

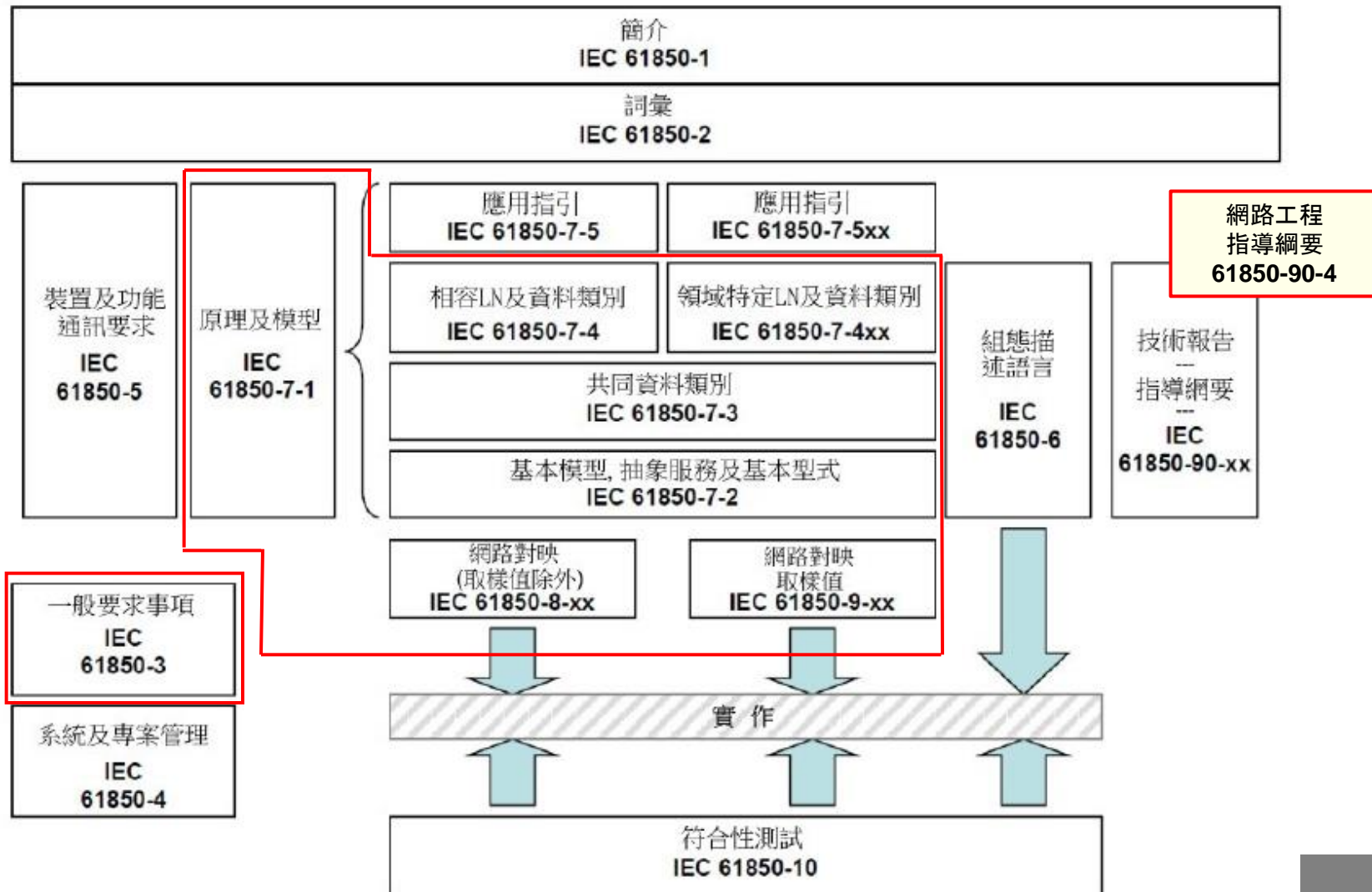
我國61850產品測試 驗證建置簡介

財團法人台灣商品檢測驗證中心

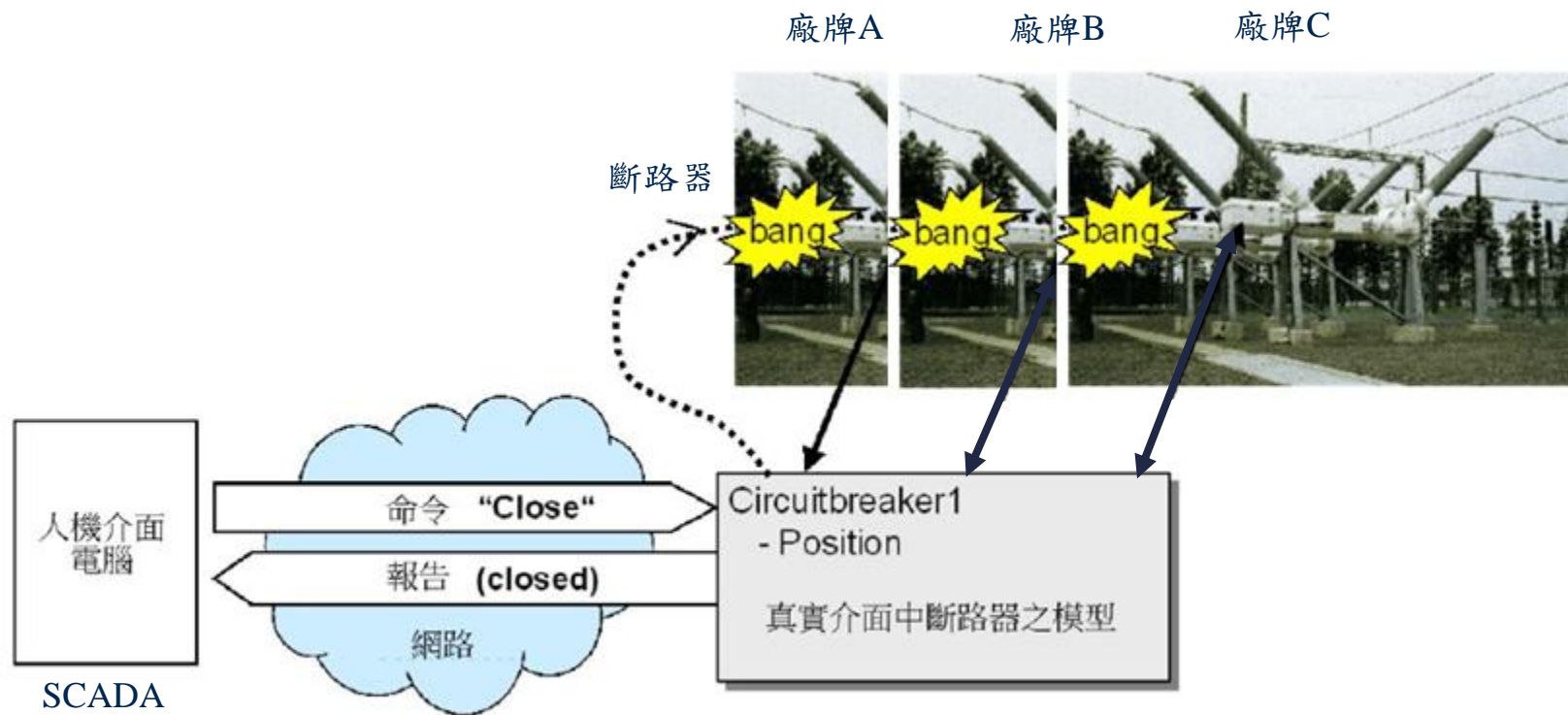
林政憲

2024年11月06日

IEC 61850 系列標準

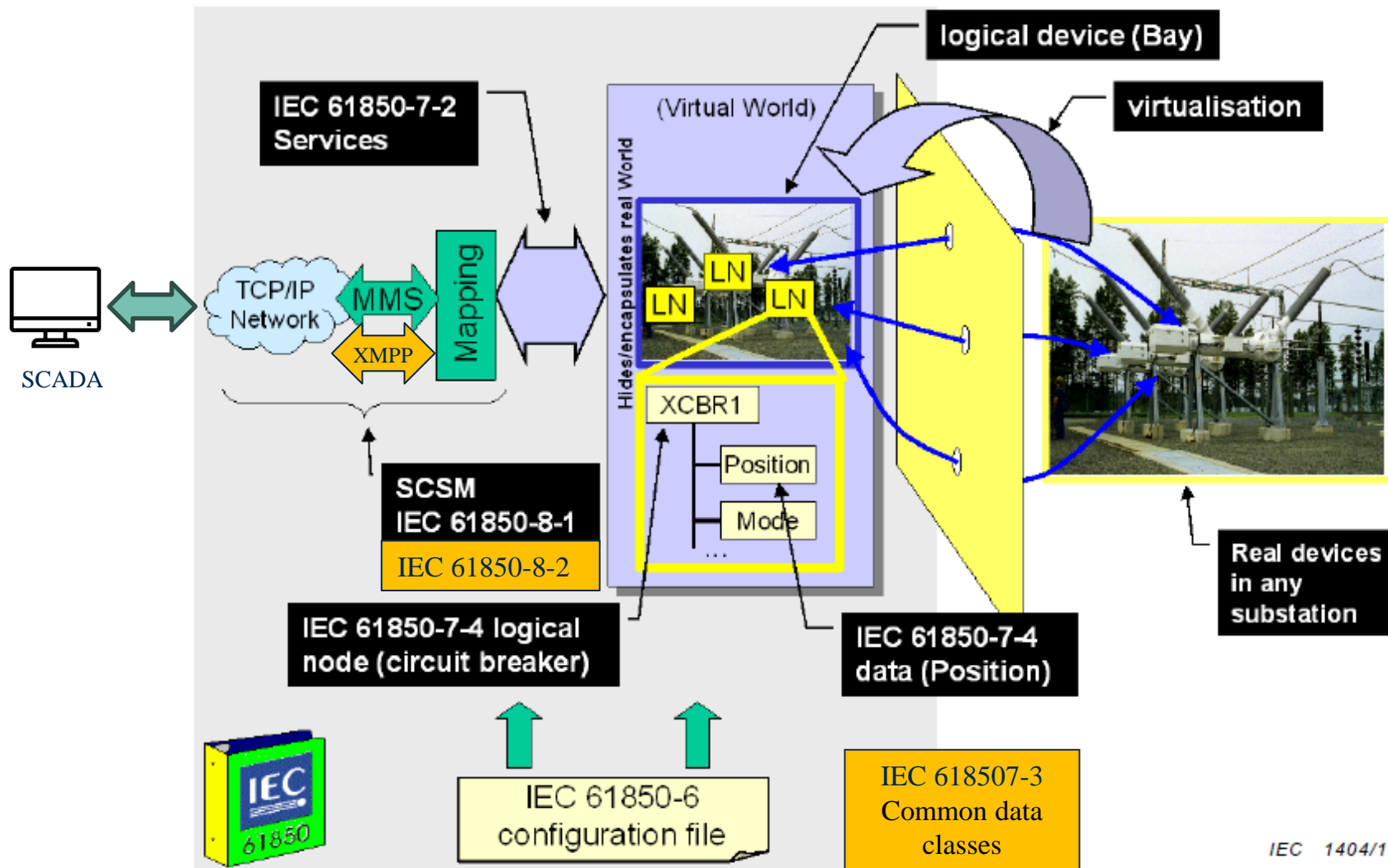


變電站裝置遠端控制



若變電站未統一通訊協定，要控制不同廠牌的斷路器，會因為各廠牌命名名稱的不同及控制命令的不同，造成互通性的問題

IEC 61850 資料模型設計



IEC 61850-7-2 服務

Table A.4.1 ACSI services per conformance block for IEC 61850-8-1 Client systems

Conformance Block	Mandatory	Conditional			
1: Basic Exchange	Associate Abort and/or Release	GetAllDataValues SetDataValues GetServerDirectory GetLogicalDeviceDirectory(LD) GetLogicalNodeDirectory(DATA) GetDataDirectory