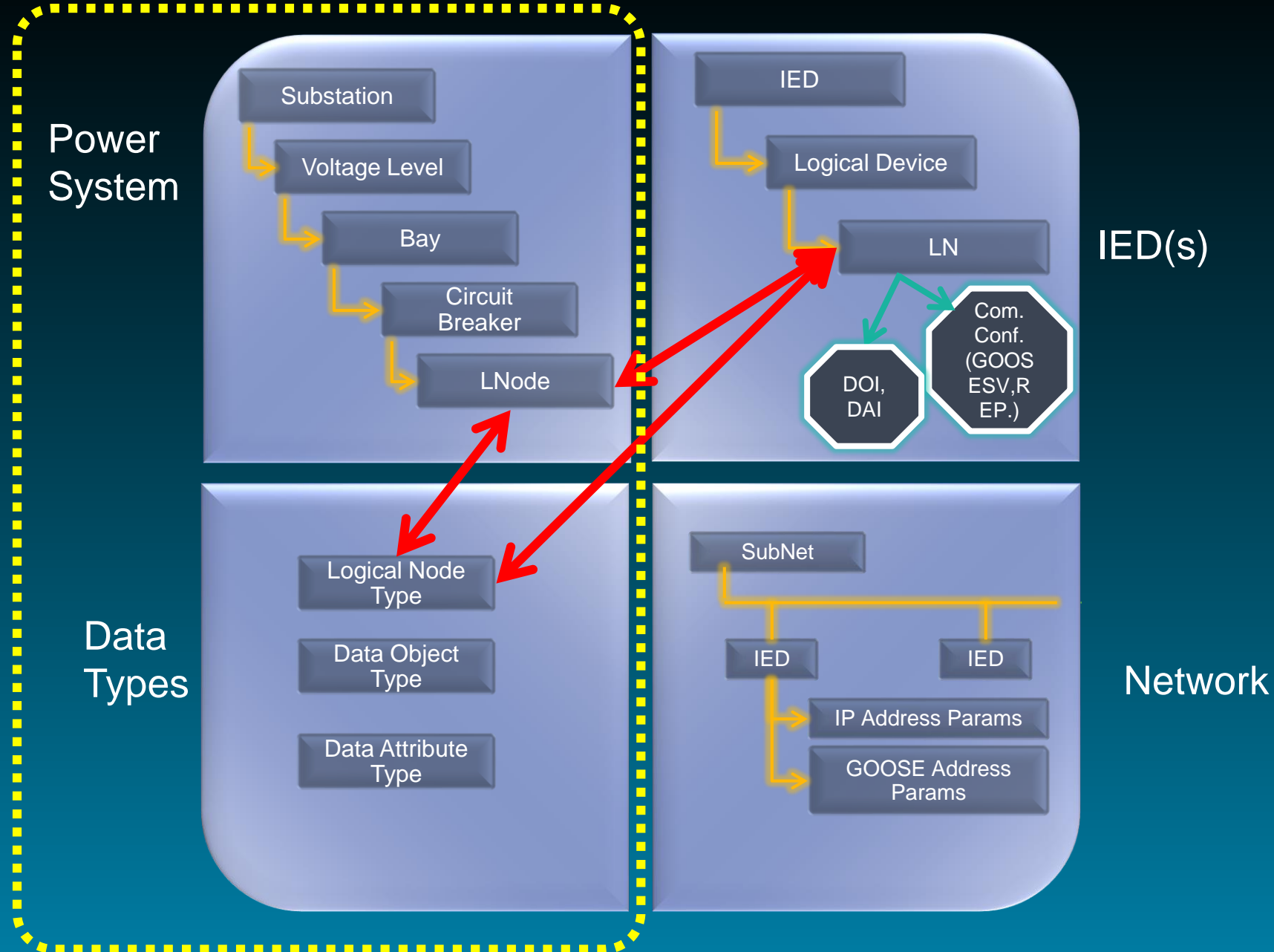
- Additional Requirements on IEC61850 Standardization
- Additional Requirements on Tools and Key Players





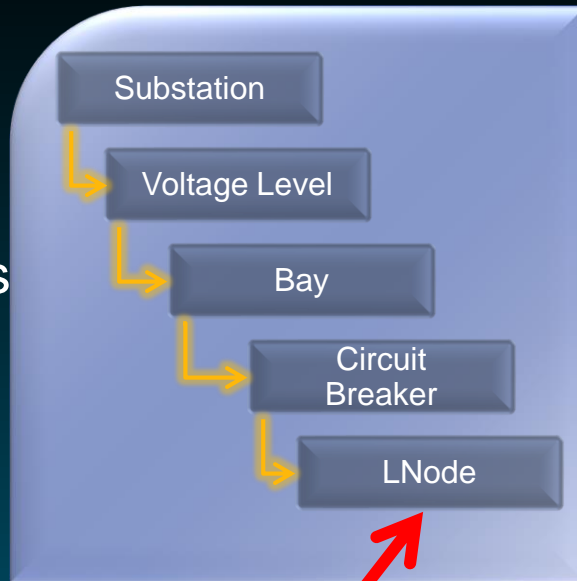
- Why did Utilities not use SSD files for system specification and tendering?
- Why did System Integrators not use SSD files for designing the system?

