

A background image showing a low-angle view of several high-voltage power transmission towers and their associated power lines against a clear blue sky. The image is partially obscured by a red diagonal overlay at the bottom.

# IEC 61850 SCL – Top Down / Bottom-Up Engineering and Ed.1.0 to Ed.2.1 changes

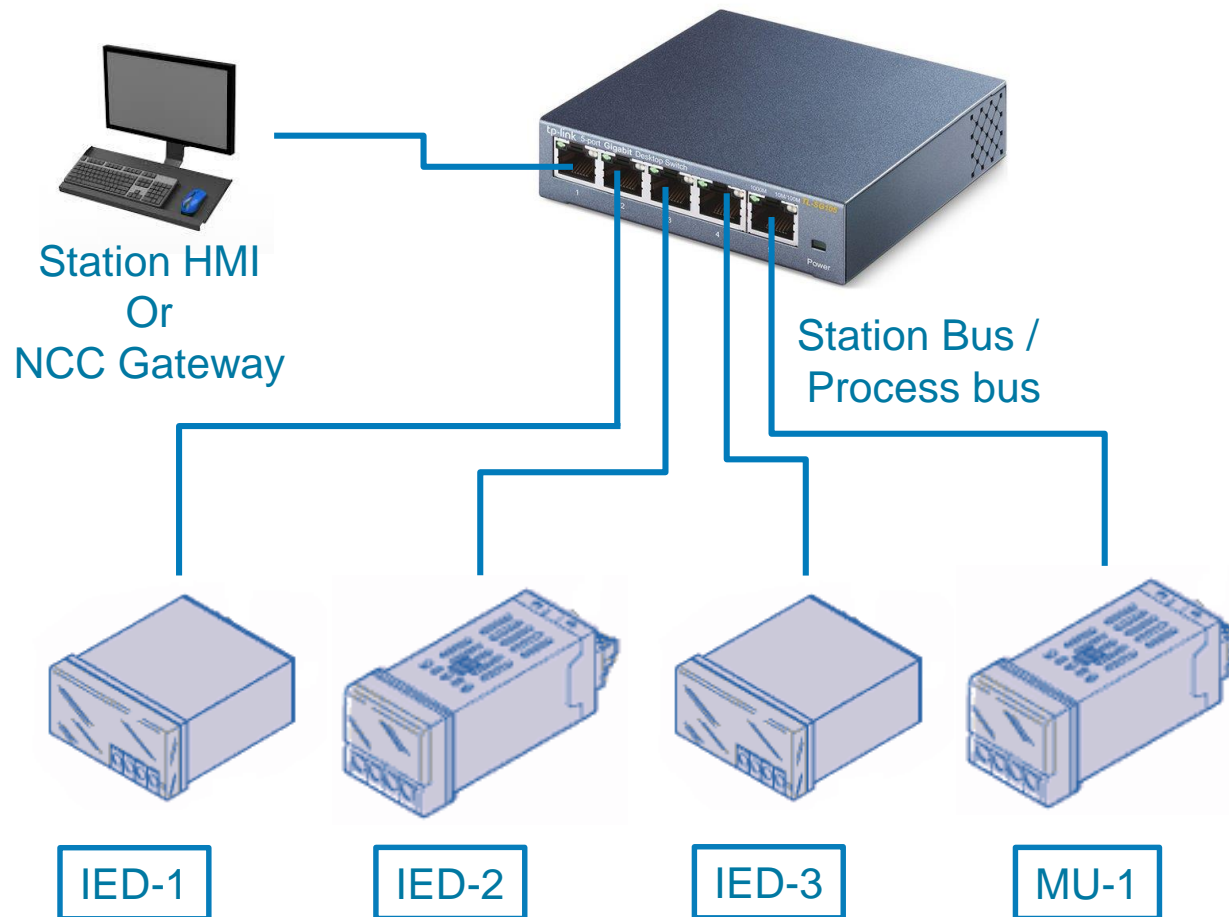
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# Agenda