GetDataDefinition GetDataValues	9: GOOSE Control Block		GetLogicalNodeDirectory(GOCB) GetGoCBValues SetGoCBValues
2: Data Set		GetDataSetValues SetDataSetValues GetLogicalNodeDirectory(DATA-SET) GetDataSetDirectory	12a: Direct Control	Operate	TimeActivatedOperate
2+: Data Set Definition	CreateDataSet DeleteDataSet		12b: SBO Control	Select, Operate	Cancel, TimeActivatedOperate
3: Substitution	SetDataValues	GetLogicalNodeDirectory(SGCB)	12c: Enhanced Direct Control	Operate Receive CommandTermination	TimeActivatedOperate
4: Setting Group Selection	SelectActiveSG	GetSGCBValues	12d: Enhanced SBO Control	SelectWithValue, Operate Receive CommandTermination	Cancel, TimeActivatedOperate
4+: Setting Group Definition	SelectEditSG, SetEditSGValue ConfirmEditSGValues	GetEditSGValue	13: Time Sync	TimeSynchronization	
5: Unbuffered Reporting	Receive Report GetURCBValues SetURCBValues	GetLogicalNodeDirectory(URCB)	14: File Transfer	GetServerDirectory(FILE) GetFile	GetFileAttributeValues SetFile DeleteFile
6: Buffered Reporting	Receive Report GetBRCBValues SetBRCBValues	GetLogicalNodeDirectory(BRCB)	15: Service Tracking	Receive Report	