Content of SCL Files

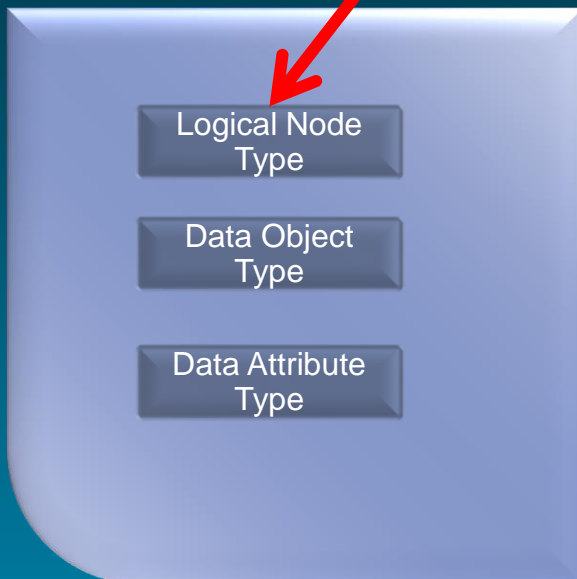


Why Utilities did not use SSD Files

Power System
(Process Section)



Data Types

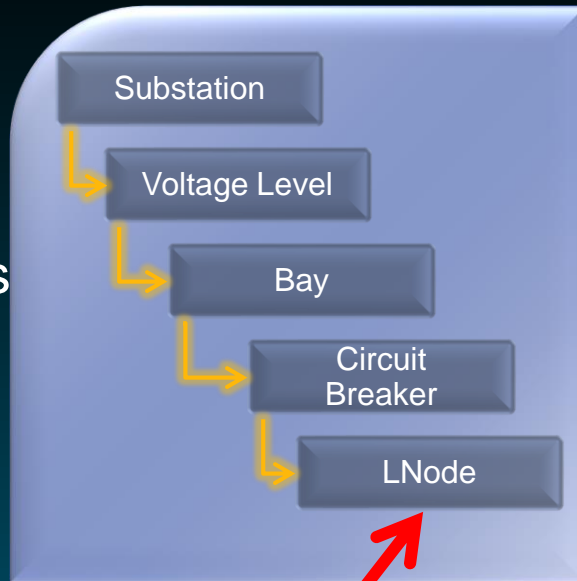


- The content of the Process Section is by far not sufficient to specify a Power Automation System.
- Organization did not fit.
- Challenging task of defining IEC 61850 mapping ... for different IED types
- Utility name spaces even more challenging.
- Potential benefit for maintenance and quality not recognized.

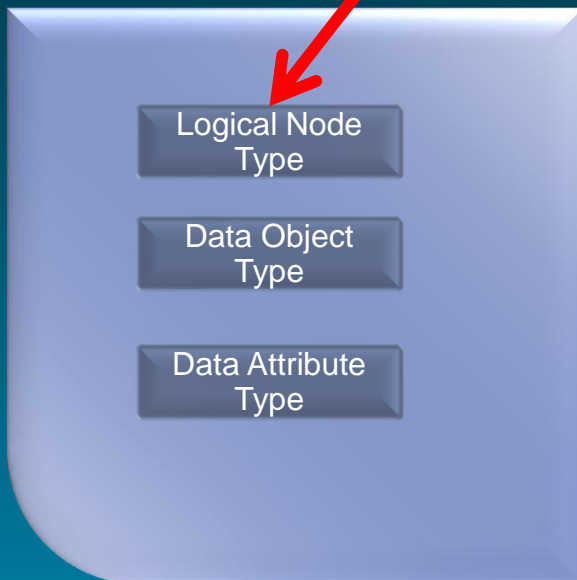
- Custom Signal designations
- HMI texts (Alarms/Events)
- Processing and routing information
- Applications & Logic
- Physical IO
- Protocolmappings e.g. IEC 60570-104 or DNP 3 Addresses
- Test information

Why System Integrators did not use SSD Files

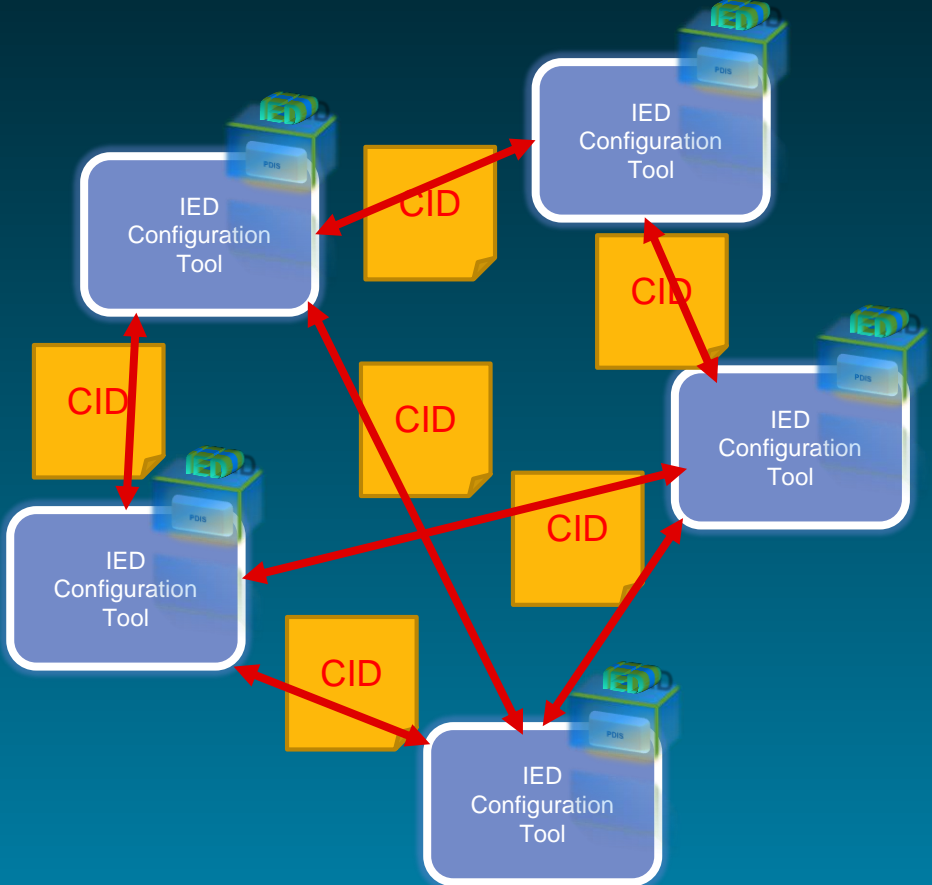
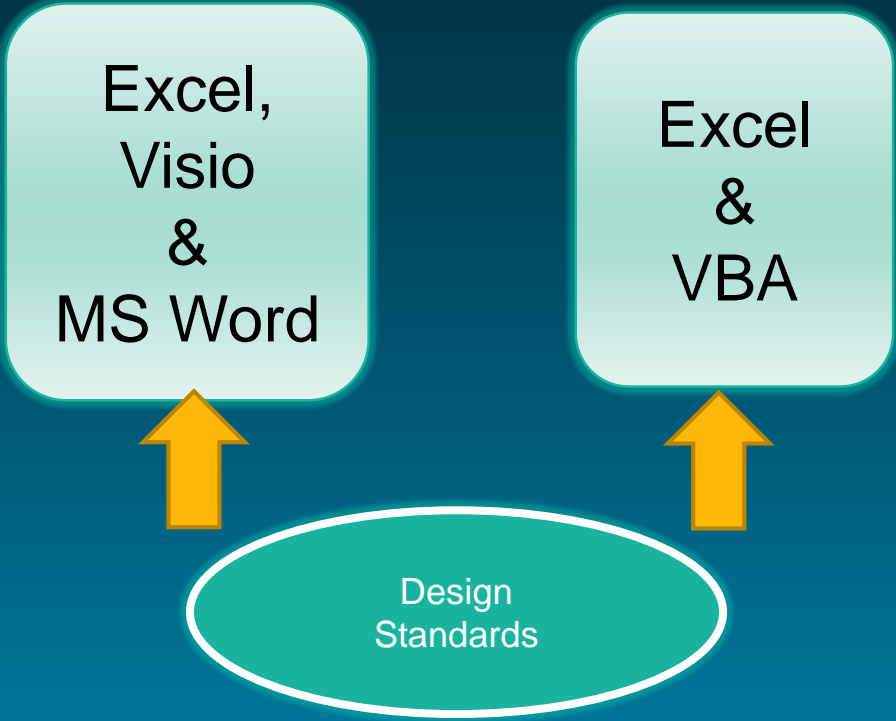
Power System
(Process
Section)

