
Norma IEC 61850

– Pregled glavnih značajki i budući razvoj (II. dio)

Predavač:

Stjepan Sučić, mag.ing.el. Končar–KET

1

• Podatkovni modeli

2

• Modeliranje funkcija

3

• SCL proširenja

4

• Komunikacijska proširenja

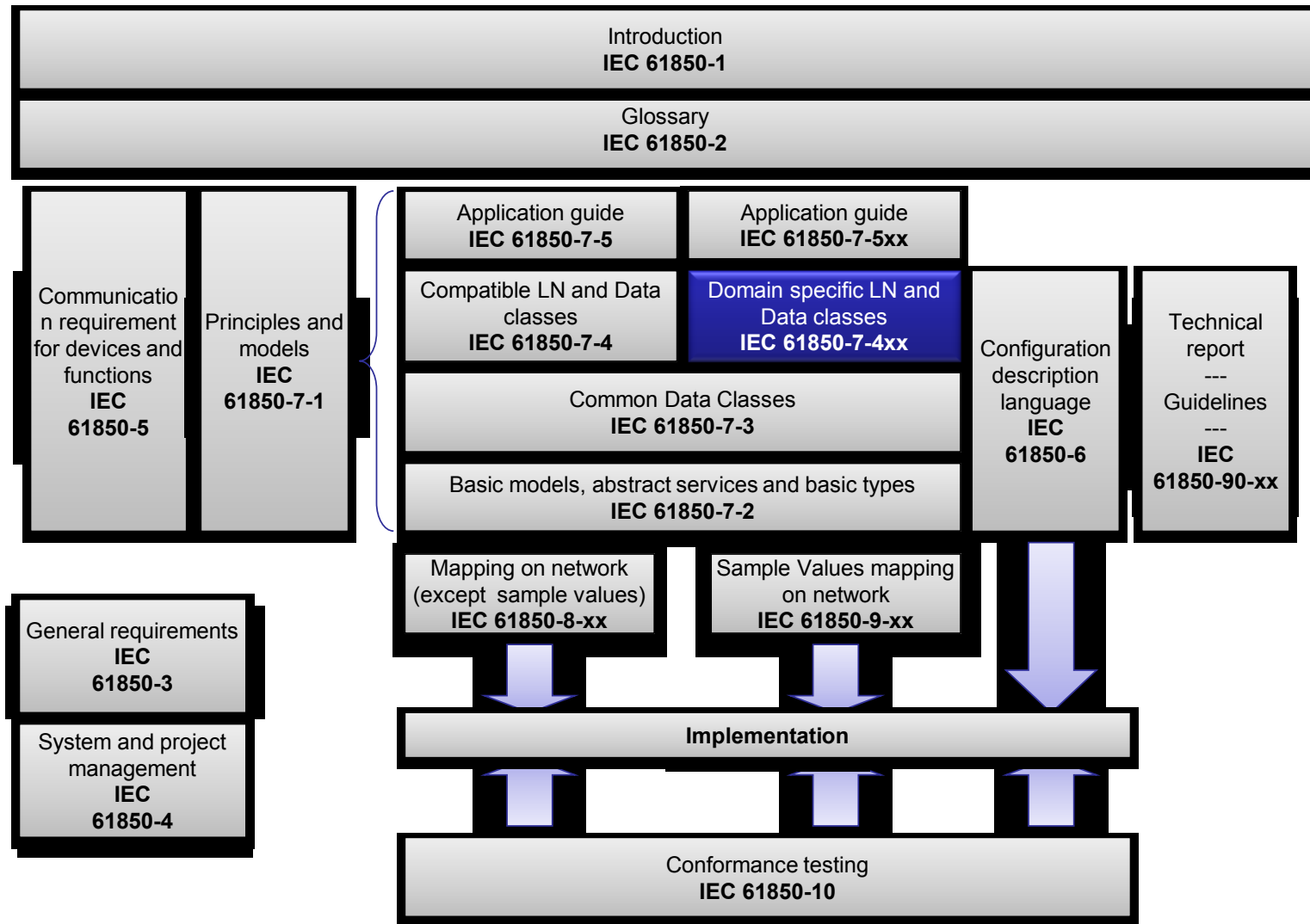
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• Tehnički izvještaji

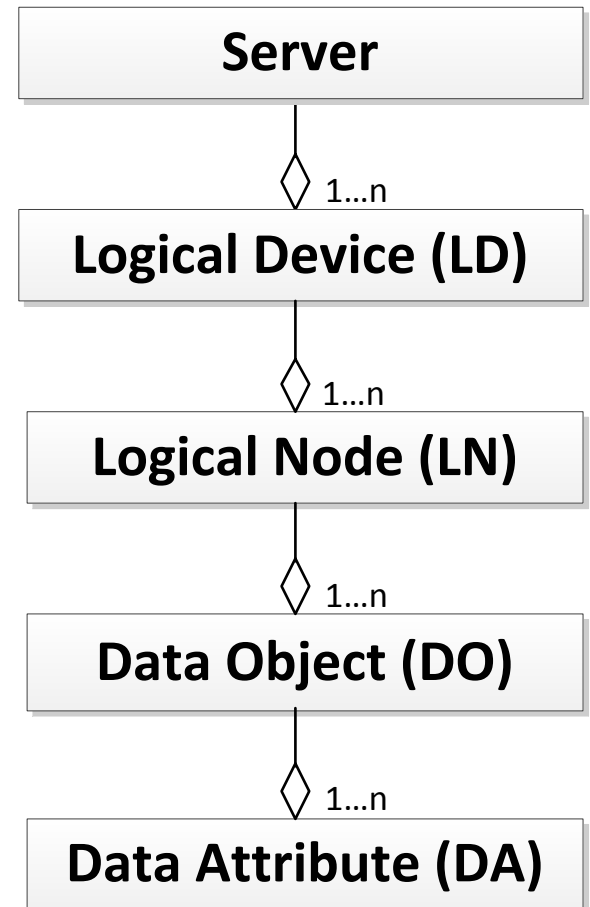
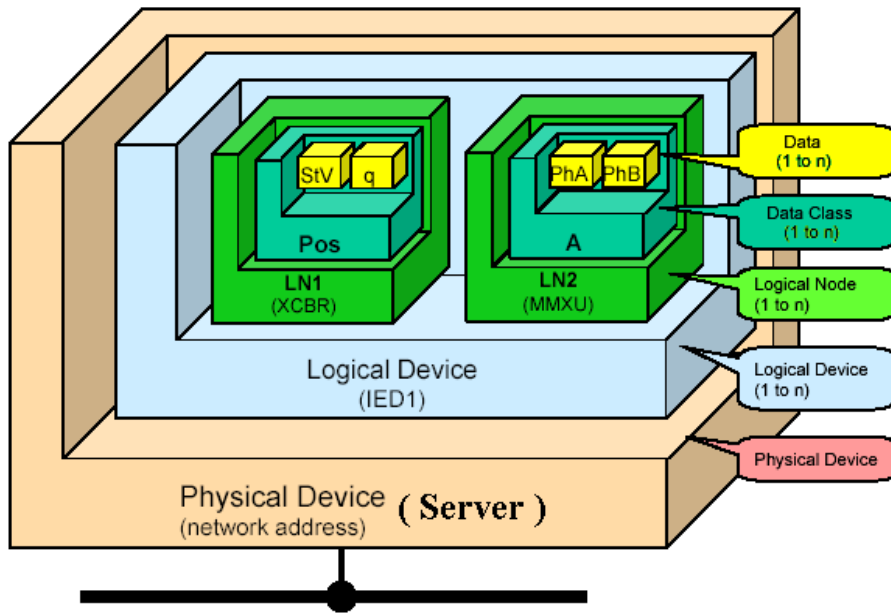
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• Referentni model

IEC 61850-7-4XX – Podatkovni modeli

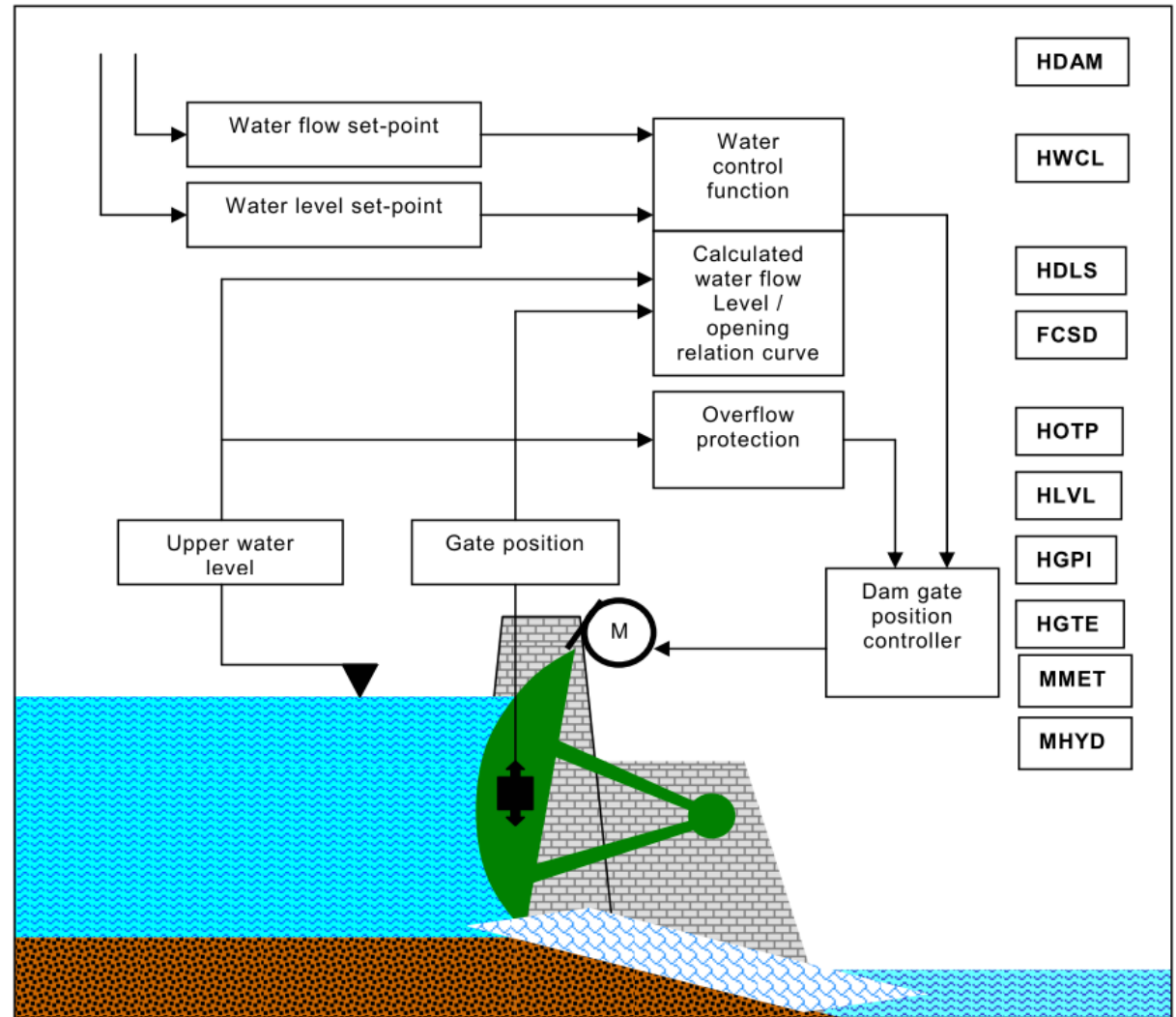


IEC 61850-7-4XX – Podatkovni modeli



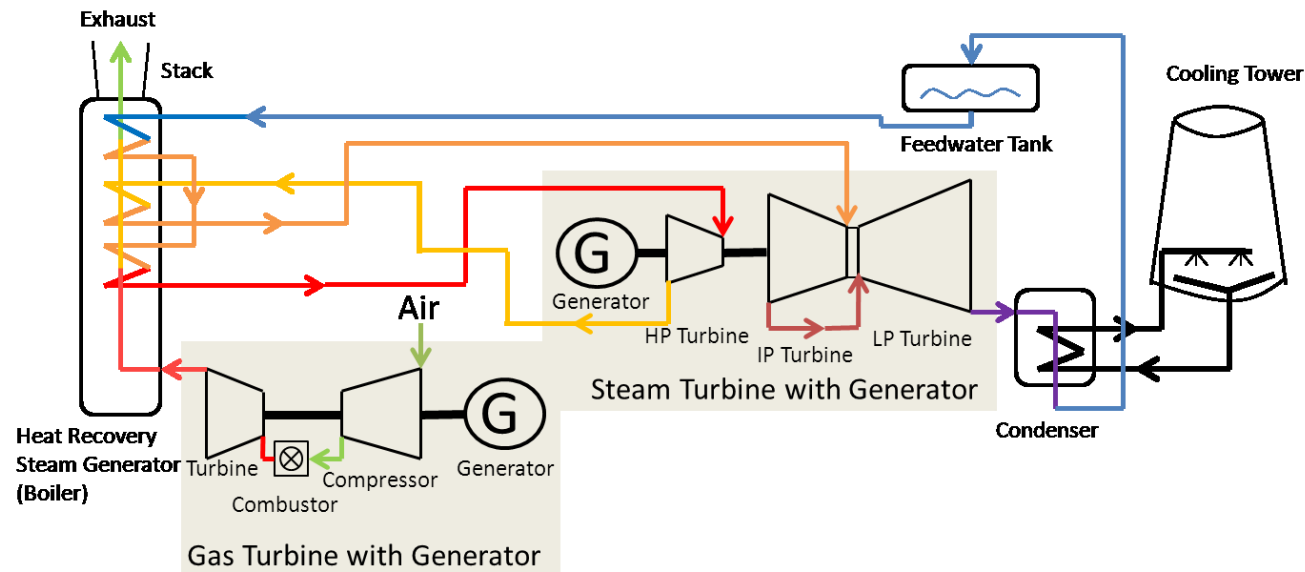
IEC 61850-7-410 – Hidroelektrane (Modeli)