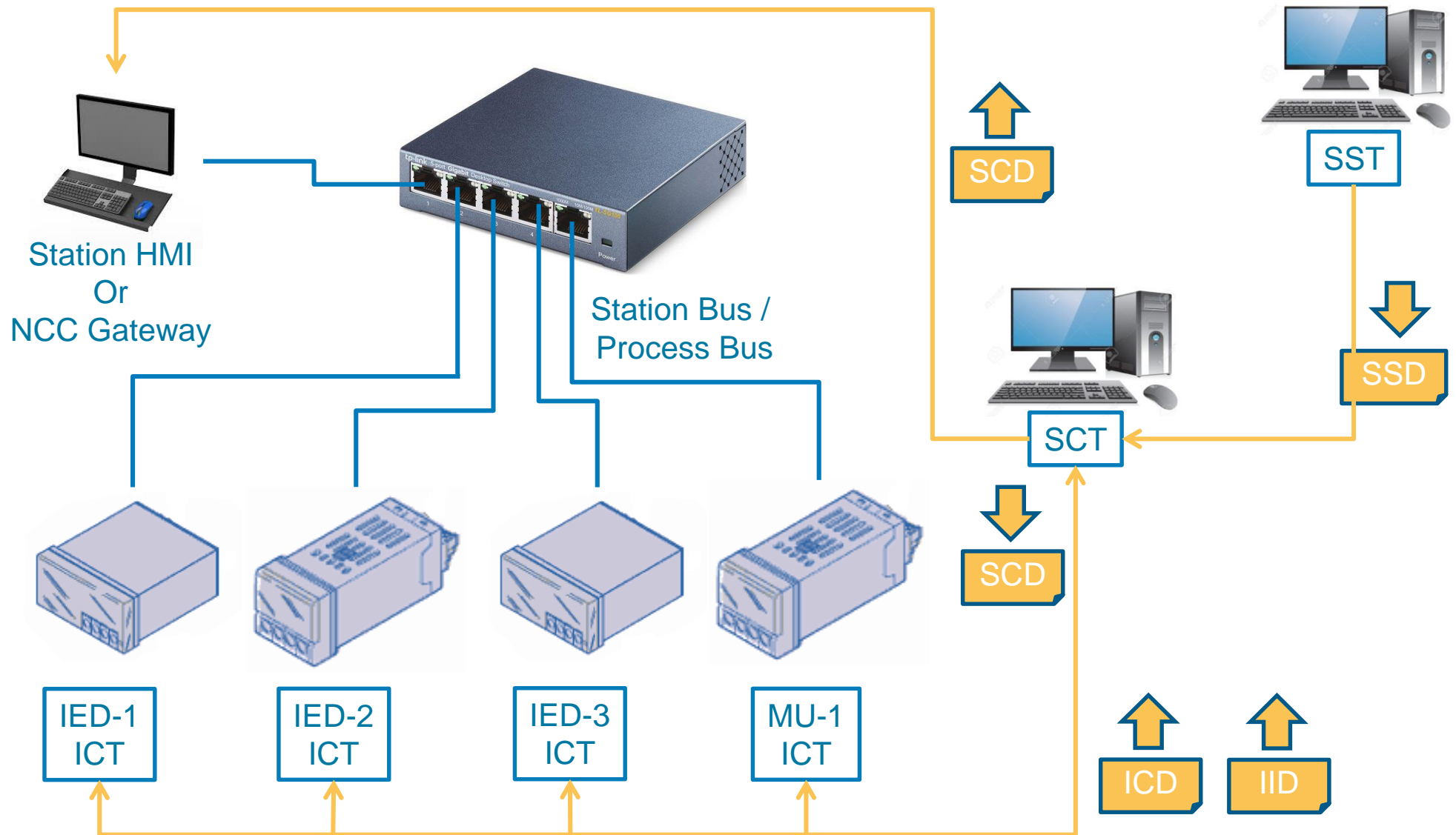
- Top-Down Engineering process
  - Illustrations & SCL File types
- Bottom-Up Engineering process
- SCL Interactions
- Differences between Top down and bottom up
- Changes from Ed.1.0 to Ed.2.0
- Changes from Ed.2.0 to Ed.2.1
  