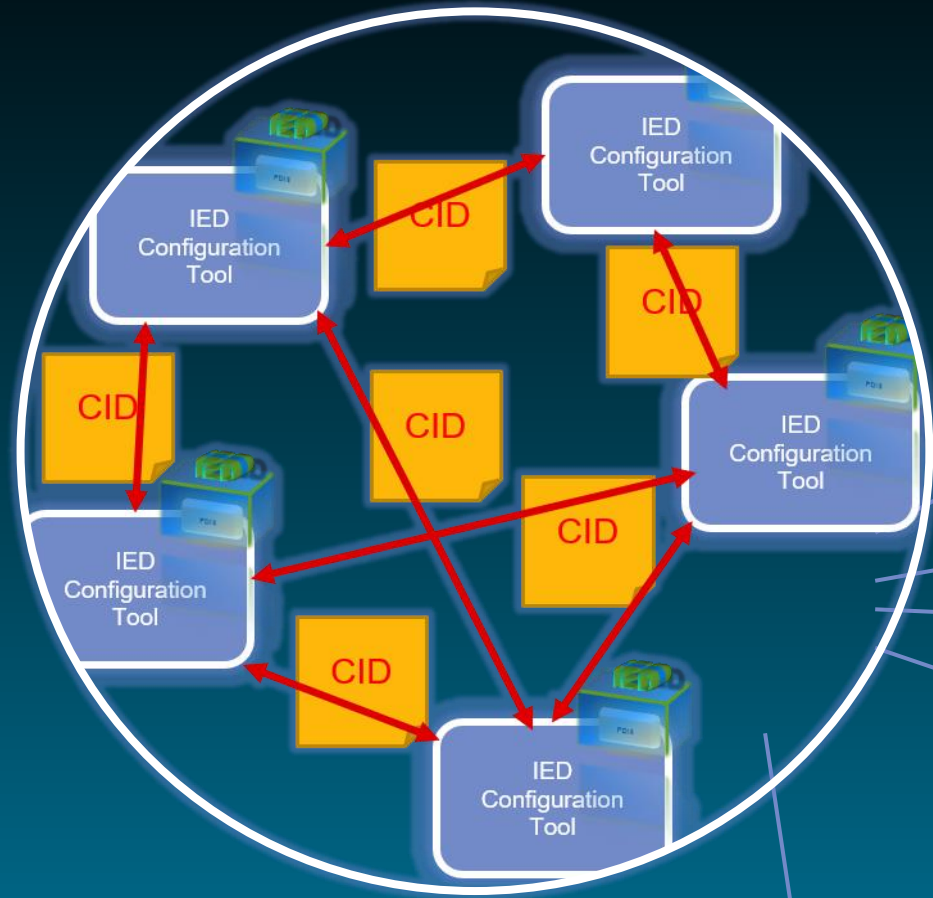


Data
Types



- The content of the Process Section does not really help to build a Power Automation System.
 - Why draw again a Single Line if it already exists?
 - Where is the productivity gain in mapping hundreds of logical nodes in SCL.
- Customers did not require an SCD with Substation section.





System Integrators delivered very different solutions for similar systems.

No transparency of the design

Device interchangeability was hard to achieve.