- TC57 WG18
- Modeli podatka
- H(XXX) LN
- Ne postoje implementacije
- Ed2.0 (draft)



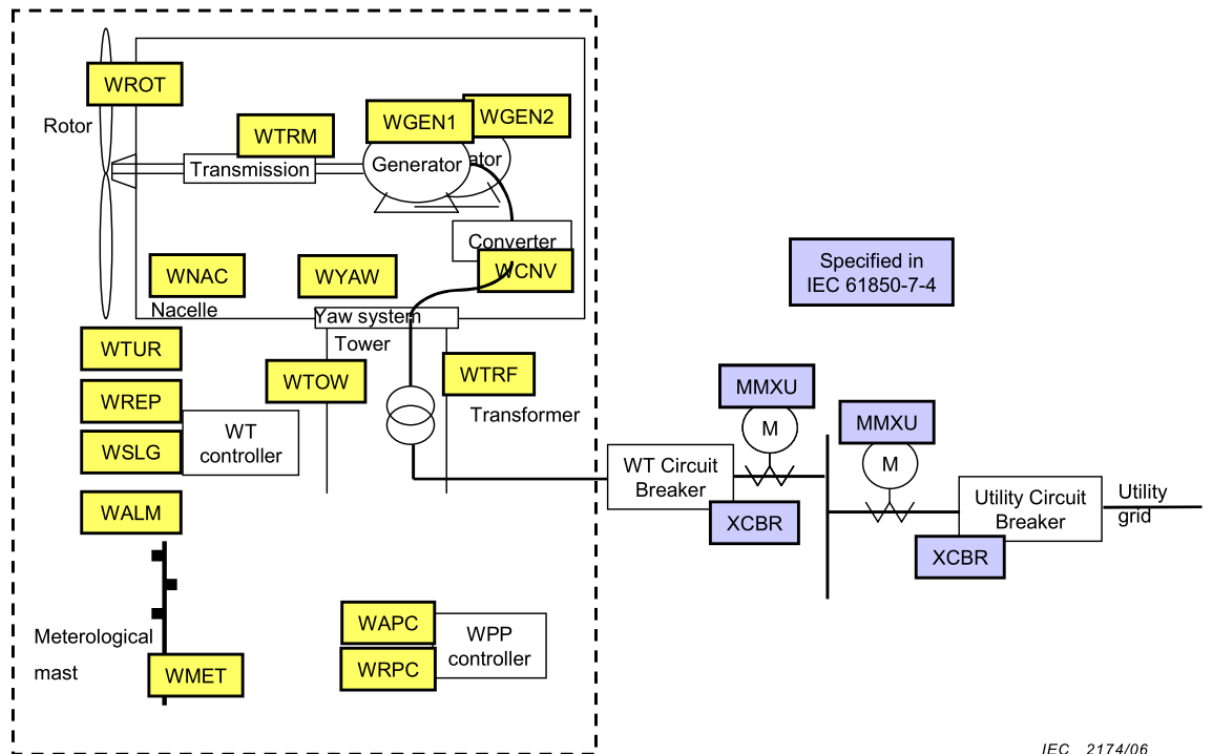
IEC 61850-7-430 – Termoelektrane (Modeli)

- TC57 WG18
- Modeli podatka
- E(XXX) LN
- Ne postoje implementacije
- Ed.1 (draft)



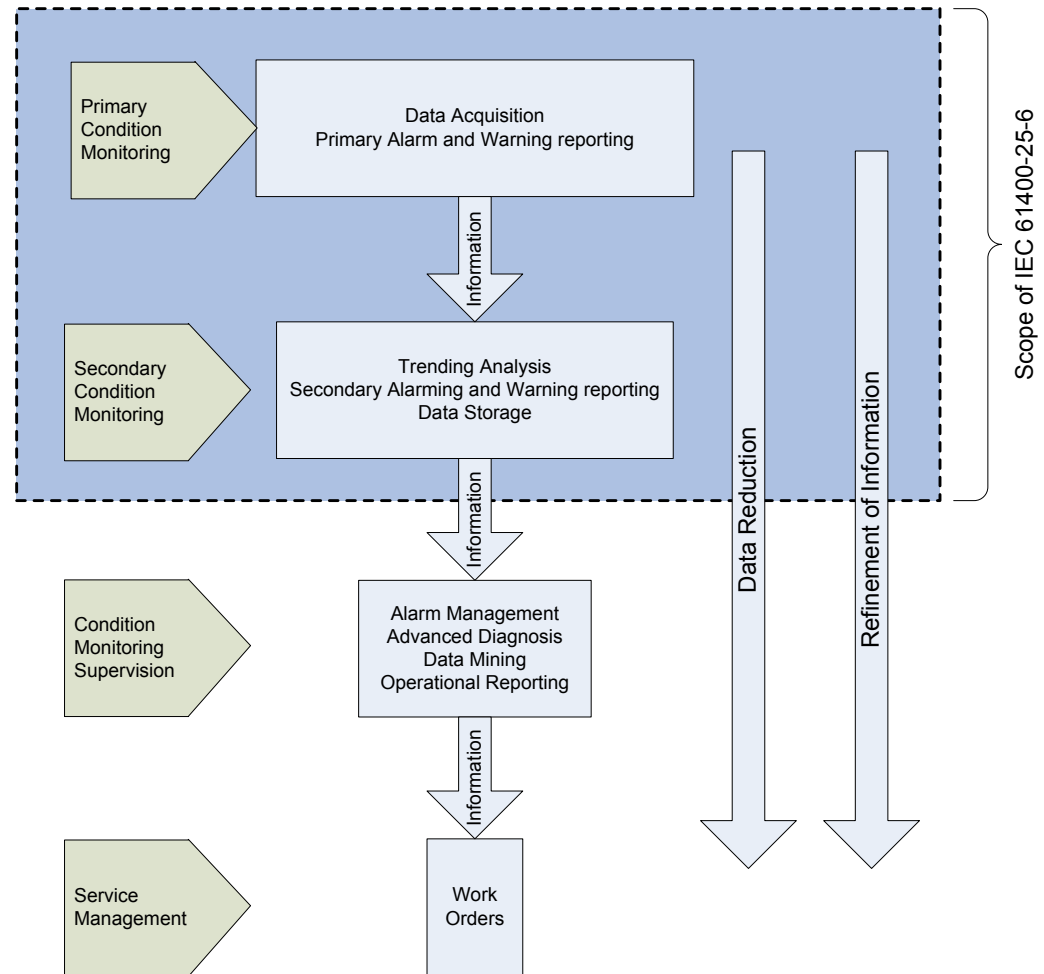
IEC 61400-25 – Vjetroelektrane

- TC88 JWG25
- Sukladno sa IEC 61850
- Višestruka ACSI mapiranja
- Dodatni servisi
- Bez SCL-a
- Ed.2 (draft)



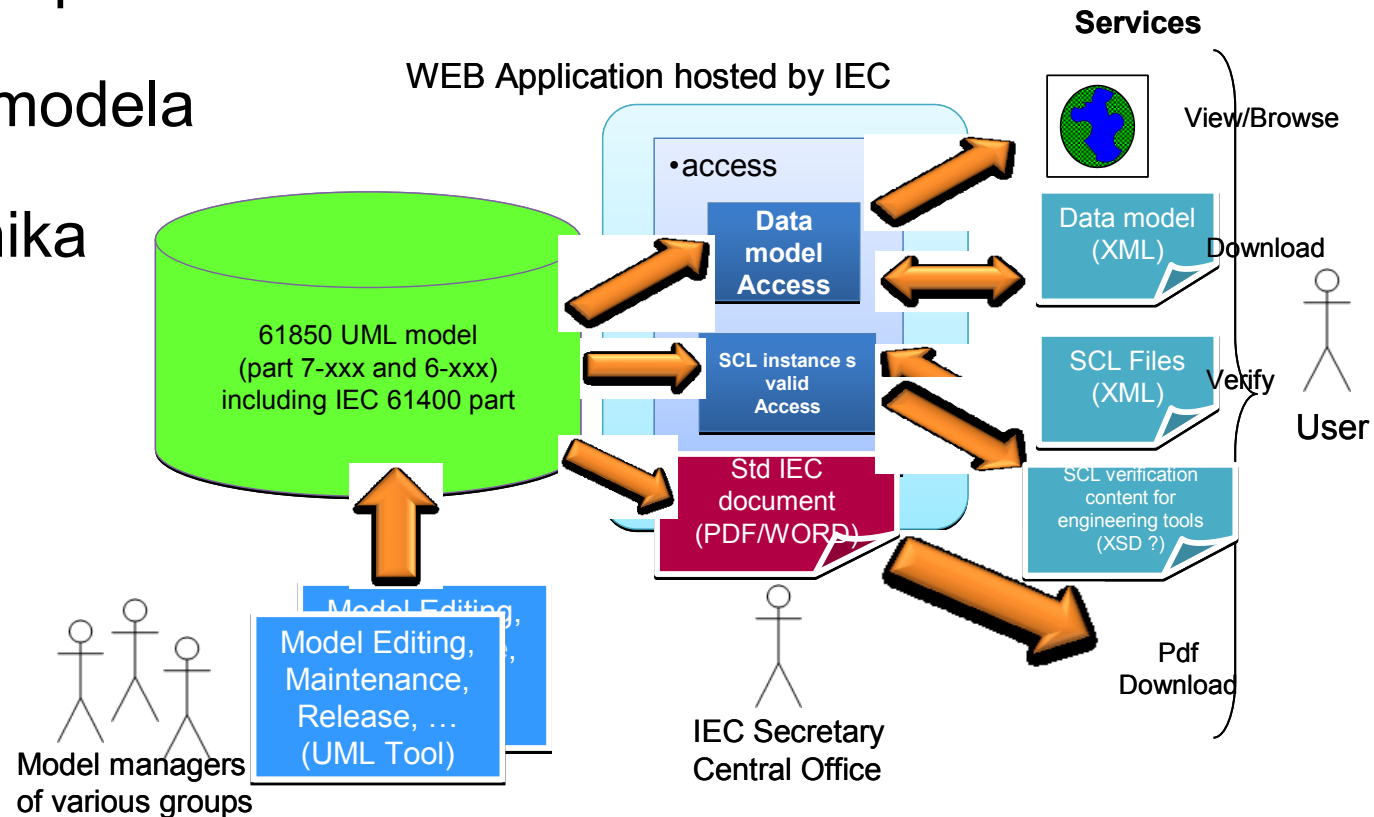
IEC 61400-25-6 – Vjetroelektrane (nadzor stanja)

- IEC 61850 proširenja
- Analiza
- Statističke funkcije
- Otkrivanje kvarova
- Ed.1

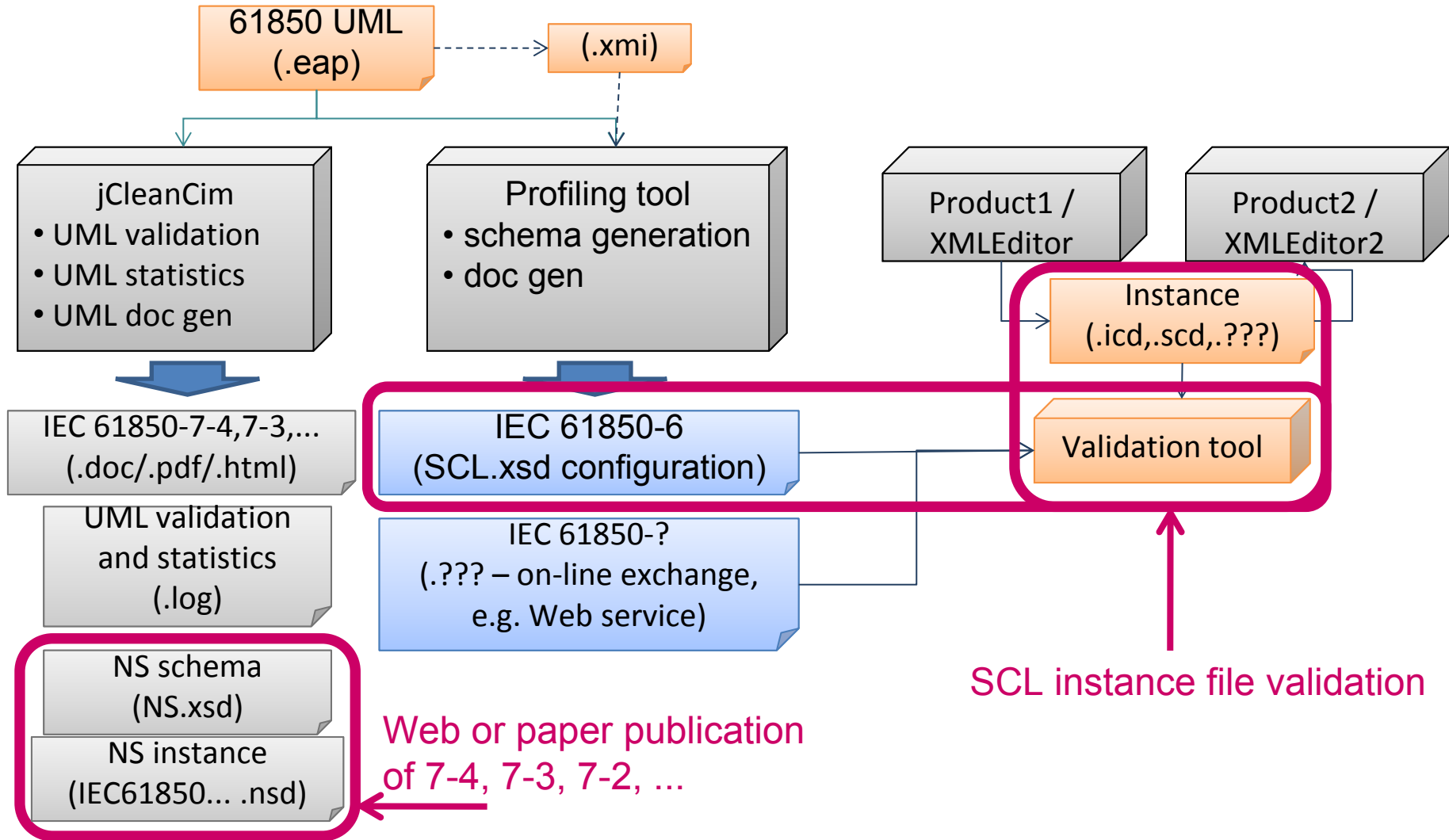


IEC 61850-7-10 – Web pristup UML modelu

- Razvoj UML modela
- Daljinski pristup
- Održavanje modela
- Grupe korisnika
- Ed.1 (draft)