7: Logging	GetLCBValues QueryLogByTime and/or QueryLogAfter GetLogStatusValues	GetLogicalNodeDirectory(LCB) GetLogicalNodeDirectory (LOG) SetLCBValues			

IEC 61850 測試待測物

➤ IEC 61850-10 (符合性)

✓ Server

- 智慧型電子裝置(Intelligent Electronic Device, IED)
間隔層控制器(Bay Controller)、保護電驛(Relay Protection)、
斷路器(Circuit Breaker)、遠端資訊末端設備(RTU)、
量計(meter)、開道器(Gateway)

✓ Client

- 資料收集與監控系統(SCADA)
- 人機介面(Human Machine Interface, HMI)
- 開道器(Gateway)、遠端資訊末端設備(RTU)

✓ GOOSE Performance

✓ Sample Values

- 合併單元(Merging Unit, MU)

✓ SCL Tool

➤ IEC TR 61850-90-4 (網路功能)

✓ 乙太網路交換機(Ethernet Switch)

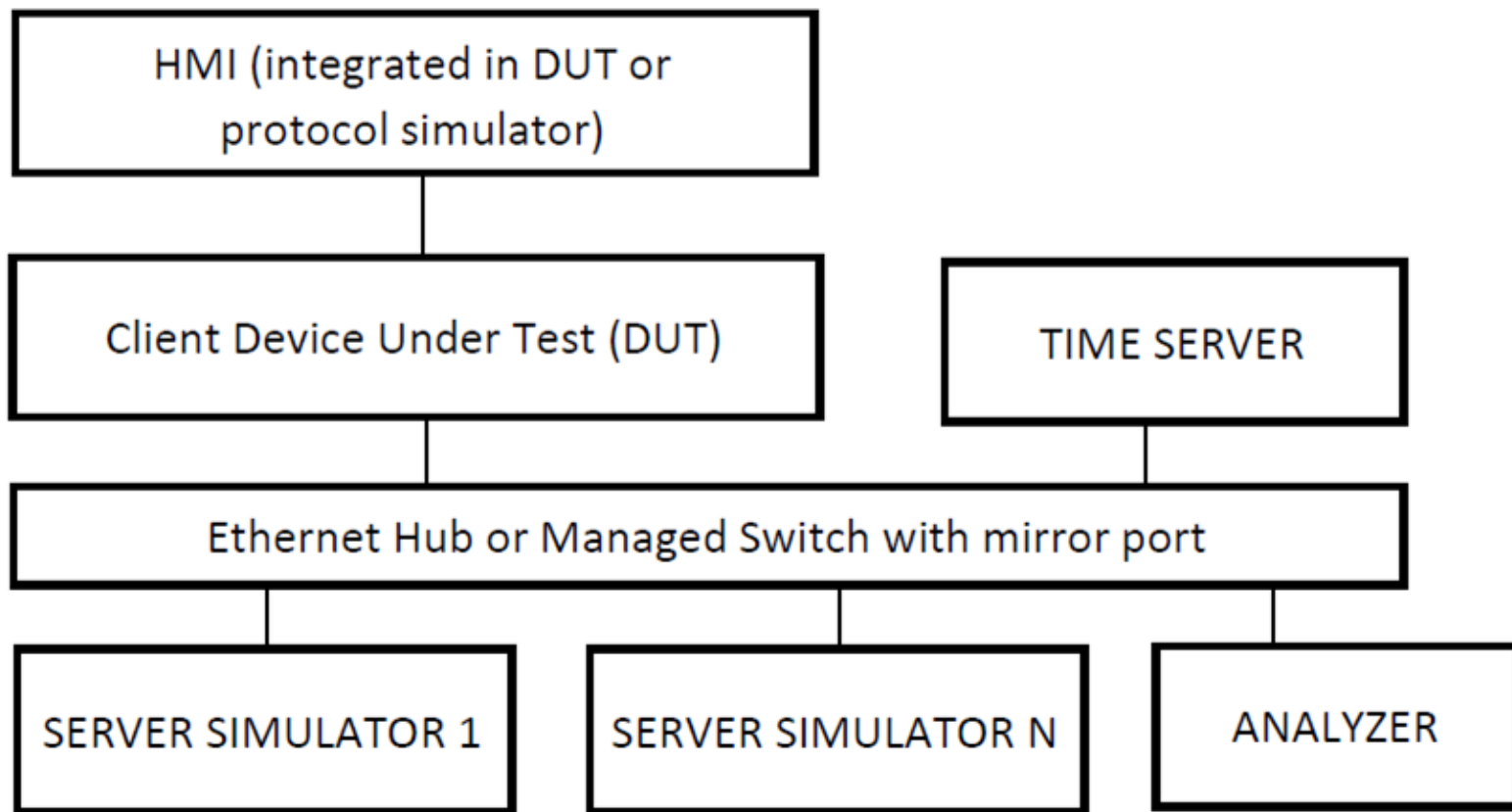
➤ IEC 61850-3 (環境品質、EMC/EMI)