Utilities lost grip on the installation

Maintenance became difficult and expensive

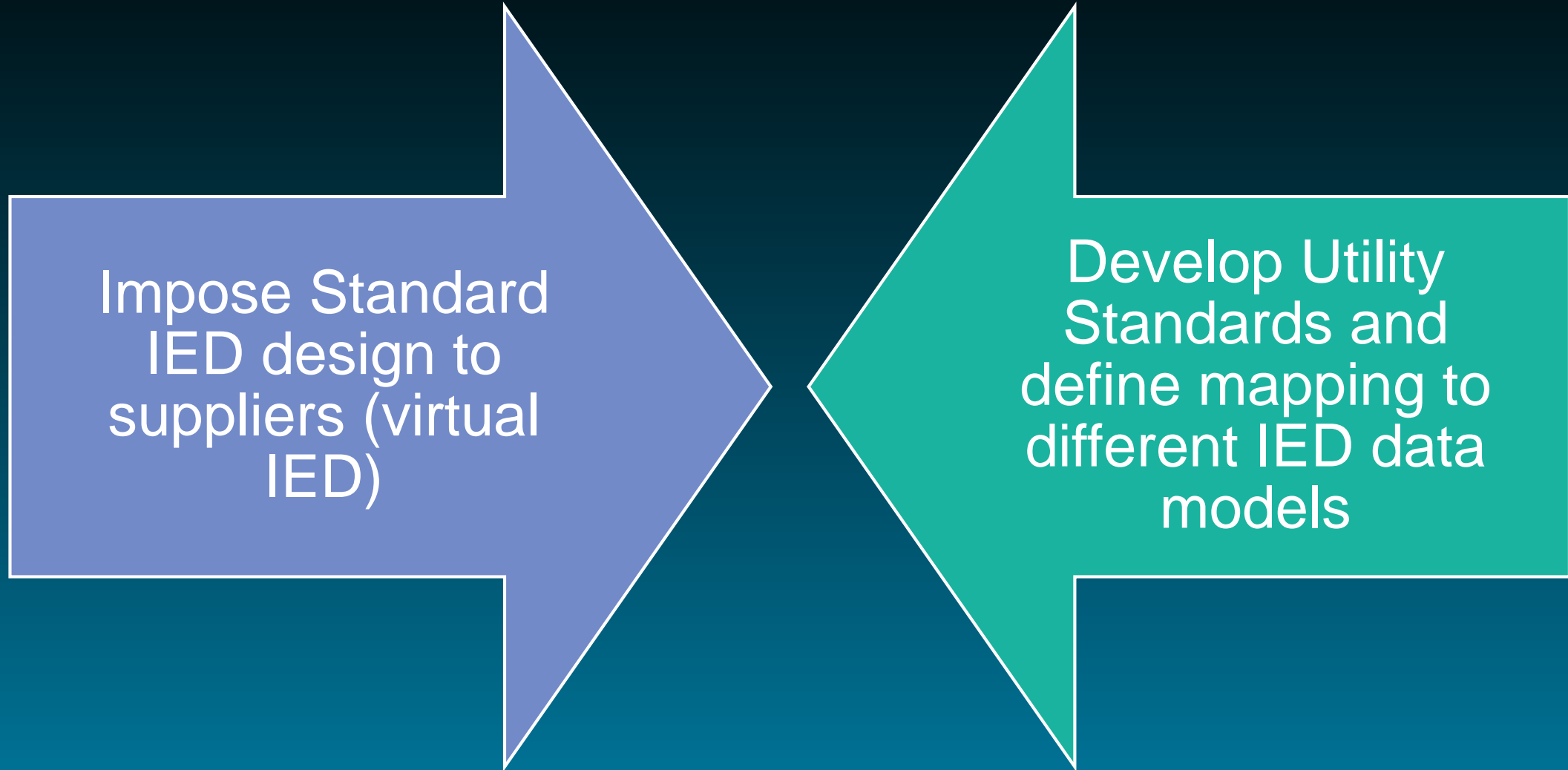
ENTSO-E

- Representatives joined TC57 WG10 and initiated User Feedback task-force
- Osmose project

Investments in IEC 61850 design standards

- Utilities participated more intensively in IEC 61850 working group.
- Utilities left the “Asset Manager” comfort zone.
- Utilities defined IEC 61850 design standards and processes.
- Utilities invested in IEC 61850 training.

...and define solutions with different technical approaches:....



.... and different pros and cons:

ENTSO-E

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.... with different technical approaches:

Impose Standard IED design to suppliers (virtual IED)

+ Simpler to handle for Utilities

- Only large Utilities can “force” design upon manufacturers

- Standards are inflexible and hard to maintain

Develop Utility Standards and define mapping to different IED data models

- Higher complexity because different IED Data Models need to be mapped.

+ More flexible and works also for smaller Utilities

+ Covers more IEDs on the market.

+ Standards are IED independent. Only the IED mapping needs maintenance.

Very sad

In both approaches the SSD file as a formal specification is not really a key element!!!

- Proprietary solutions
- Not represented in SCL
- No processing by IEC 61850 Engineering tools