IEC 61850-7-10 – Web pristup UML modelu



Sadržaj

1

- Podatkovni modeli

2

- **Modeliranje funkcija**

3

- SCL proširenja

4

- Komunikacijska proširenja

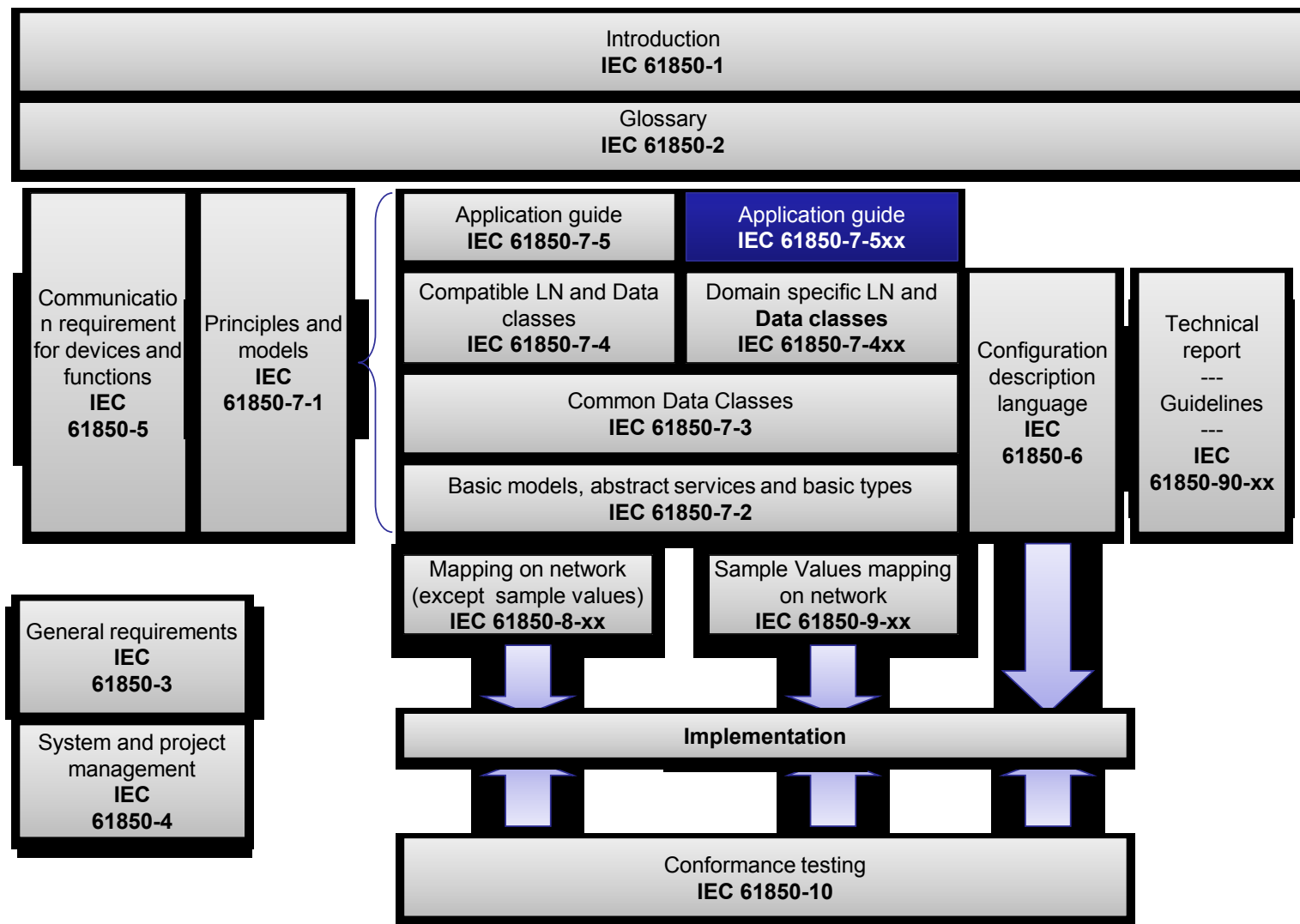
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- Tehnički izvještaji

6

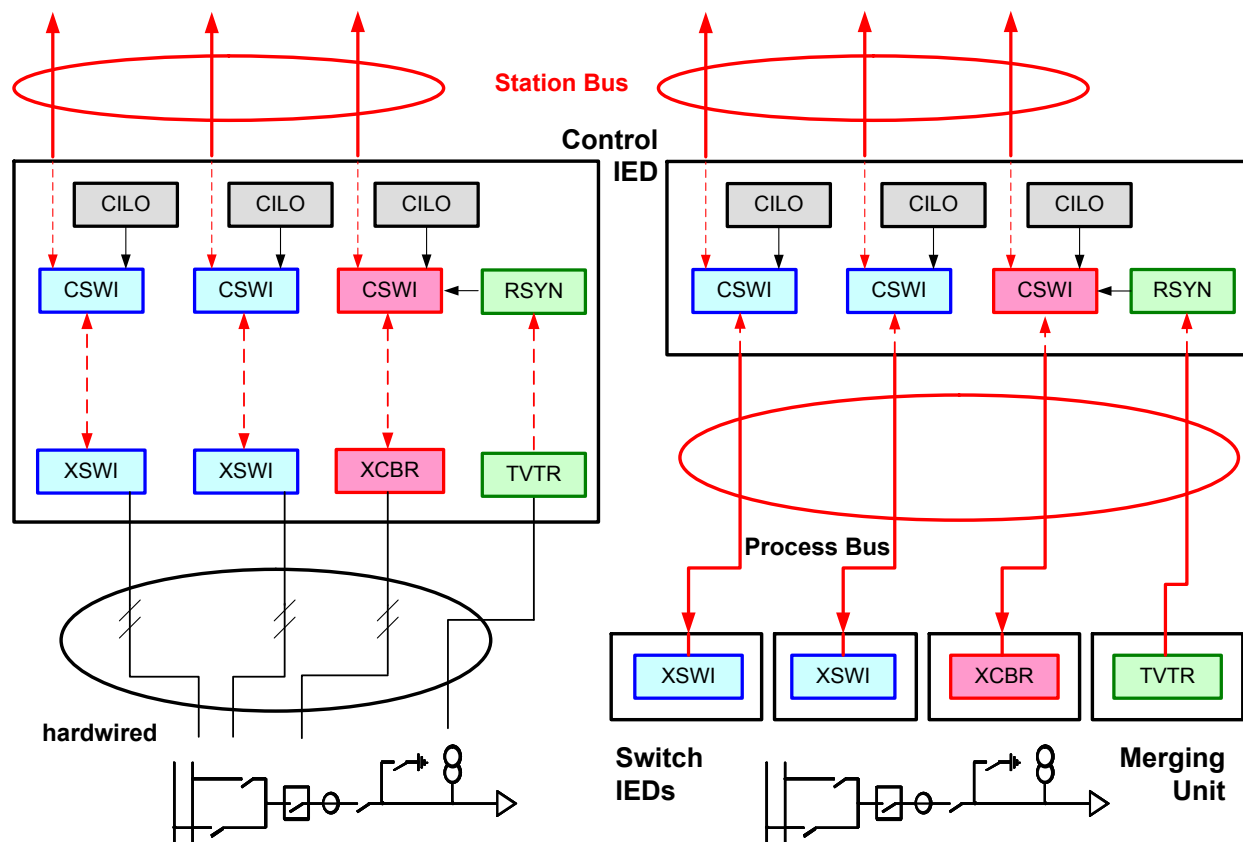
- Referentni model

IEC 61850-7-5XX – Modeliranje funkcija



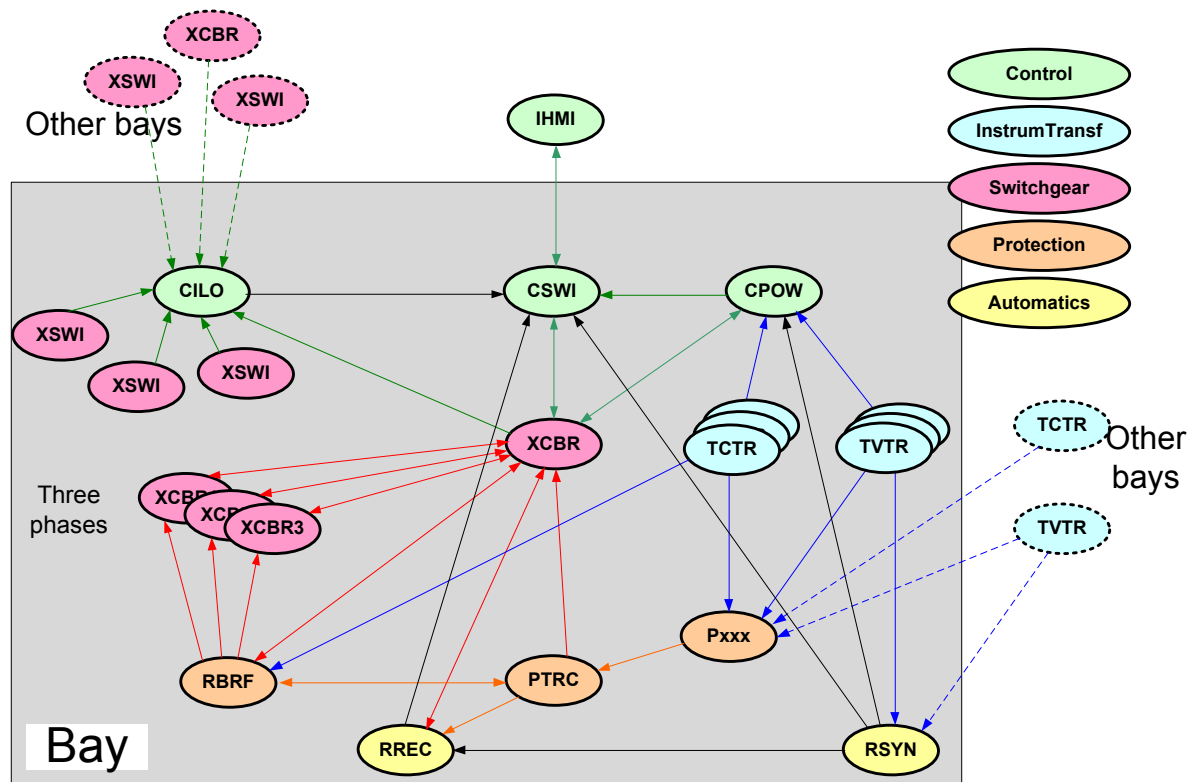
IEC 61850-7-5 – Načela modeliranja funkcija

- TC57 WG10
- Arhitektura
- Funkcije
- Sučelja
- Nadležnosti upravljanja
- Komunikacije
- Ed1.0 (draft)



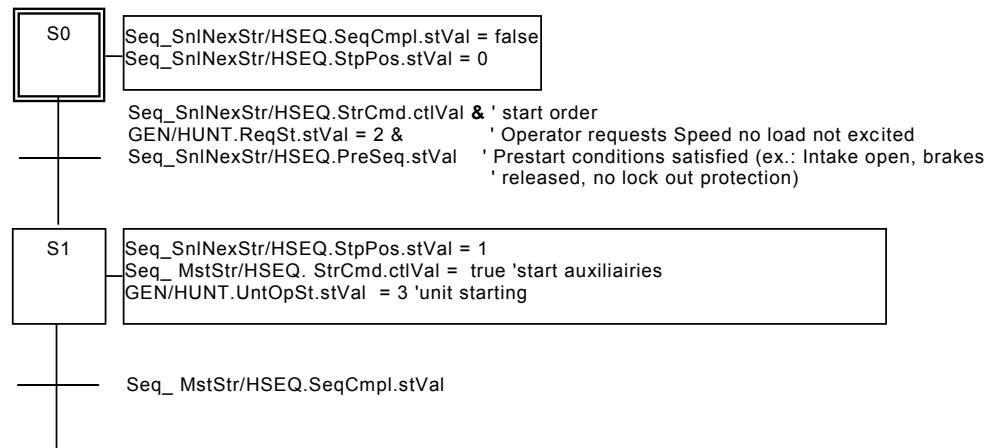
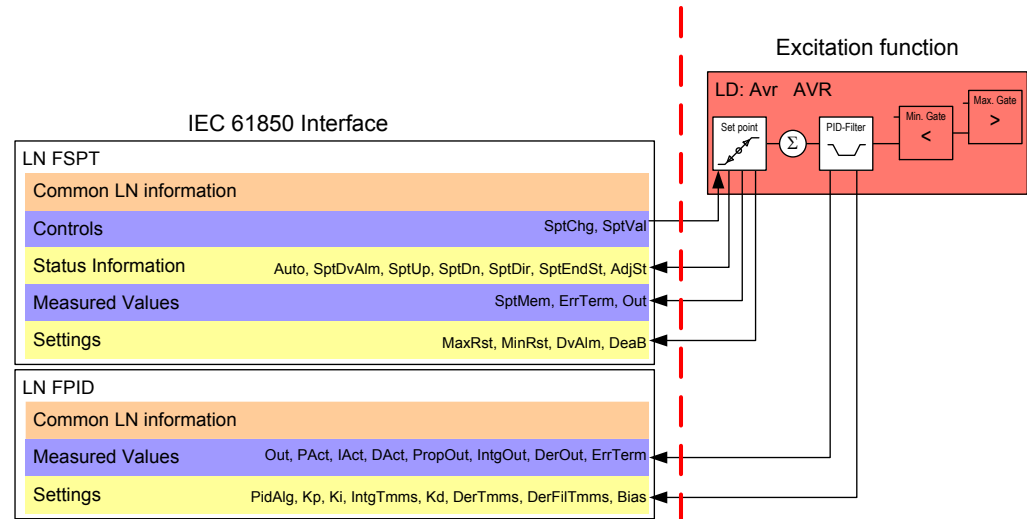
IEC 61850-7-500 – Trafostanice (Funkcije)