✓ 乙太網路交換機(Ethernet Switch)



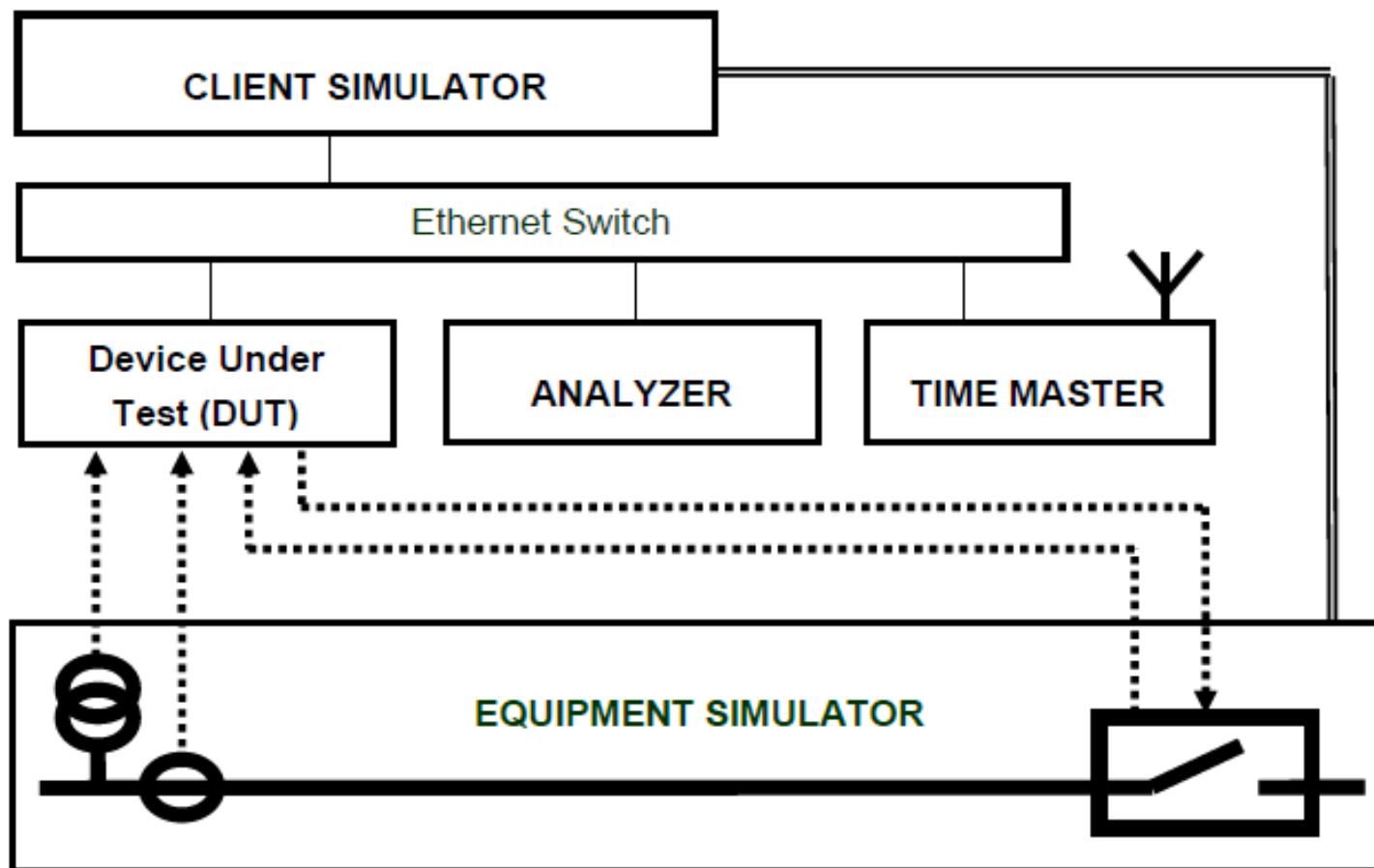
IEC 61850 Client端測試環境

資料收集與監控系統(SCADA)、人機介面(Human Machine Interface, HMI)、
閘道器(Gateway)、遠端資訊末端設備(RTU)



IEC 61850 Server端測試環境

間隔控制器(Bay Controller)、繼電器保護裝置(Relay Protection)、斷路器(Circuit Breaker)、遠端資訊末端設備(RTU)、量計(meter)、開道器(Gateway)