IEC 61850 Standard

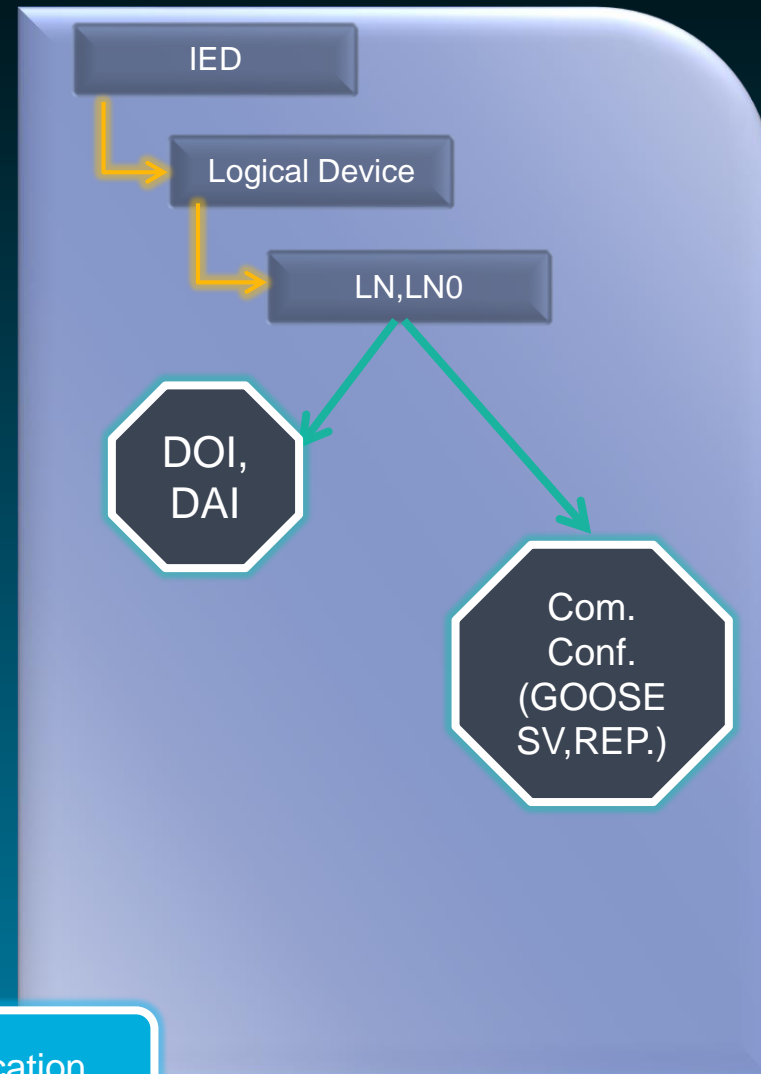
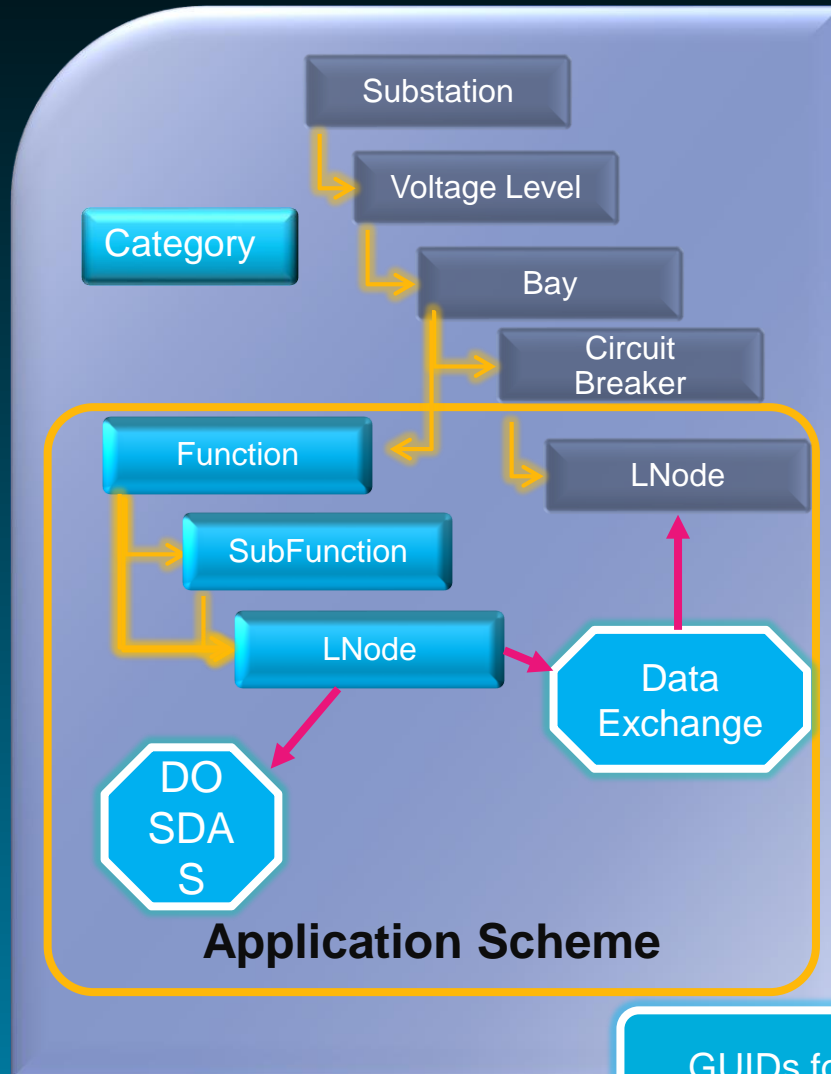
- SSD files need to contain enough information to specify most aspects of a power automation system independently of the IED architecture.
- IEC 61850 Standard needs to show the way from IED independent system specification to implementation.

Engineering Tools

- Engineering tools must extend IEC 61850 communication engineering to general signal and application engineering.
- Engineering tools must support company design standards and SCL representation.
- Engineering tools must bridge the gap between customer data model and vendor specific implementations.