- TC57 WG10
- Upravljanje
- Mjerna oprema
- Sklopni aparati
- Zaštitne funkcije
- LN-dekompozicija
- LN - povezivanje
- Ed1.0 (draft)



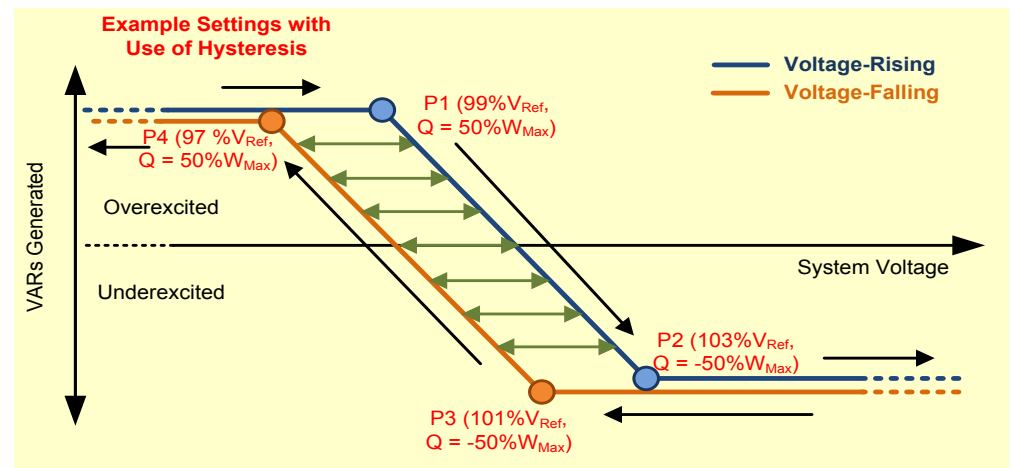
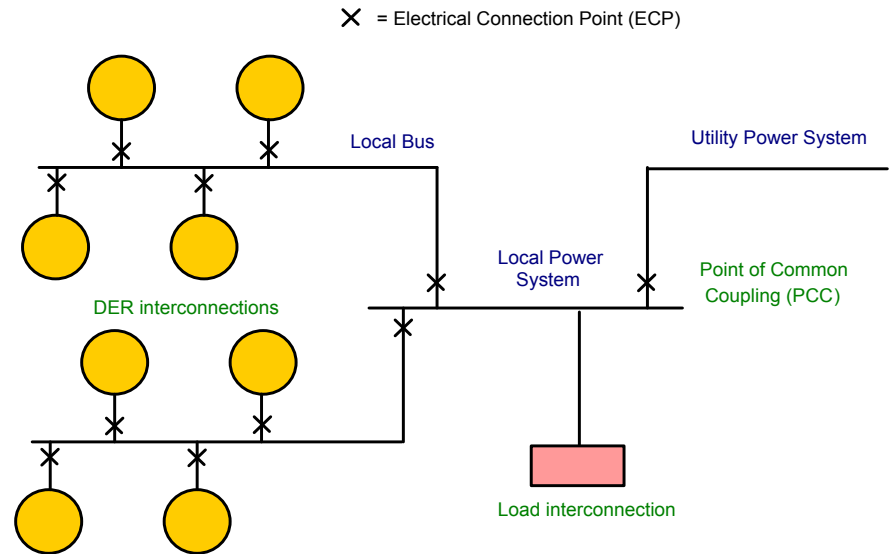
IEC 61850-7-510 – Hidroelektrane (Funkcije)

- TC57 WG18
- Modeli funkcija
- LN - povezivanje
- DA - slijed pozivanja
- Ed1.0
- Ne postoje implementacije



IEC 61850-7-520 – Distribuirani izvori (Funkcije)

- TC57 WG17
- Upravljanje DIE
- Različite arhitekture
 - Mikromreže
 - Virtualne elektrane
 - Baterijski sustavi
- Modeli funkcija
- Ed.1 (draft)



Sadržaj

1

- Podatkovni modeli

2

- Modeliranje funkcija

3

- **SCL proširenja**

4

- Komunikacijska proširenja

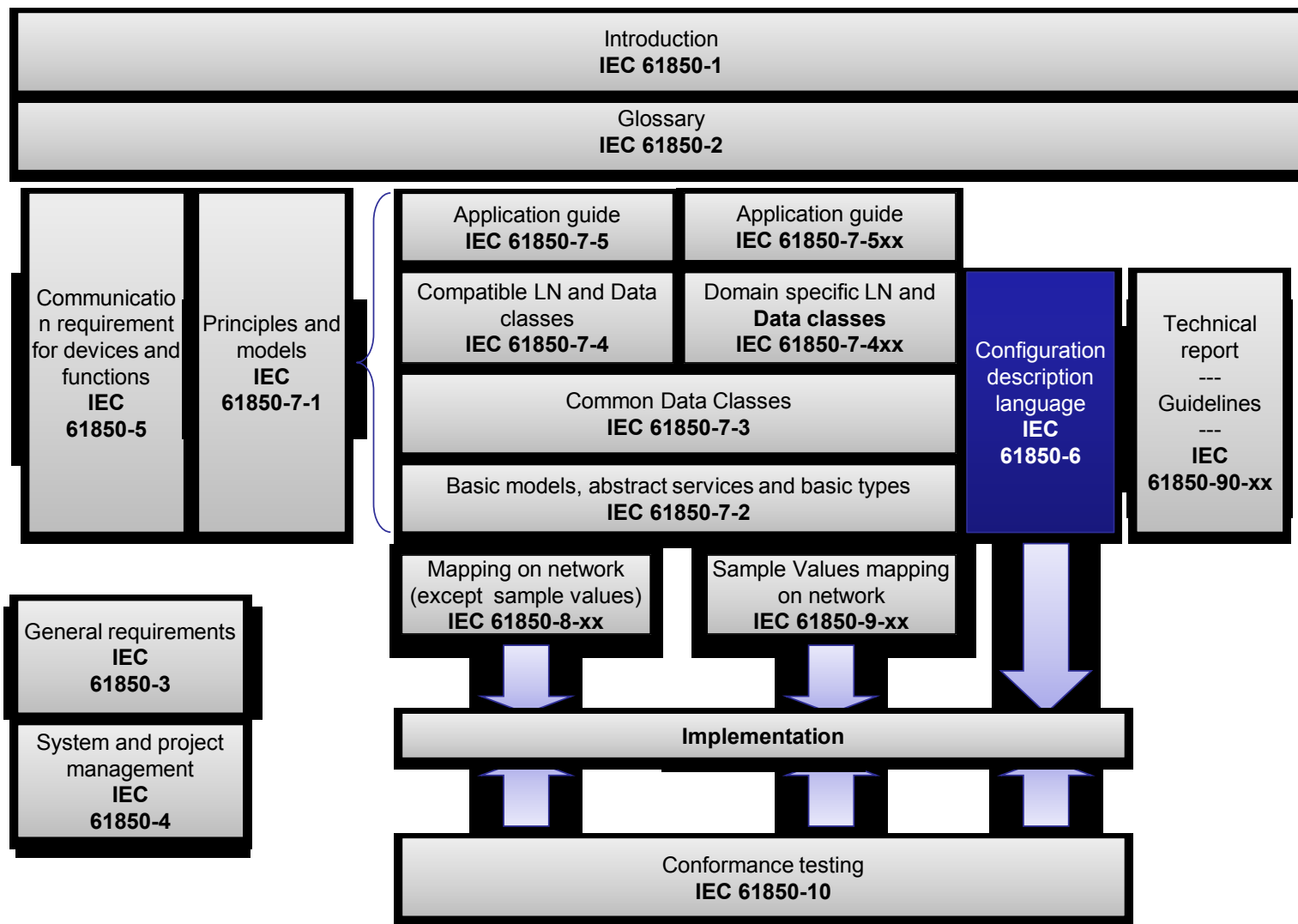
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- Tehnički izvještaji

6

- Referentni model

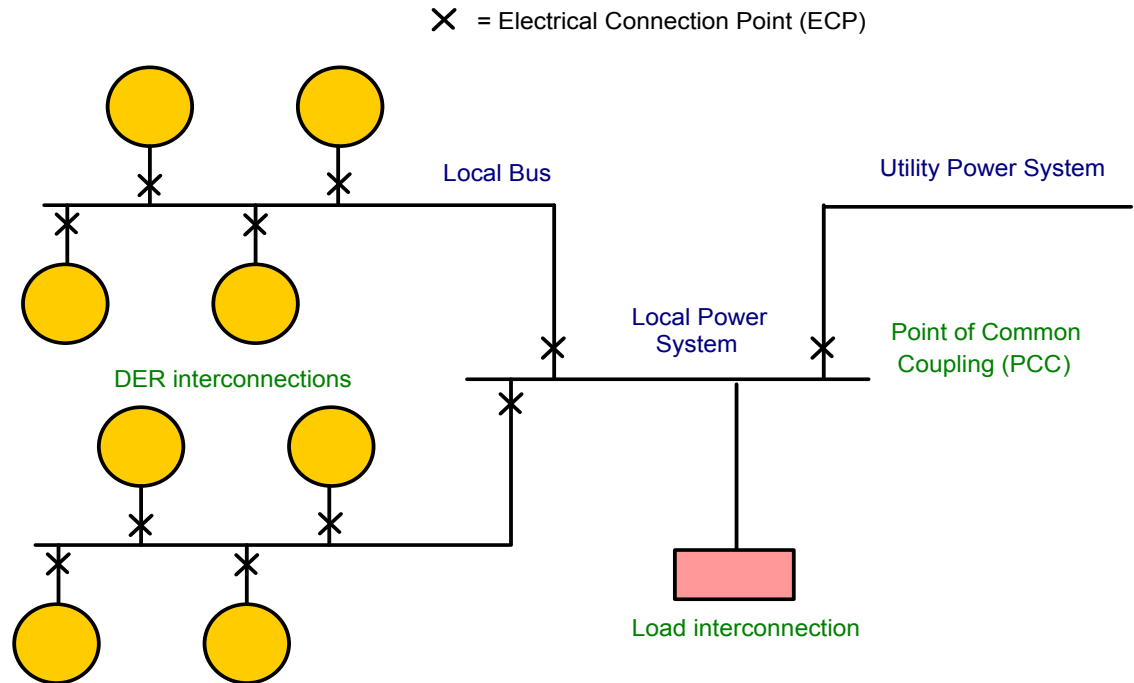
IEC 61850-6XX – SCL proširenja



- Problemi primjene IEC 61850-6
- Ograničenja
- Nove arhitekture naprednog EES-a
- Različiti modeli postrojenja
- UML usklađeni model
- Automatsko stvaranje dokumentacije
- Vođenje projekata

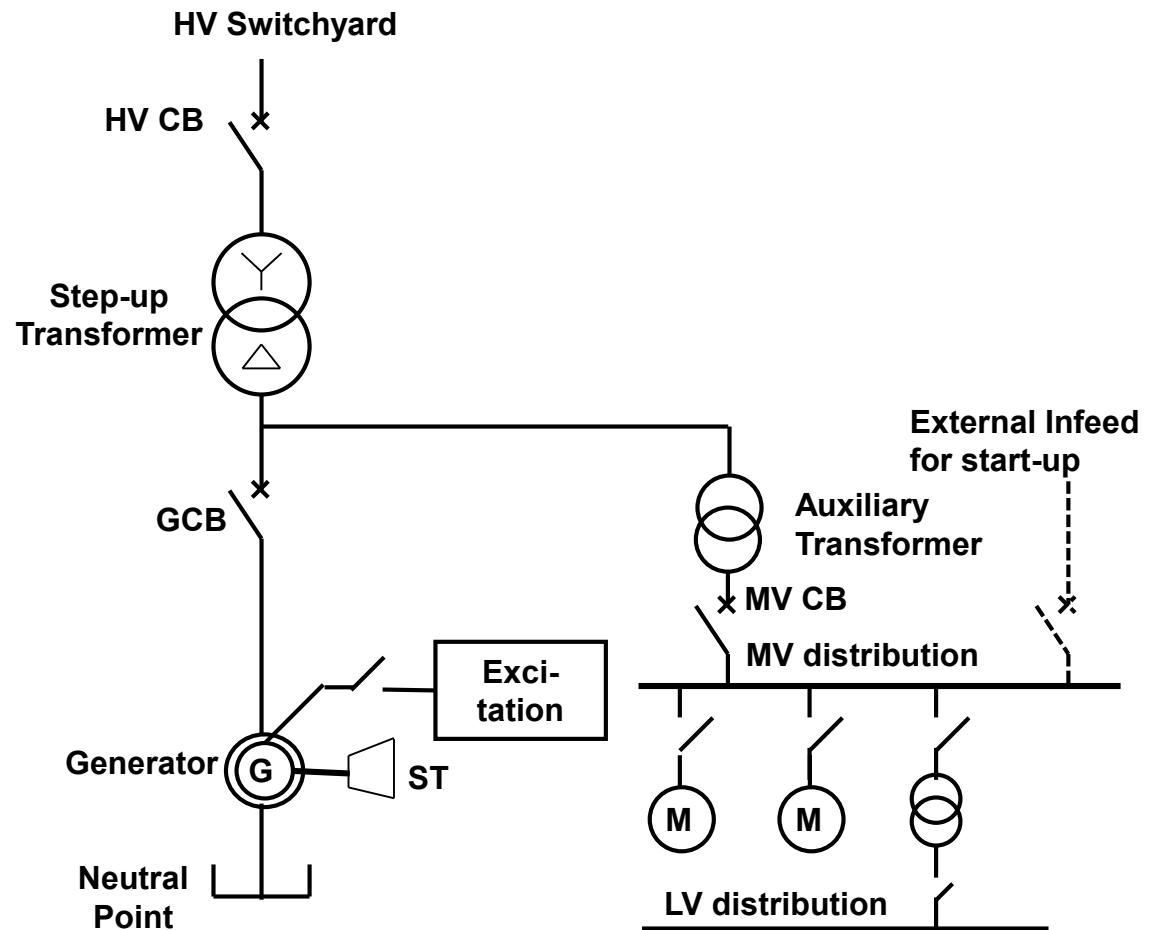
IEC 61850-620 – Distribuirani izvori (SCL)