- IOP 2019 High Voltage SCL Project – A Walkthrough

# Illustration – IEC61850 Bus

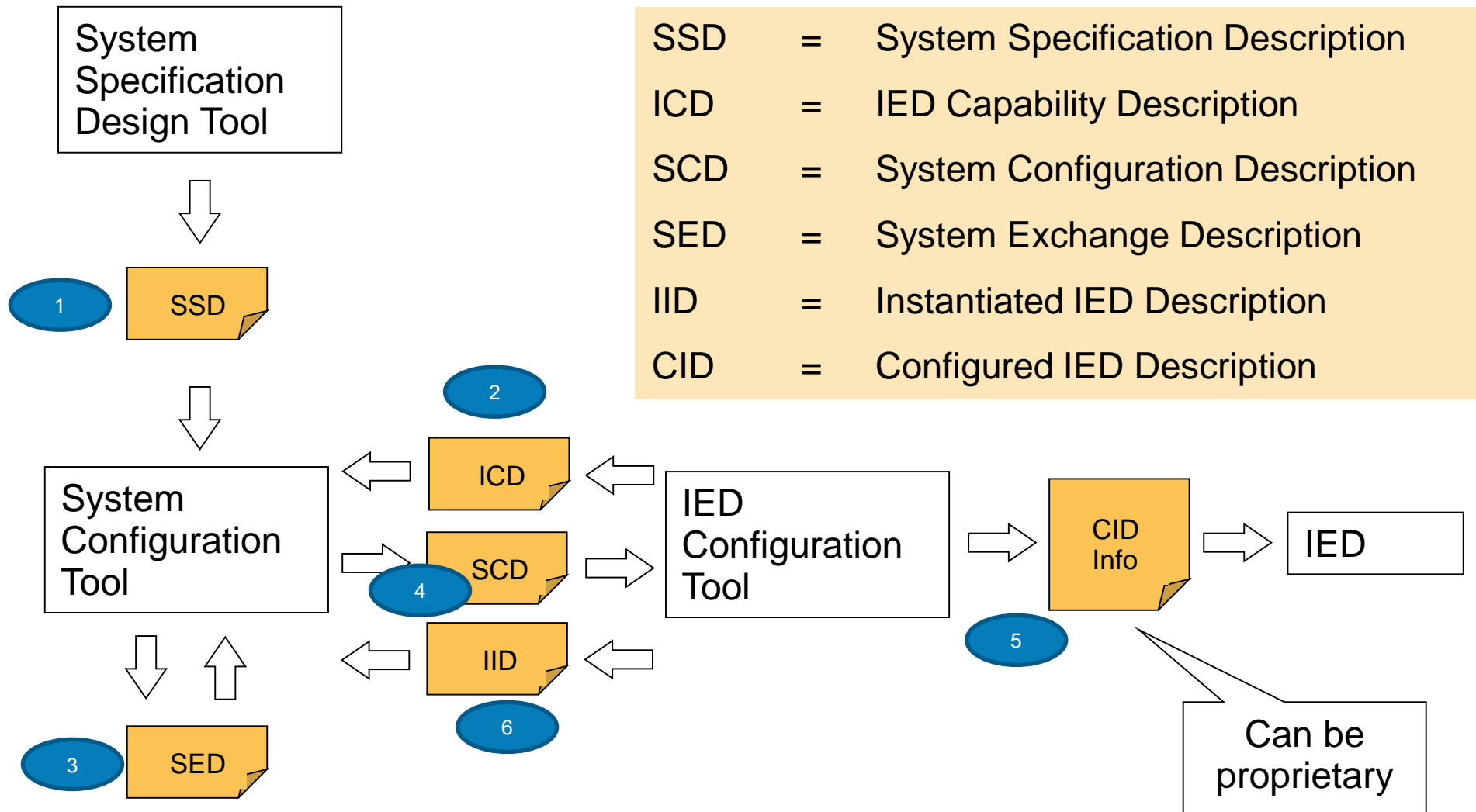


- IEC-61850 Protocol communication
- IED to IED (GOOSE)
- MU to IED (SV)
- Client – IED (Reports, Reads, Controls ...)