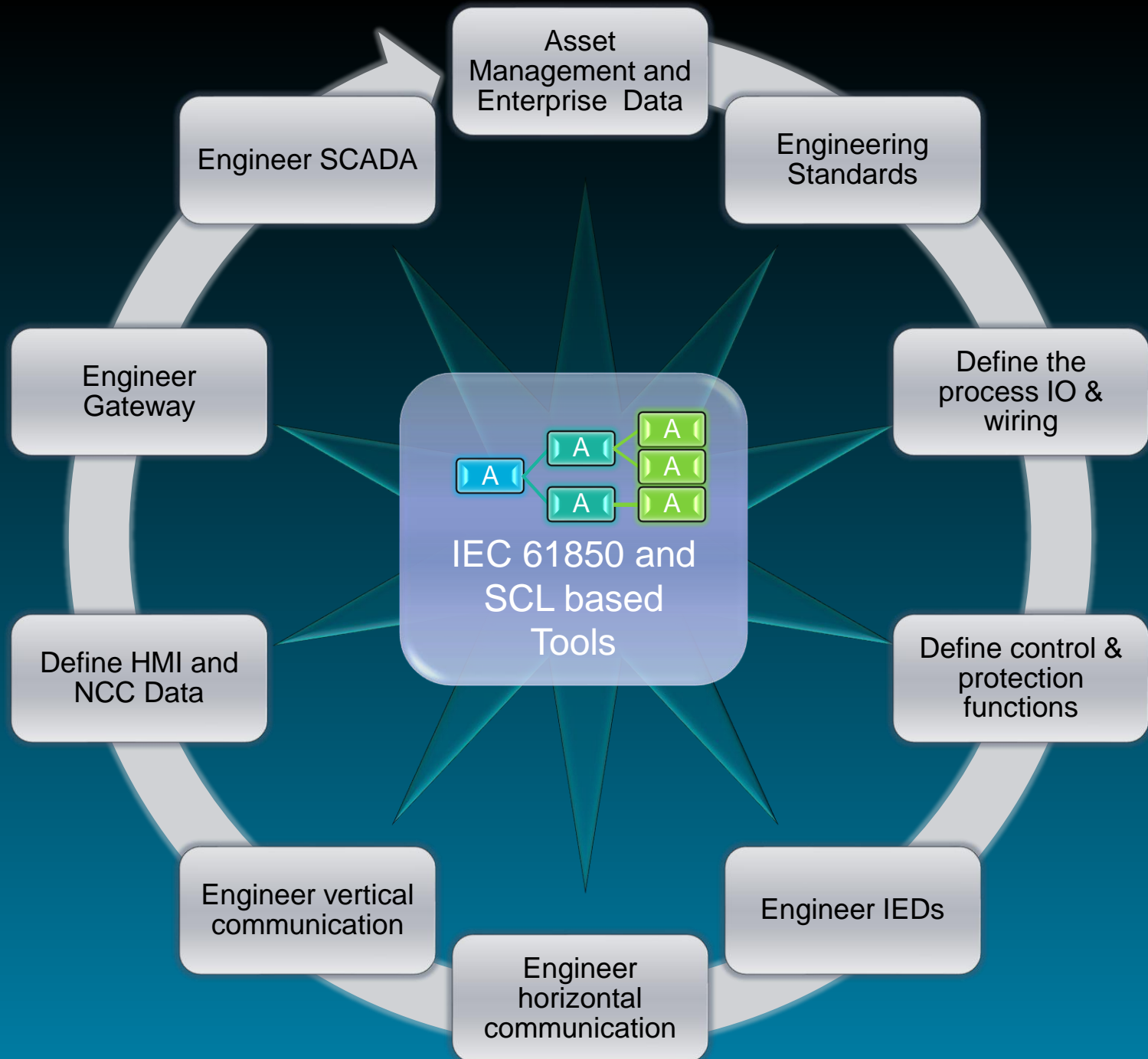
SCL : Quo Vadis TF 6-100 & Osmose

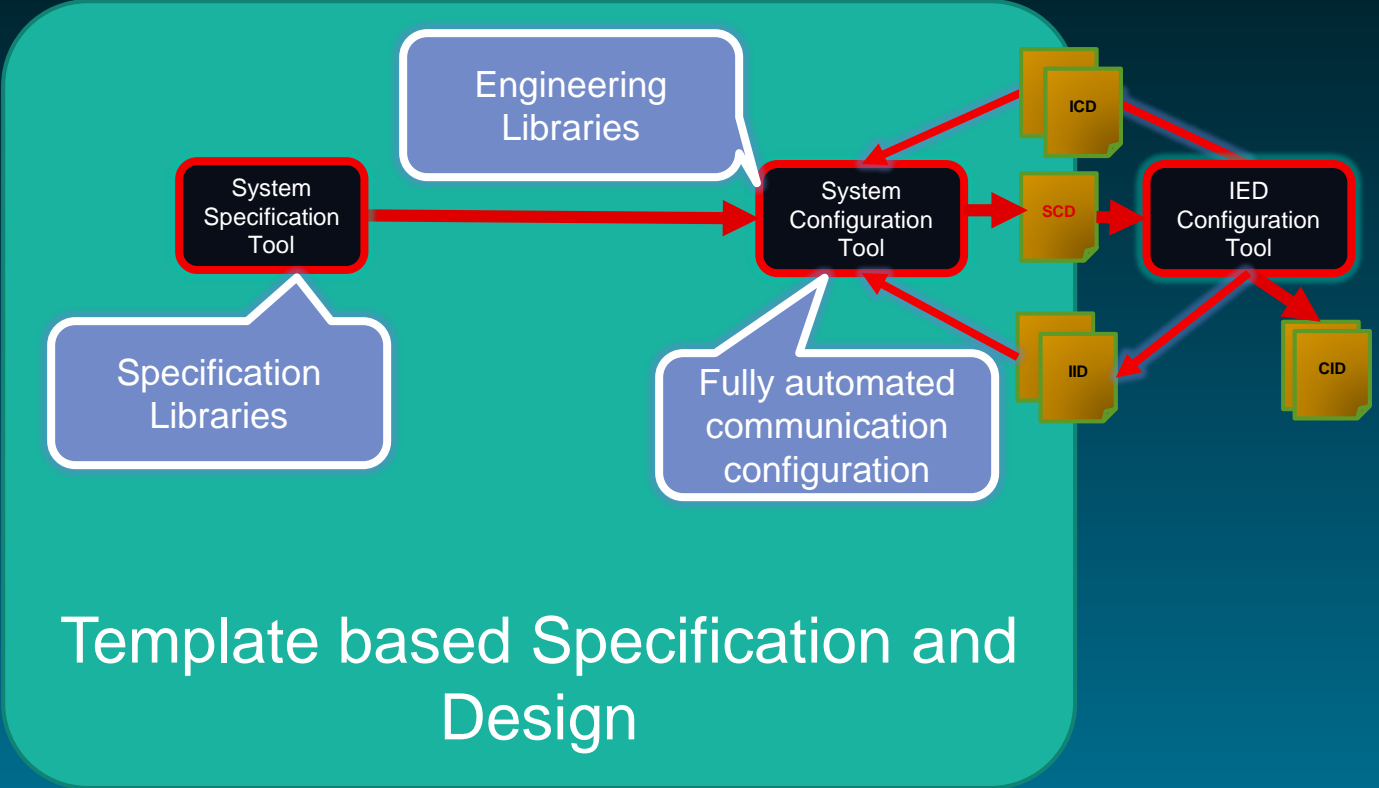
Substation(s)