- TC57 WG17
- SCL proširenja
- Različite arhitekture
 - Mikromreže
 - Virtualne elektrane
 - Baterijski sustavi
- Ed.1 (draft)



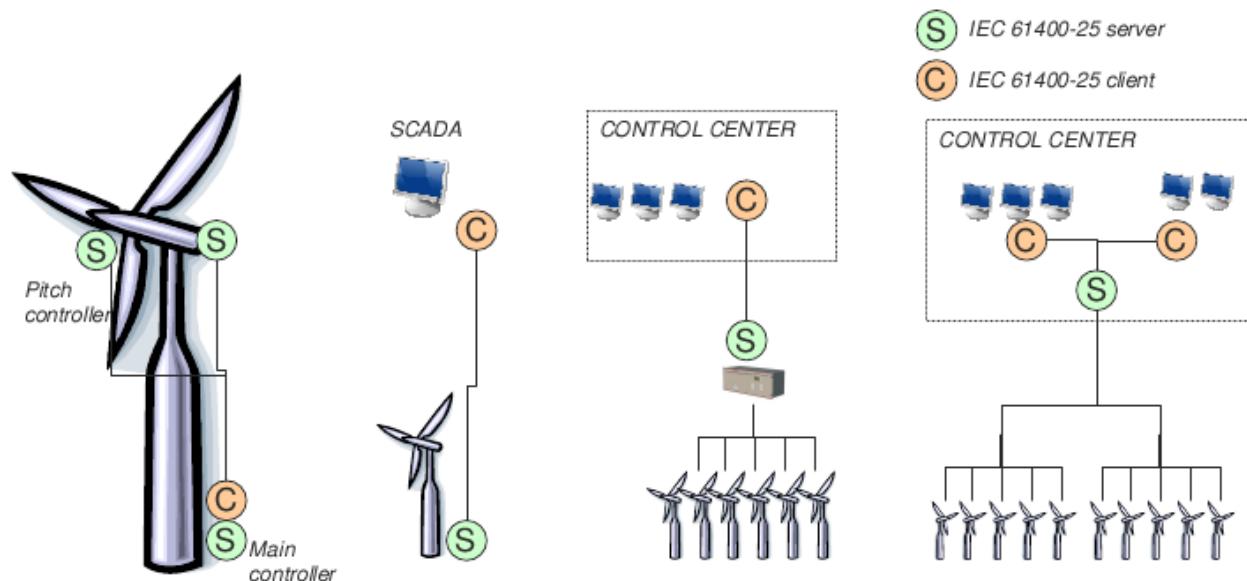
IEC 61850-630 – Termoelektrane (SCL)

- TC57 WG18
- SCL proširenja
- Različiti tipovi
- Jednopolne shem
- Ed.1 (draft)



IEC 61850-640 – Vjetroelektrane (SCL)

- TC88 JWG25
- SCL proširenja
- Turbina/vjetroelektrana/vjetropark
- Modeli vjetroelektrana
- Ed.1 (draft)



Sadržaj

1

- Podatkovni modeli

2

- Modeliranje funkcija

3

- SCL proširenja

4

- **Komunikacijska proširenja**

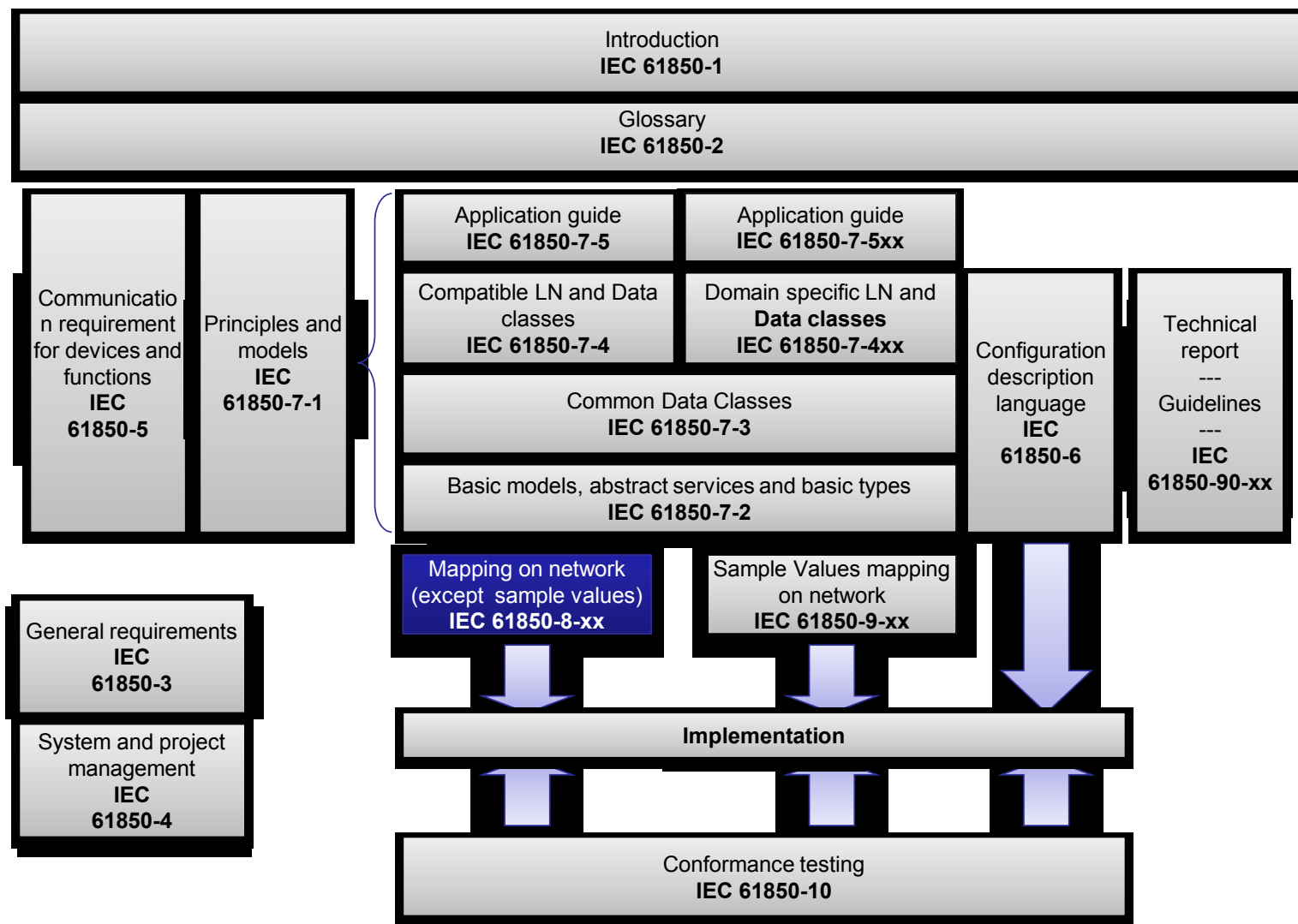
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- Tehnički izvještaji

6

- Referentni model

IEC 61850-80-X – Komunikacijska proširenja

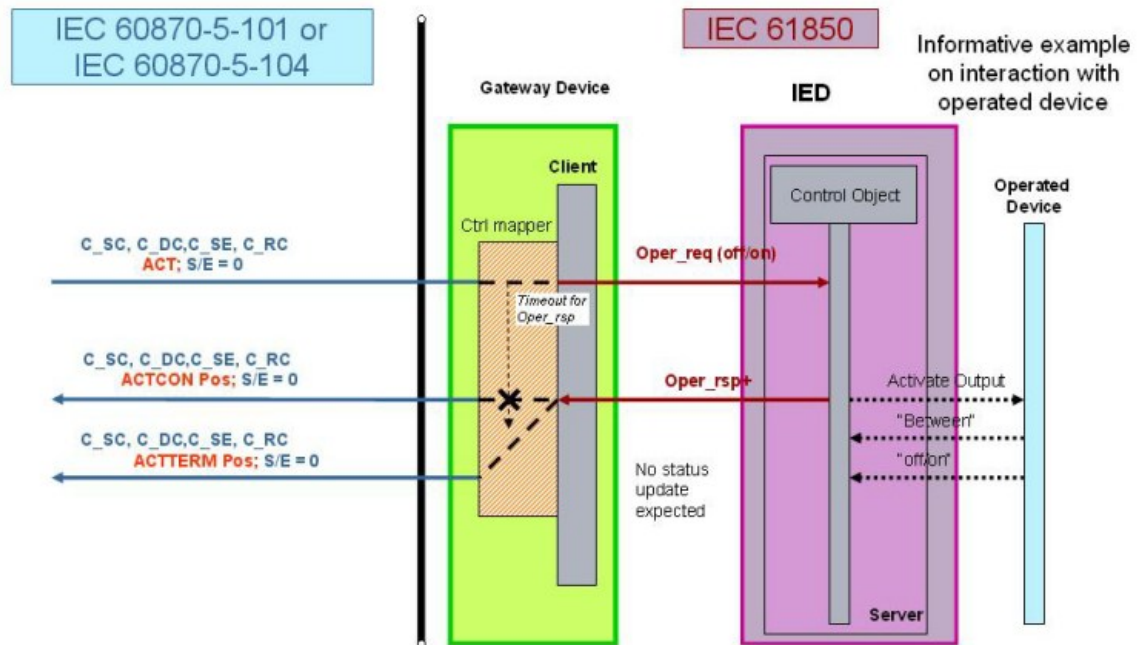


IEC 61850-80-X – Komunikacijska proširenja

- Pretvorba IEC 61850 na postojeće protokole
 - IEC 60870-5-101/103/104
 - DNP3
- Prilagodba ACSI servisa na nove tehnologije
 - Web Servisi
 - OPC UA
 - DPWS
 - ...
- Primjena na postojećim sustavima

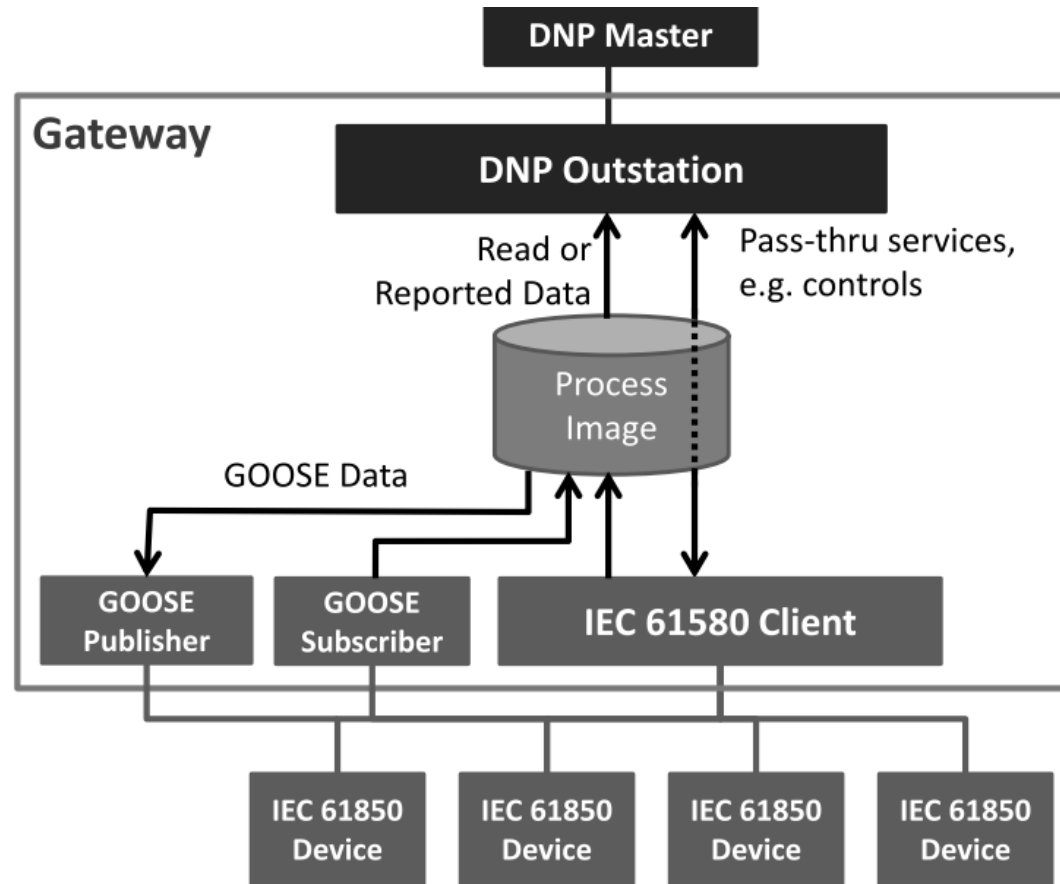
IEC 61850-80-1 – Pretvorba za IEC 104 protokol

- TC57 WG10
- ASDU-CDC preslikavanje
- IEC 104 servisi – ACSI
- Europsko tržište
- Postojeći sustavi
- Ed.1