IEC 61850 符合性測試前準備

■ 如何開始符合性測試?

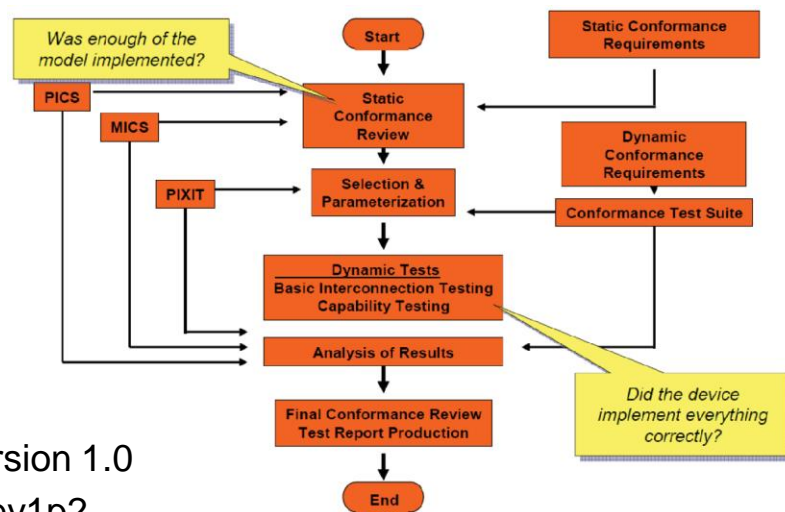
➤ 準備文件

- PICS(Protocol Implementation Conformance Statement)
- MICS(Model Implementation Conformance Statement)
- PIXIT(Protocol Implementation eXtra Information for Testing)
- TICS(TISSUES Implementation Conformance Statement)
- ICD File