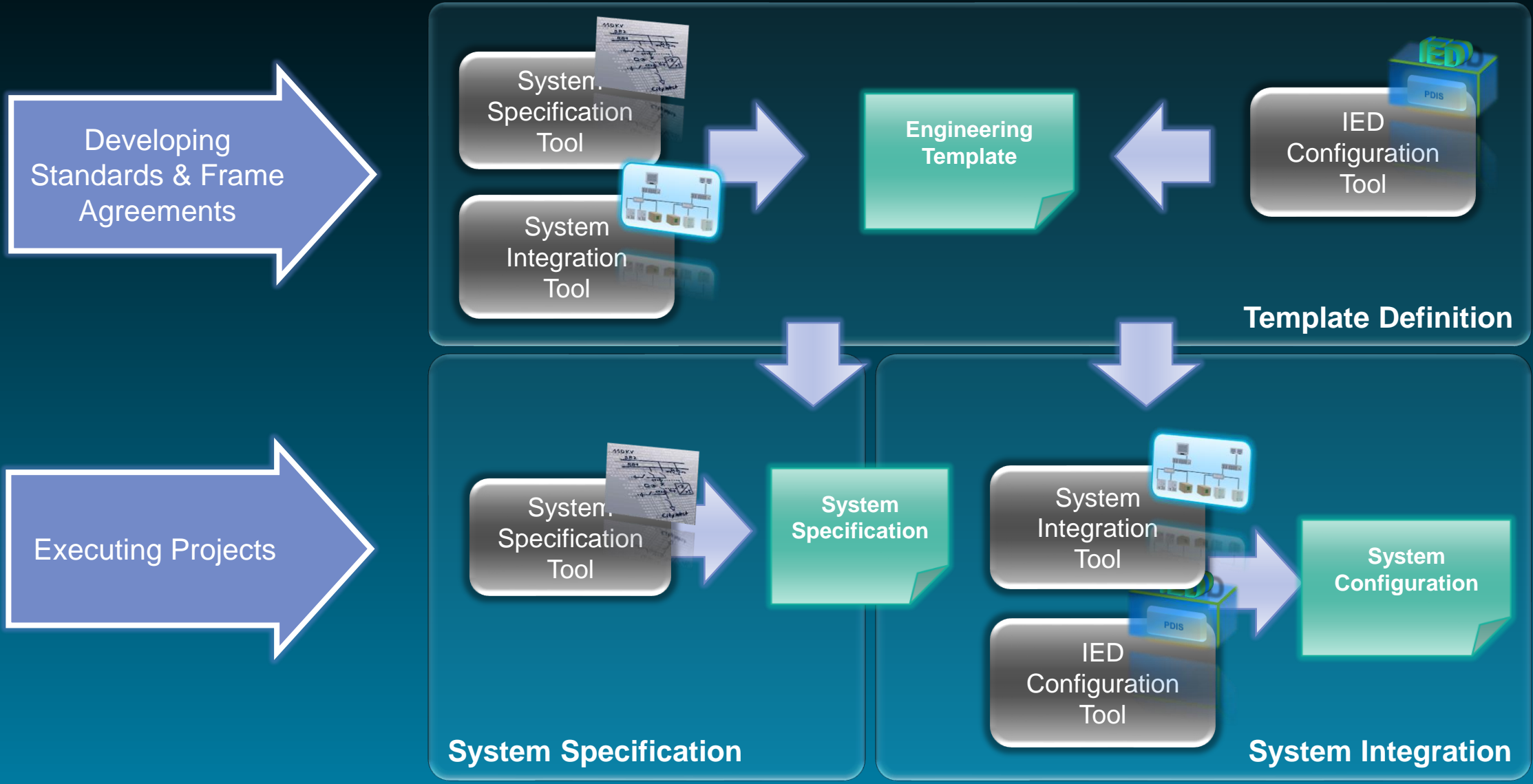


Virtual
IED(s)