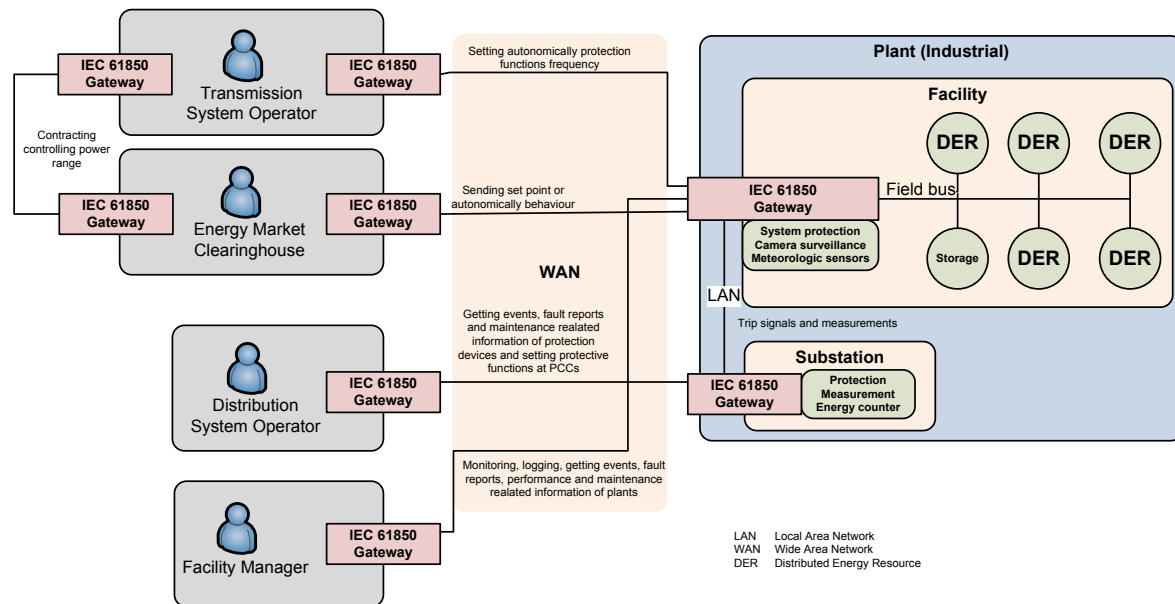
IEC 61850-80-2 – Pretvorba za DNP3 protokol

- TC57 WG10
- DNP3 objekti - CDC
- DNP3 servisi – ACSI
- Američko tržište
- Postojeći sustavi
- IEEE 1851.1
- Ed.1(draft)



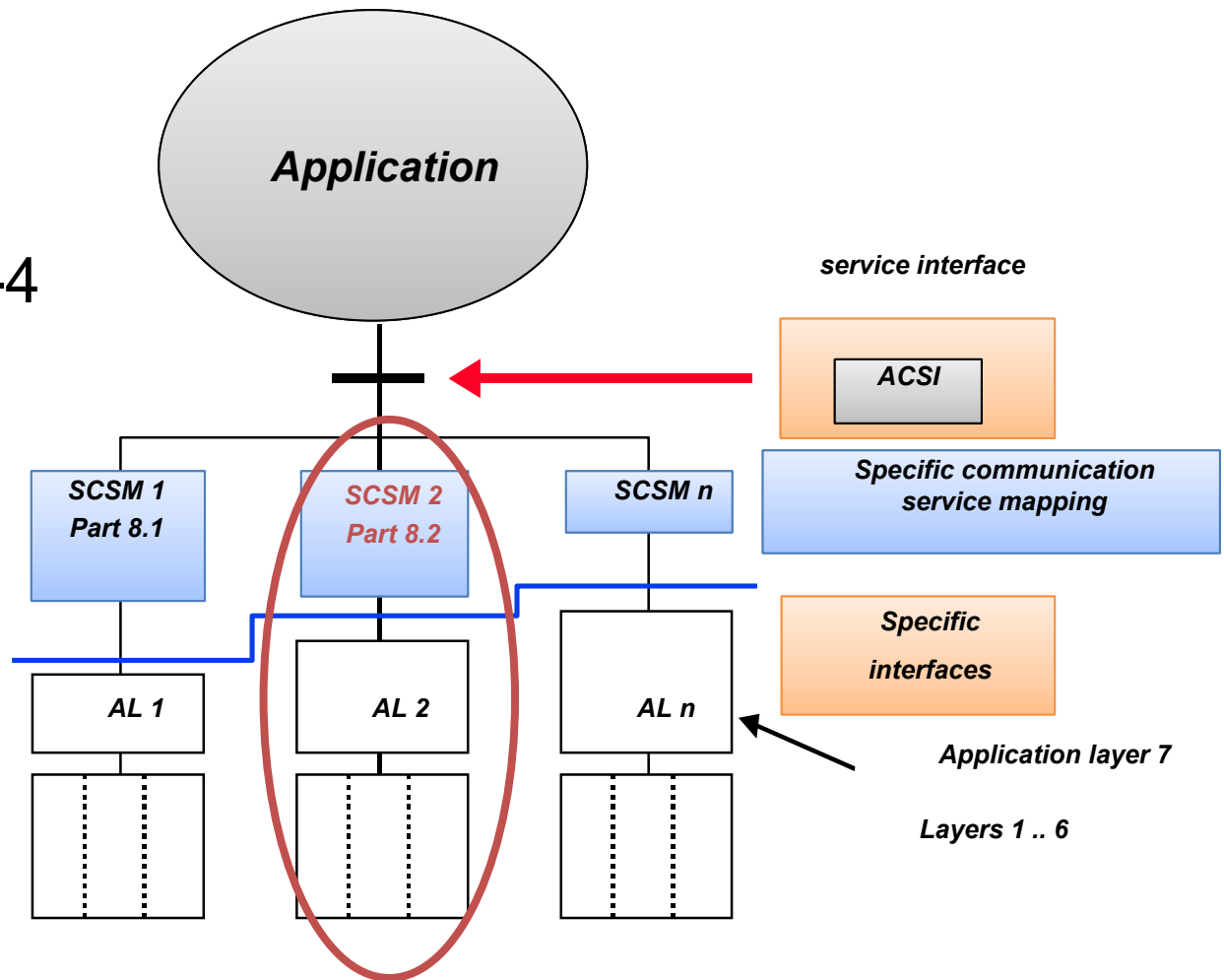
IEC 61850-80-3 – Mapiranje na Web servise

- TC57 WG17/WG18 / TC88 JWG24
- Komunikacijski zahtjevi
- Upravljanje različitim tipovima postrojenja
- ACSI podrška
- IEC 61850-8-2
- Ed.1 (draft)



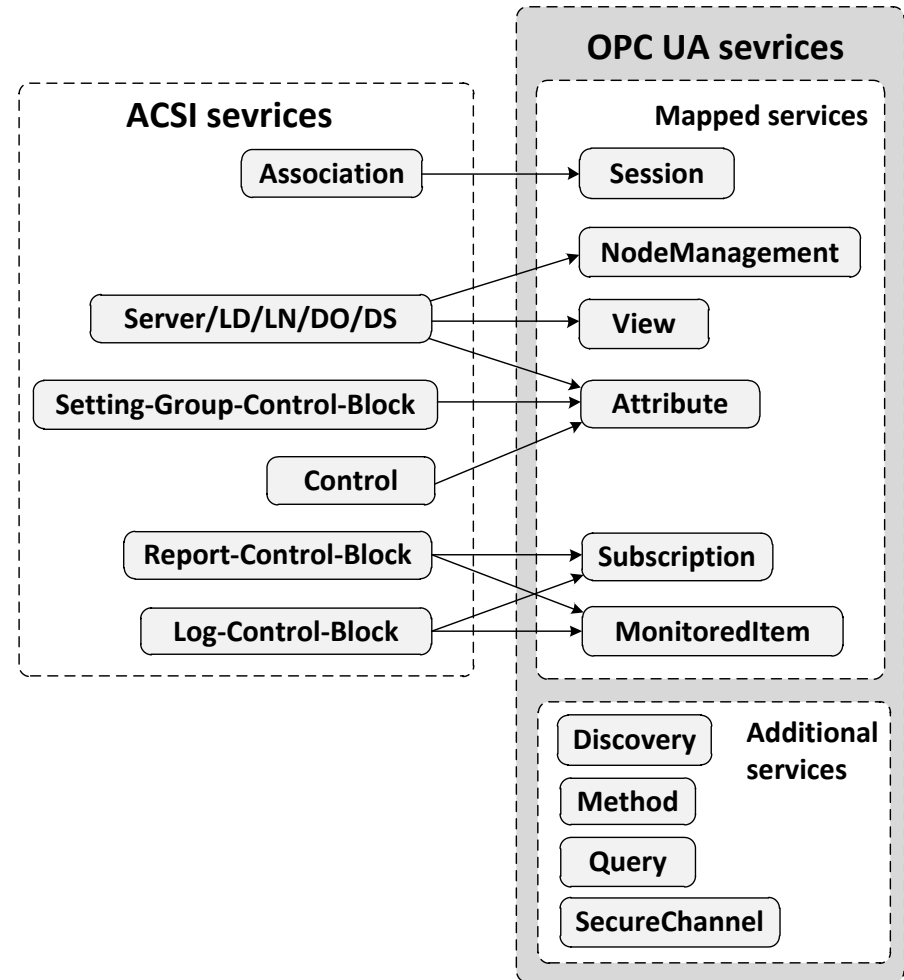
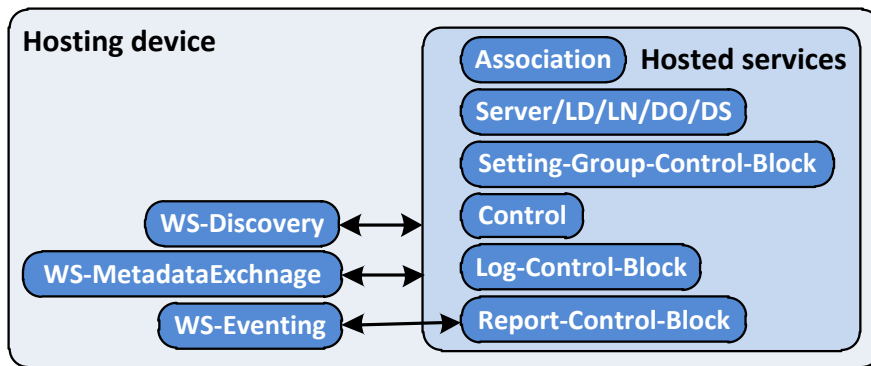
IEC 61850-80-3 – Mapiranje na Web servise