➤ 文件審查與測試計畫

- 文件審查
- 檢查SCL語法
- 挑選測試項目，制定測試計畫

➤ 執行測試



UCATestProceduresClient61850-8-1_Ed2Amd1_Version 1.0

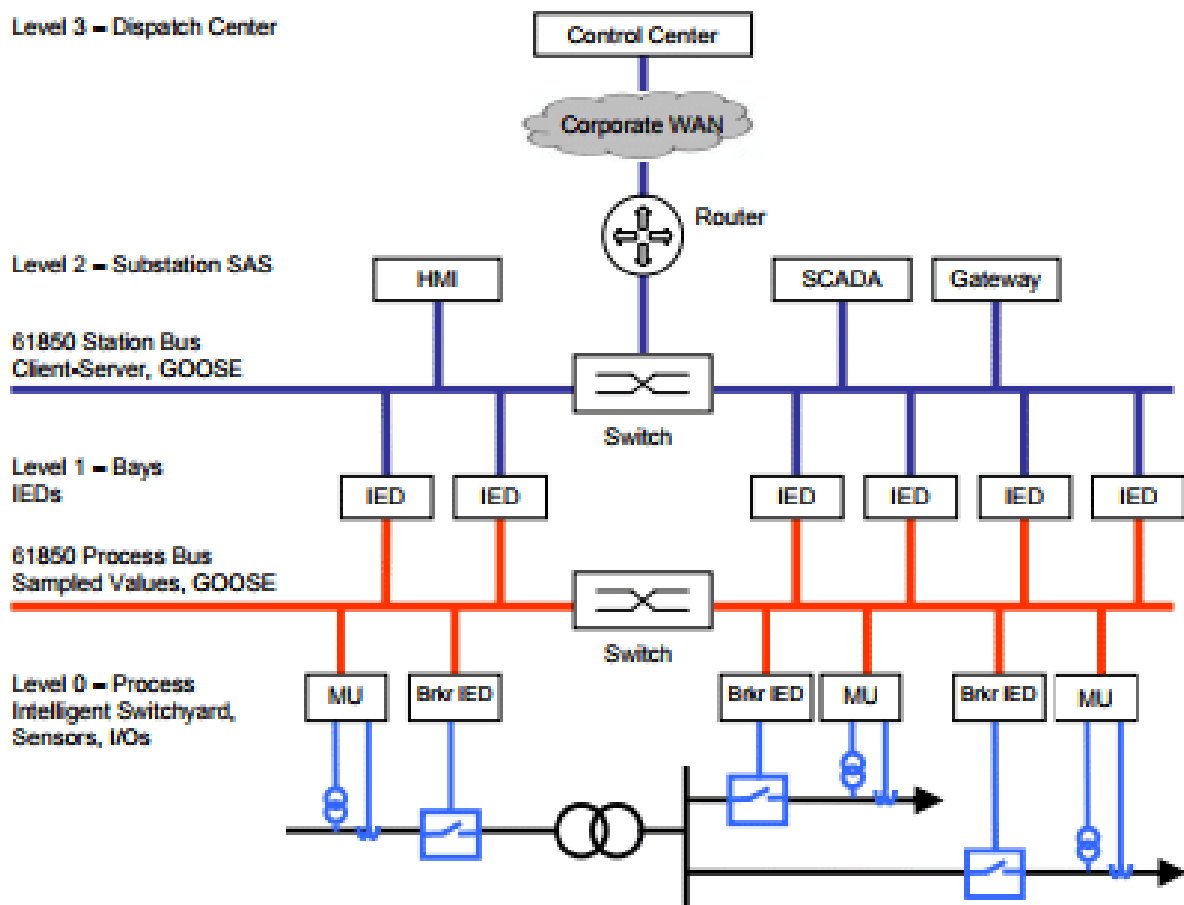
UCATestProceduresServer61850-8-1_Ed2Amd1_Rev1p2