GUIDs for File Identification

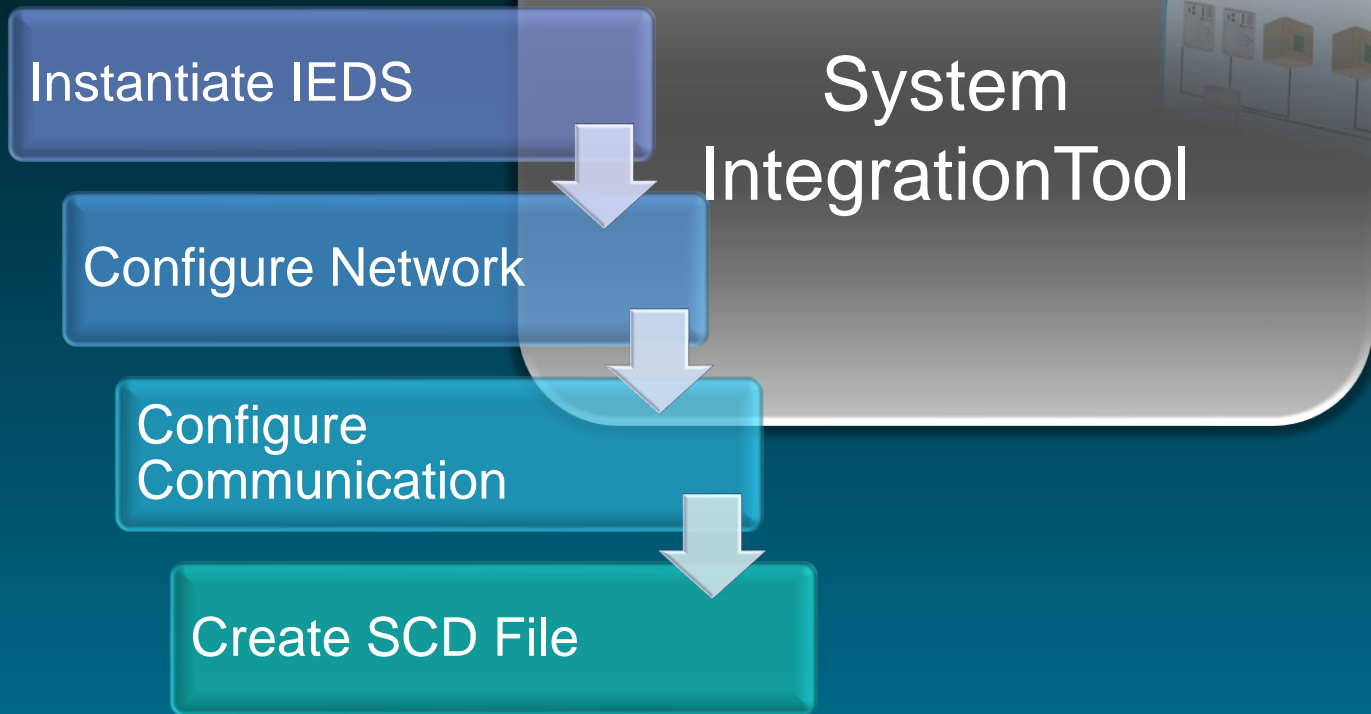




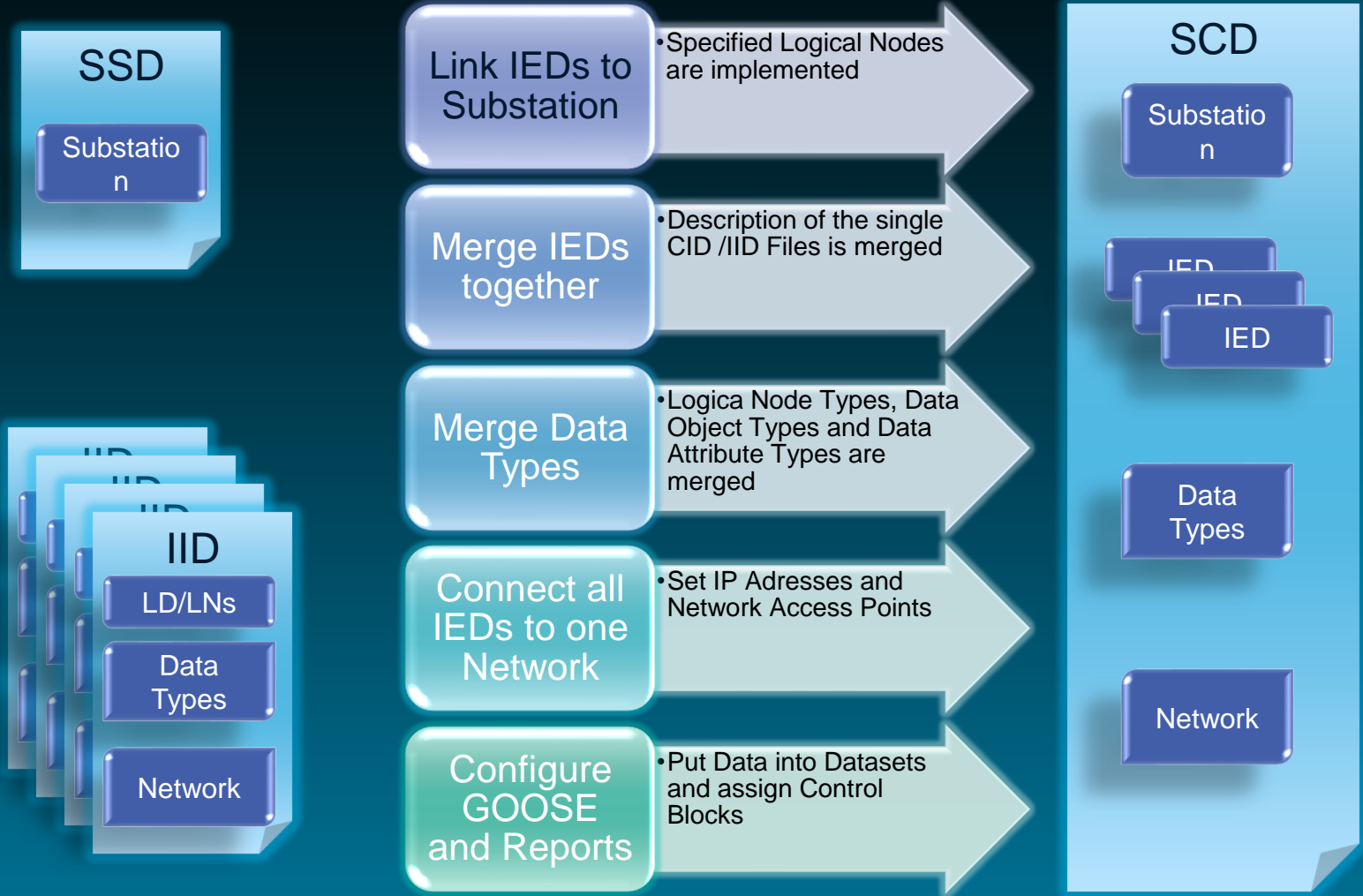




System Integration Process



Create SCD File



What can SSD be used for

SSD

Graphical representation of electrical scheme (Single Line) and the automation functions for documentation

Base for colouring of HMI (monitoring and control systems)

Automated generation of standardized functional specification

Generation of structured function oriented signal lists with hierarchical naming.

Allocation of control and protection functions of the secondary equipment (IED's)