- OPC UA
- DPWS
- IEC 61400-25-4
(Annex A)
- REST
- XMPP

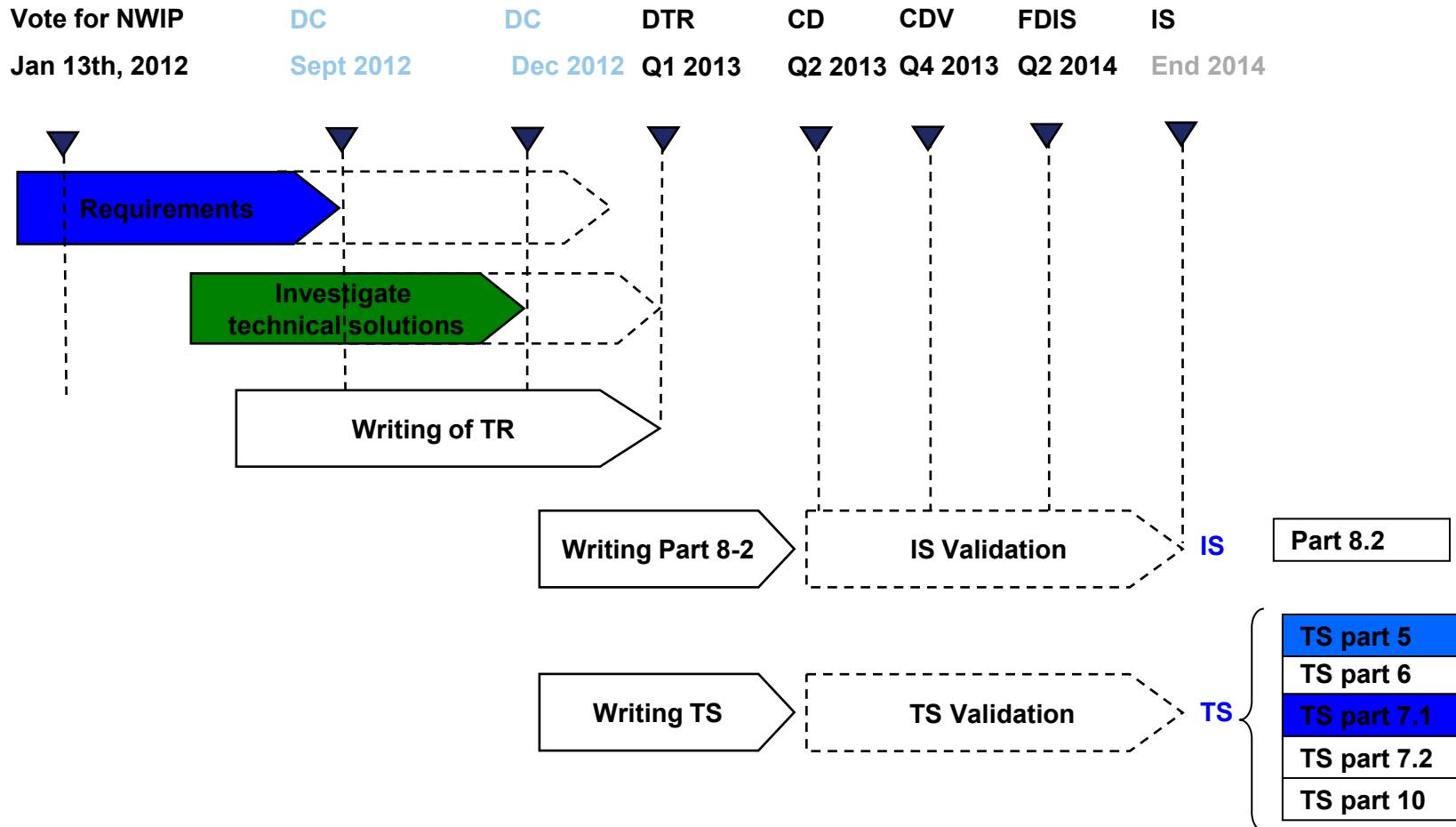


IEC 61850-80-3 – Mapiranje na Web servise

- KONČAR-KET
- Web Service TF
- DPSW
- OPC UA



IEC 61850-80-3 – Mapiranje na Web servise



Sadržaj

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- Podatkovni modeli

2

- Modeliranje funkcija

3

- SCL proširenja

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- Komunikacijska proširenja

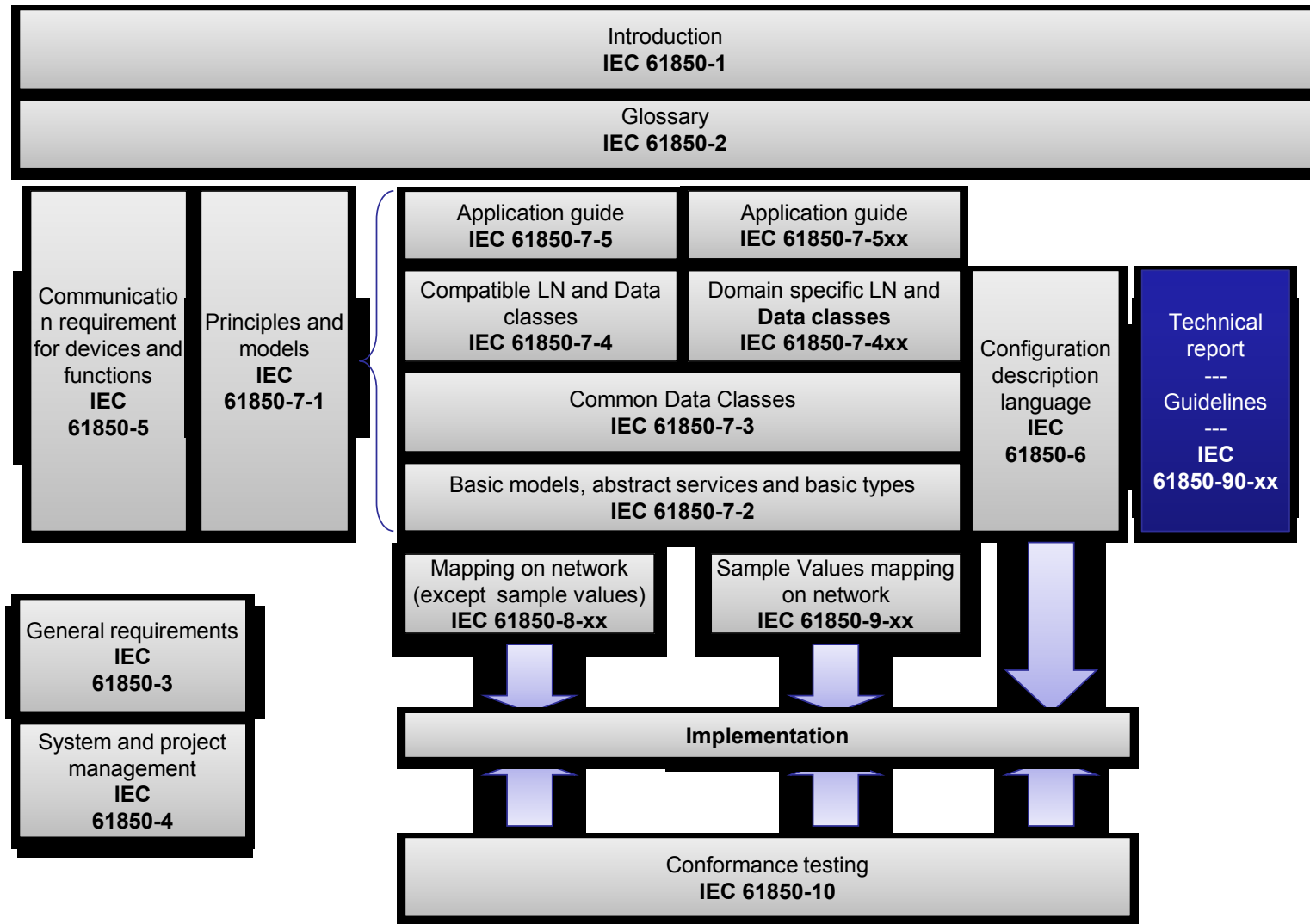
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- Tehnički izvještaji

6

- Referentni model

IEC 61850-90-X – Tehnički izvještaji

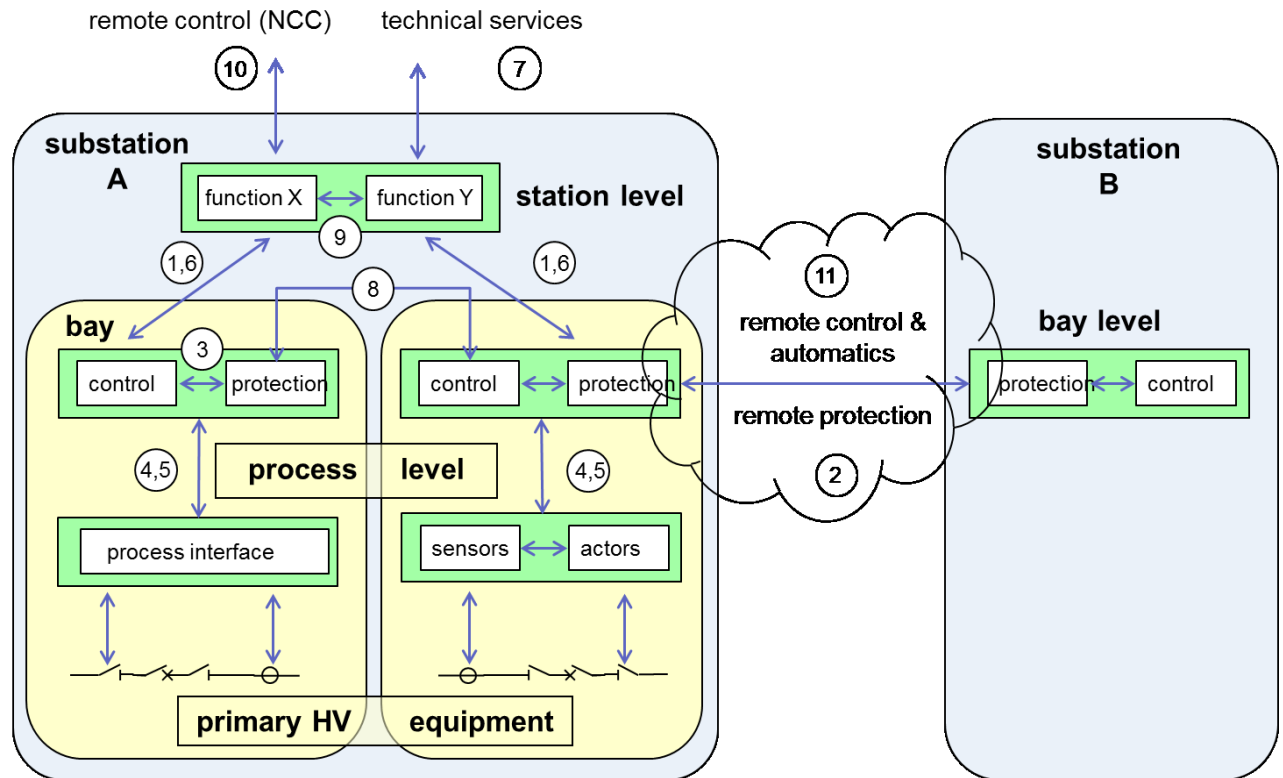


IEC 61850-90-X – Tehnički izvještaji

- Technical Report (TR) vs. Industrial Standard
- Izvještaji (Reports)
- Smjernice (Guidelines)
- Razvoj tehnologija
- Različite domene

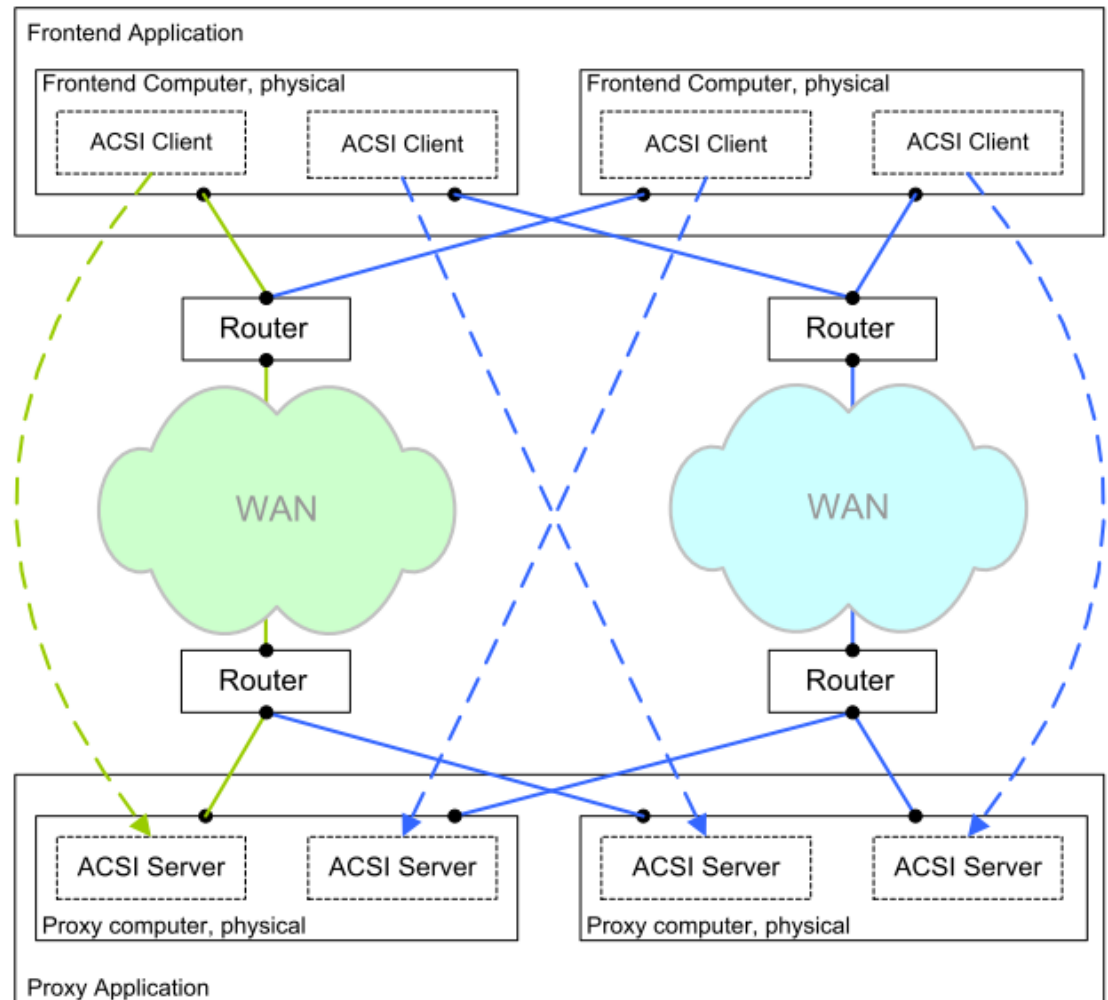
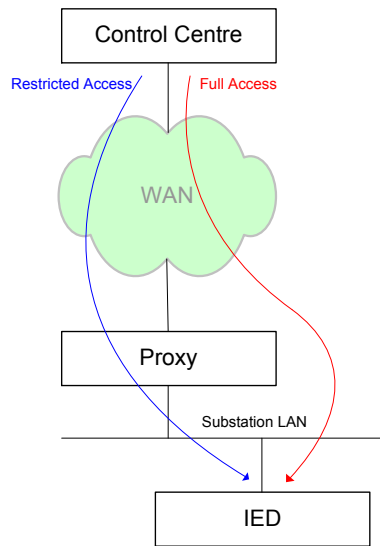
IEC 61850-90-1 – Komunikacija između stanica

- TC57 WG10
- Posebne funkcije zaštite
- Gateway
- VPN
- Ed.1



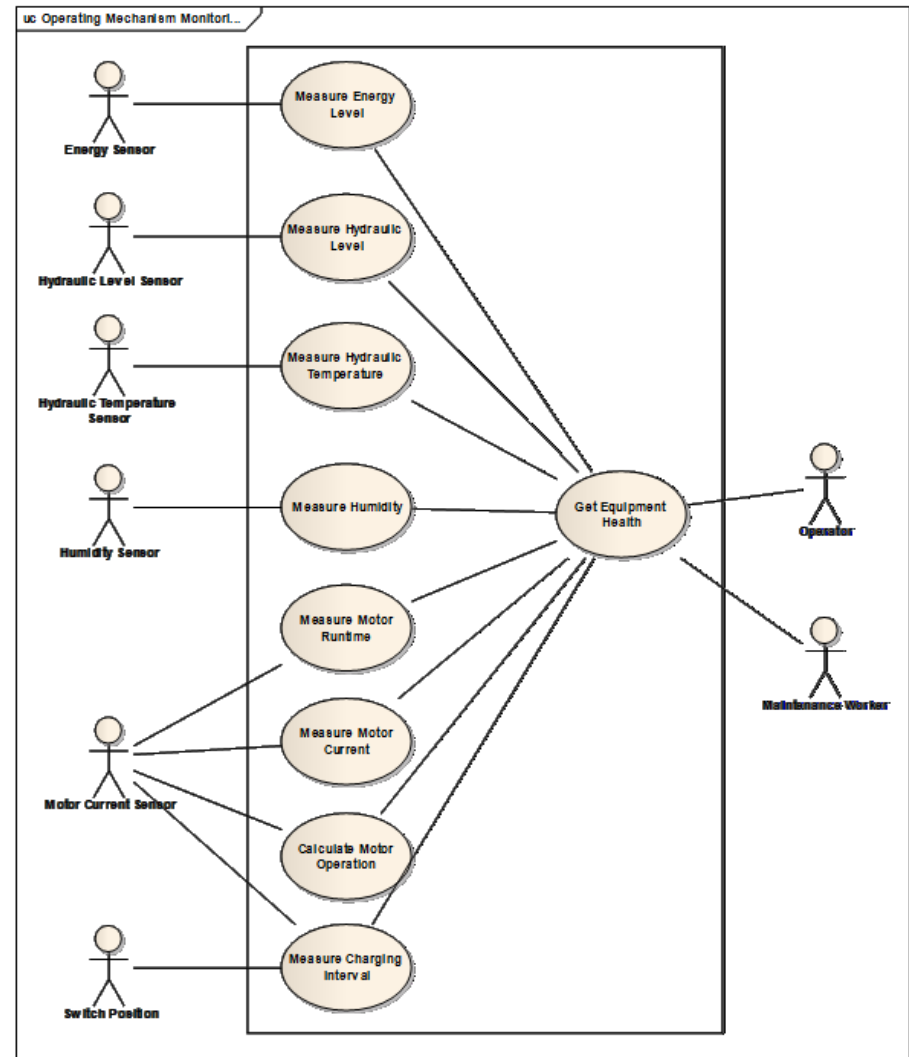
IEC 61850-90-2 – Komunikacija prema centrima