IEC 61850 Level A 認可實驗室

UCAIug 認可實驗室

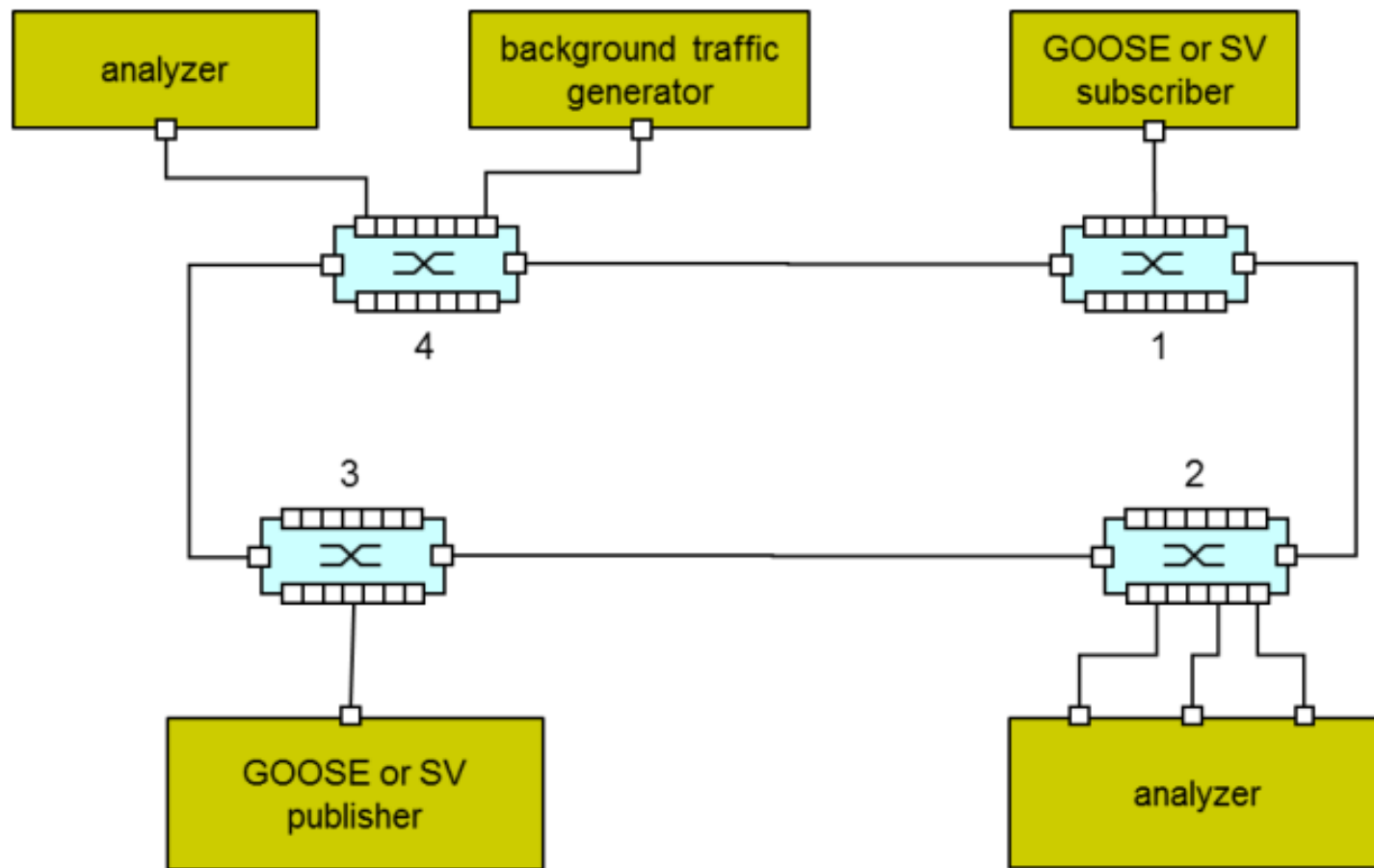
Tester	Level	Ed2.0 Server	Ed2.1 Server	Ed2.0 Client	Ed2.1 Client	Ed2.1 SCL Tool
AMA-CERT-Lab GmbH	A	Y				
Central Power Research Institute India	A	Y	Y			
DNV Netherlands (formerly KEMA, DNV-KEMA)	A	Y	Y	Y	Y	Y
Taiwan Testing and Certification Center (formerly Electronics Testing Center, Taiwan)	A	Y		Y		
Korea Electrotechnology Research Institute	A	Y		Y		
Xuchang KETOP Testing Research Institute Co., Ltd	A	Y				
Korea Testing Laboratory	A	Y	Y	Y	Y	
State Grid Electric Power Research Institute	A	Y				
Tecnia	A	Y				
TÜV SÜD China Ltd	A	Y	Y	Y		
UL, Korea, Ltd	A	Y				
Electrical Research & Development Association	A	Y				
CESI S.p.A. – KEMA Labs	A	Y	Y			

智慧變電站架構



資料來源：https://www.researchgate.net/figure/Architecture-of-IEC-61850-Substation-Automation-System-with-Station-Bus-and-Process-Bus_fig3_325069210

IEC 61850-90-4 測試環境



IEC 61850-90-4 測試項目

- VLAN handling test
- Multicast handling test
- Priority tagging test
- RSTP recovery test
- PRP test
- HSR test
- IEC/IEEE 61850-9-3 (PTP) test
- PTP TC test
- PTP BC test

END

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