# Illustration – Top Down Engineering

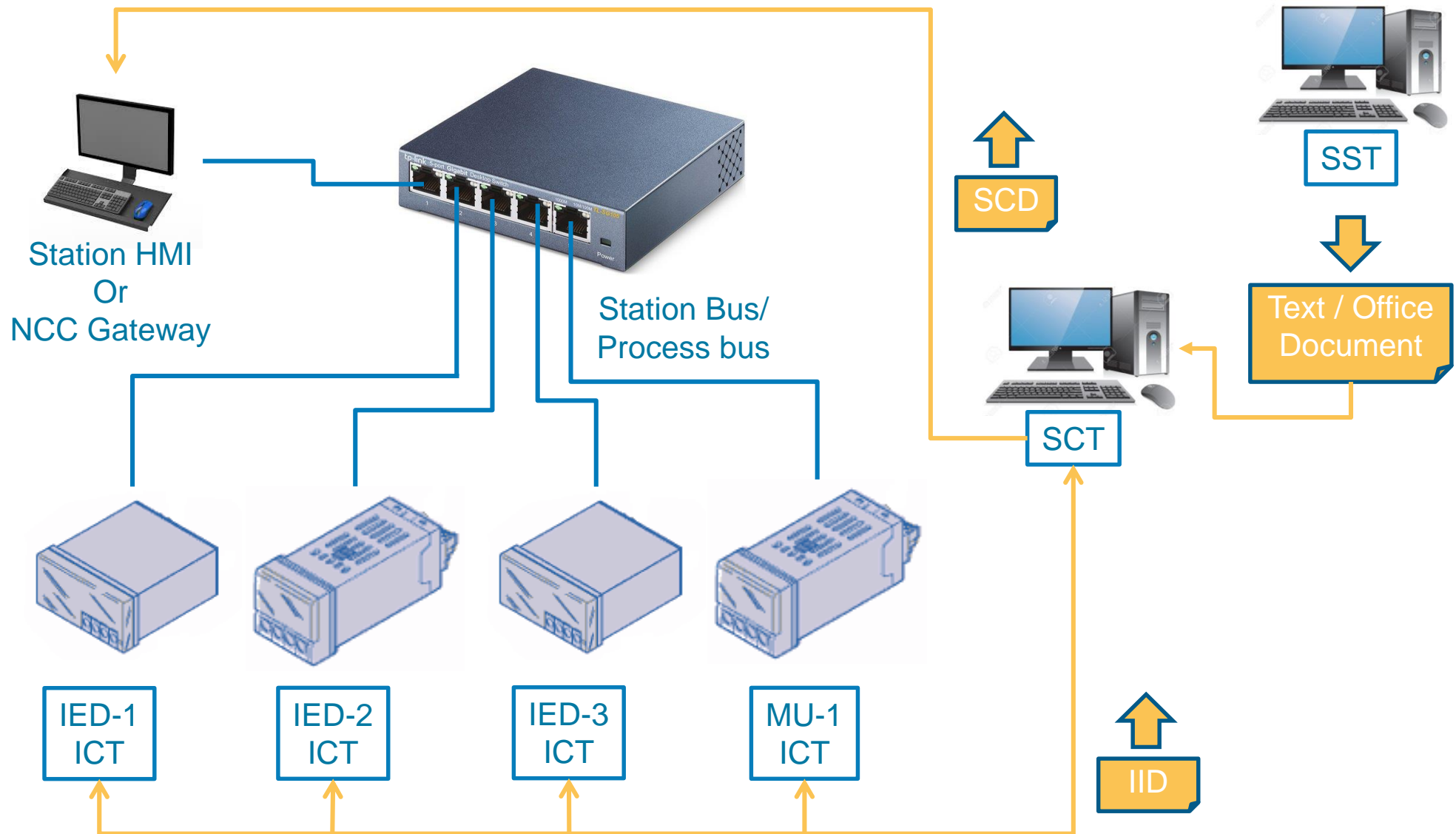


# Top-Down SCL Interactions

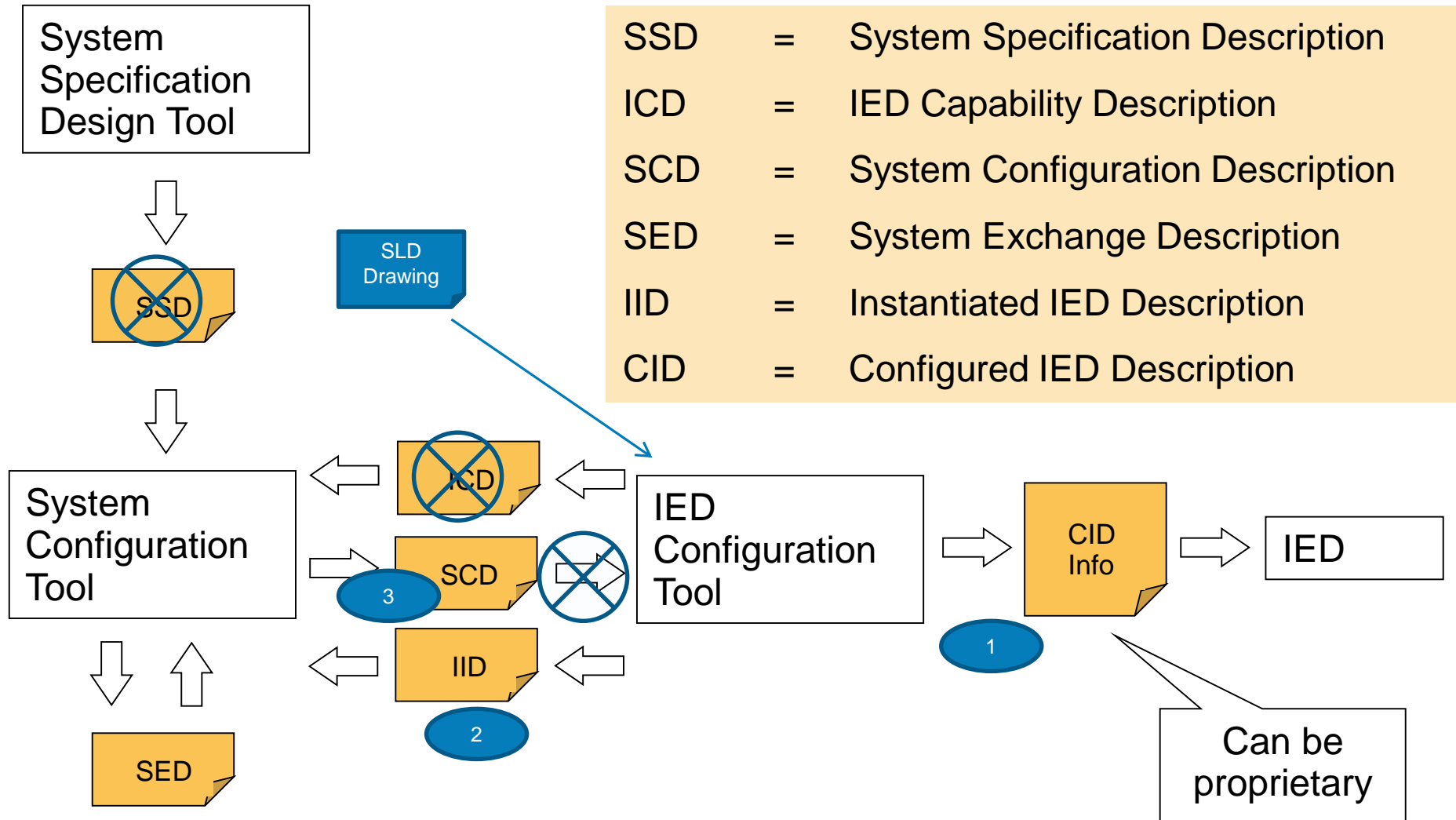


- SSD = System Specification Description
- ICD = IED Capability Description
- SCD = System Configuration Description
- SED = System Exchange Description
- IID = Instantiated IED Description
- CID = Configured IED Description

# Illustration – Bottom Up Engineering



# Bottom-Up Interactions





- Bottom Up (to meet compliance)
  - Informal textual specification documents
  - System Integrator or Vendor generates all design and tests to meet the specification
  - IEDs are engineered directly with all Datasets, Reports, Goose and signal flows using ICTs
  - An SCT view may be provided by importing IIDs to an SCT
- Top Down (as per standard)
  - Formal specification – SSD, ISD
  - Design of solution may be included in Specification partially or fully
  - IEDs are imported as ICDs and engineered in the SCT
  - SCD output is used to configure the IEDs
  - IIDs and SCD may be exchanged multiple times to complete the process



# Changes from Ed.1.0 to Ed.2.0 schema



- Security support definition (Signature / Encryption)
- Service Type in External Input References
- Sample Mod definitions (SV)
- Engineering Data flow definitions (Full / Fix / Dataflow)
- Additional SI units
- Integer 64 support
- Service, Blocking, Operate Received FCs
- Service Tracking Objects
- Enumeration Status and Controls
- Line and Process to Substation section

# Changes from Ed.1.0 to Ed.2.0 schema - 2



- Curve Setting Type and other setting types
- Additional of Logical Nodes
- Redundancy Protocol definition (HSR / PRP / RSTP)
- Physical connection Types
- Additional addressing Parameters like SNTP/ MMS ports, IPv6 addresses etc.
- Enhanced Services section for better definition of IED capability
- Enhanced Client Services section
- ServerAt definition for redundant port



## Changes from Ed.1.0 to Ed.2.0 schema - 3

- Clarity in the definition of External Input References with more parameters
- GI default true in Reports
- Definition of indexed / non indexed Reports
- Access Point name under Client LN (Report reservation)
- More details to IED name (GOOSE/SV subscription)
- Introduction of RGOOSE / RSV
- sAddr definition and vallmport
- Protocol Namespace definiton
- .....and many more



# Changes from Ed.2.0 to Ed.2.1 schema

- Removed Schema Date
- Additions in Substation Section
  - Frequency & no. of phases to Line
  - Added Voltage as a separate element
  - Line to Terminal Properties
- Additions in IED Section
  - Original SCL Release
  - Max number of buffered Reports
  - Key Delivery Assurance
  - Multicast Security

# Changes from Ed.2.0 to Ed.2.1 schema - 2



- Additions in IED Section
  - Synchronization Source and no. of ASDU to SMV settings
  - SV / RV and GOOSE / RGOOSE support under services section
  - SV / RV and GOOSE / RGOOSE support under Client services section
  - Internal Address binding capability definition
  - IEC 61850 9-3 based time sync
- External Input References
  - Preconfigured Server, LN, DO, DA

**Thank you for attending!**



**For any further clarifications  
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