- Koncentrator
- Redundancija
- Proxy/gateway
- Ed.1 (draft)



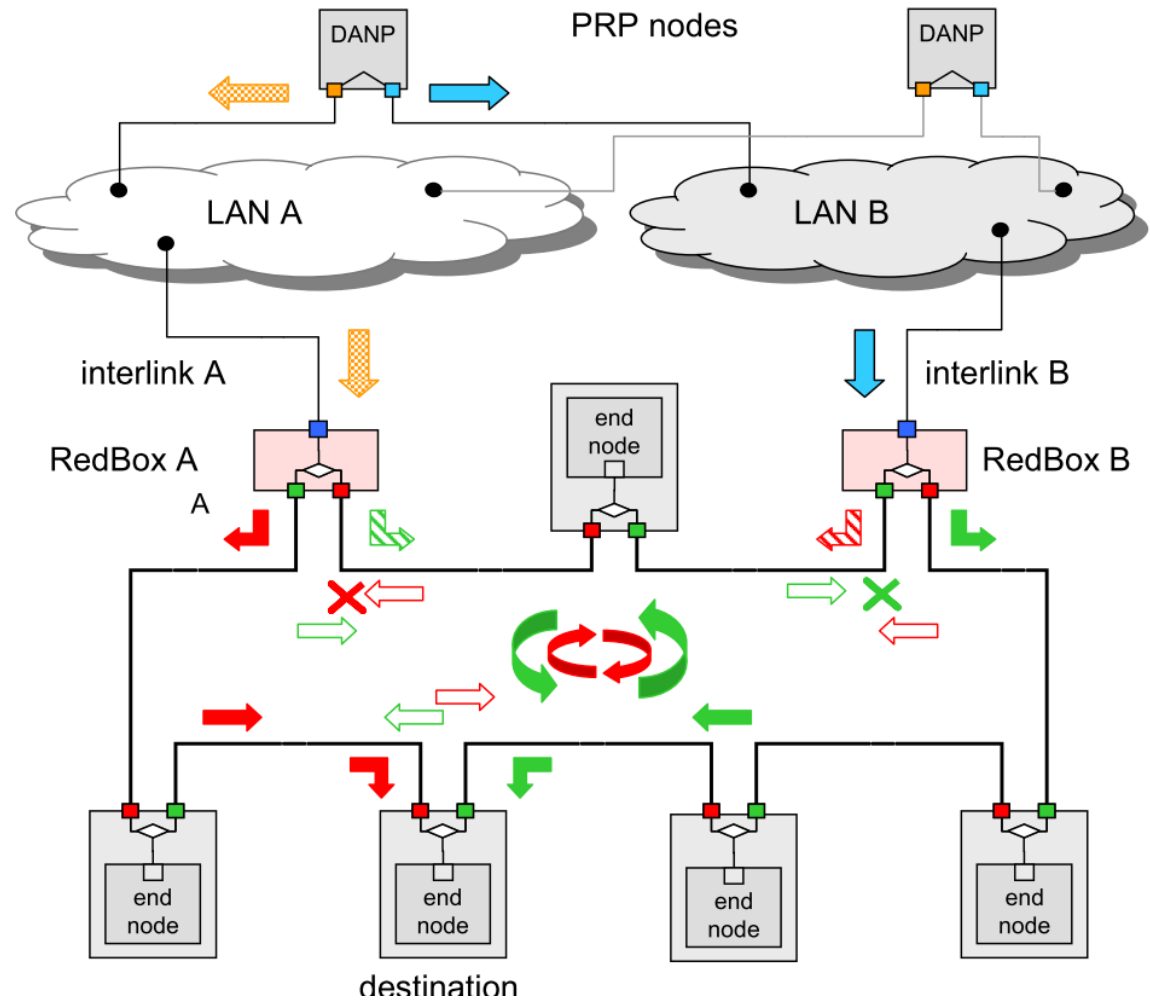
IEC 61850-90-3 – Nadzor opreme

- TC57 WG10
- Slučajevi primjene:
GIS, TL, UGC, LTC,
AUX,.....
- Senzori
- WSN
- Analitičke funkcije
nadzora opreme
- Ed.1 (draft)



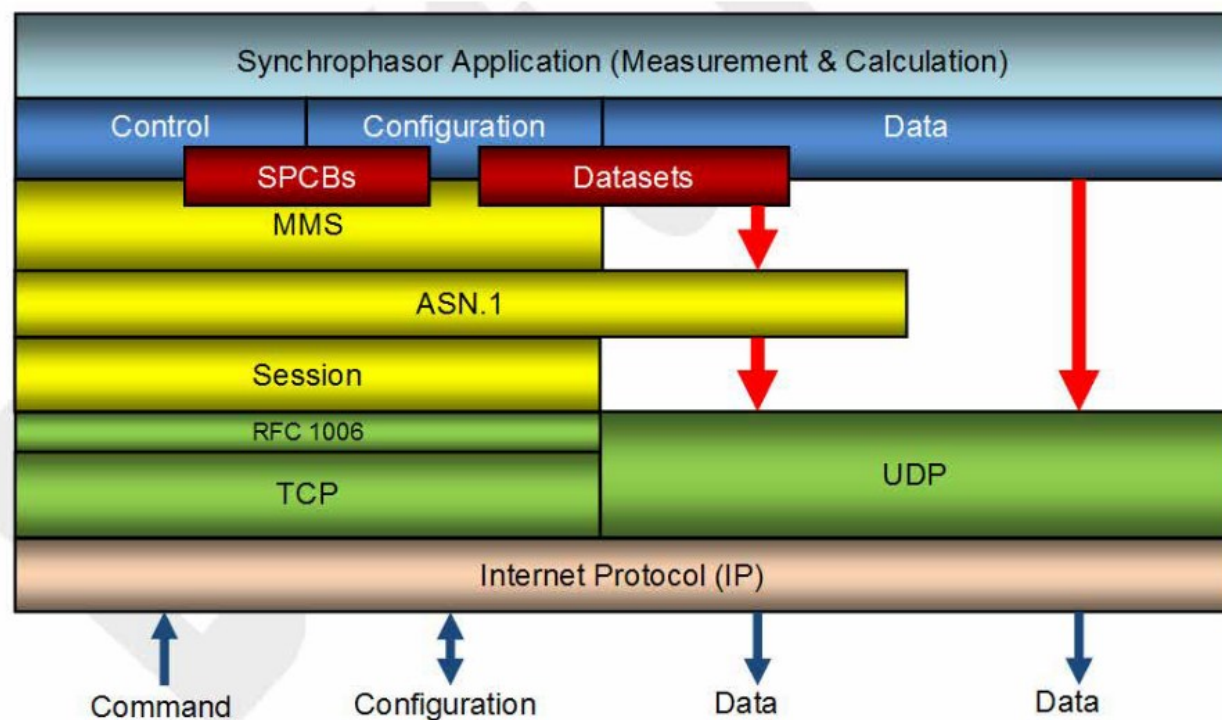
IEC 61850-90-4 – Mrežne konfiguracije

- TC57 WG10
- Preporuke
- Redundancija
- IEEE 1588
- PRP
- HSR
- VLAN
- Ed.1



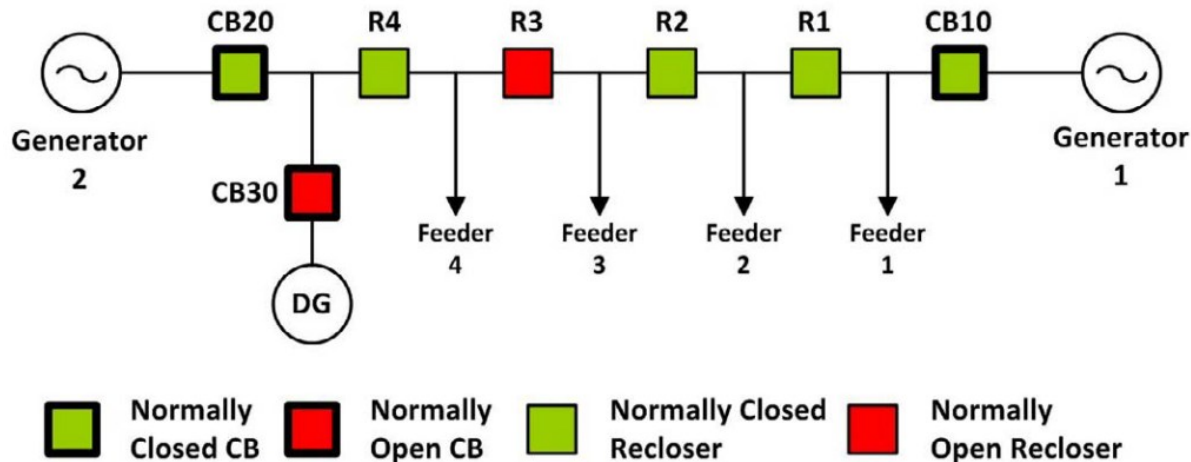
IEC 61850-90-5 – Primjena u WAMPC sustavima

- TC57 WG10
- IEEE C37.118-2
- R-GOCB
- R-MSVCB
- R-GOOSE
- R-SV
- Open source
- Ed.1



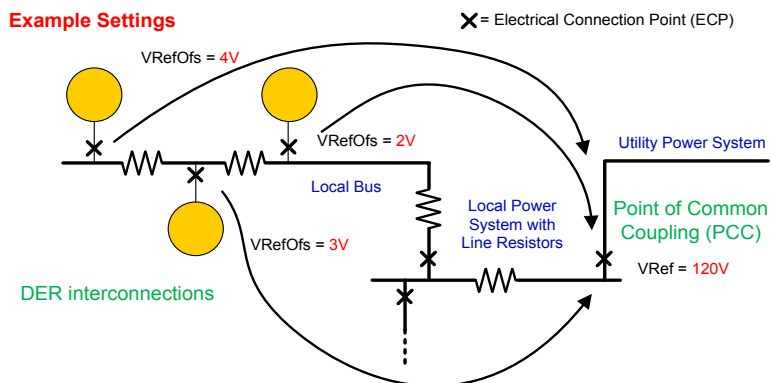
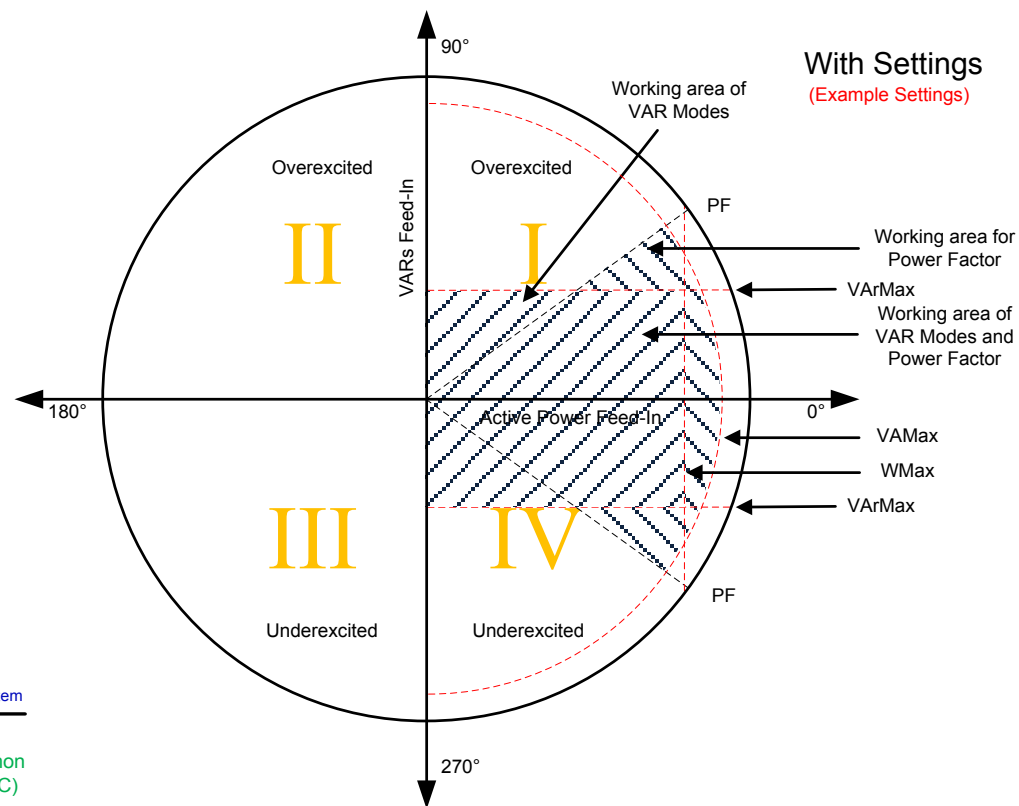
IEC 61850-90-6 – Automatizacija distribucije

- TC57 WG10
- Slučajevi primjene
- DA funkcije (LF, AMI, OMS...)
- Ed.1 (draft)



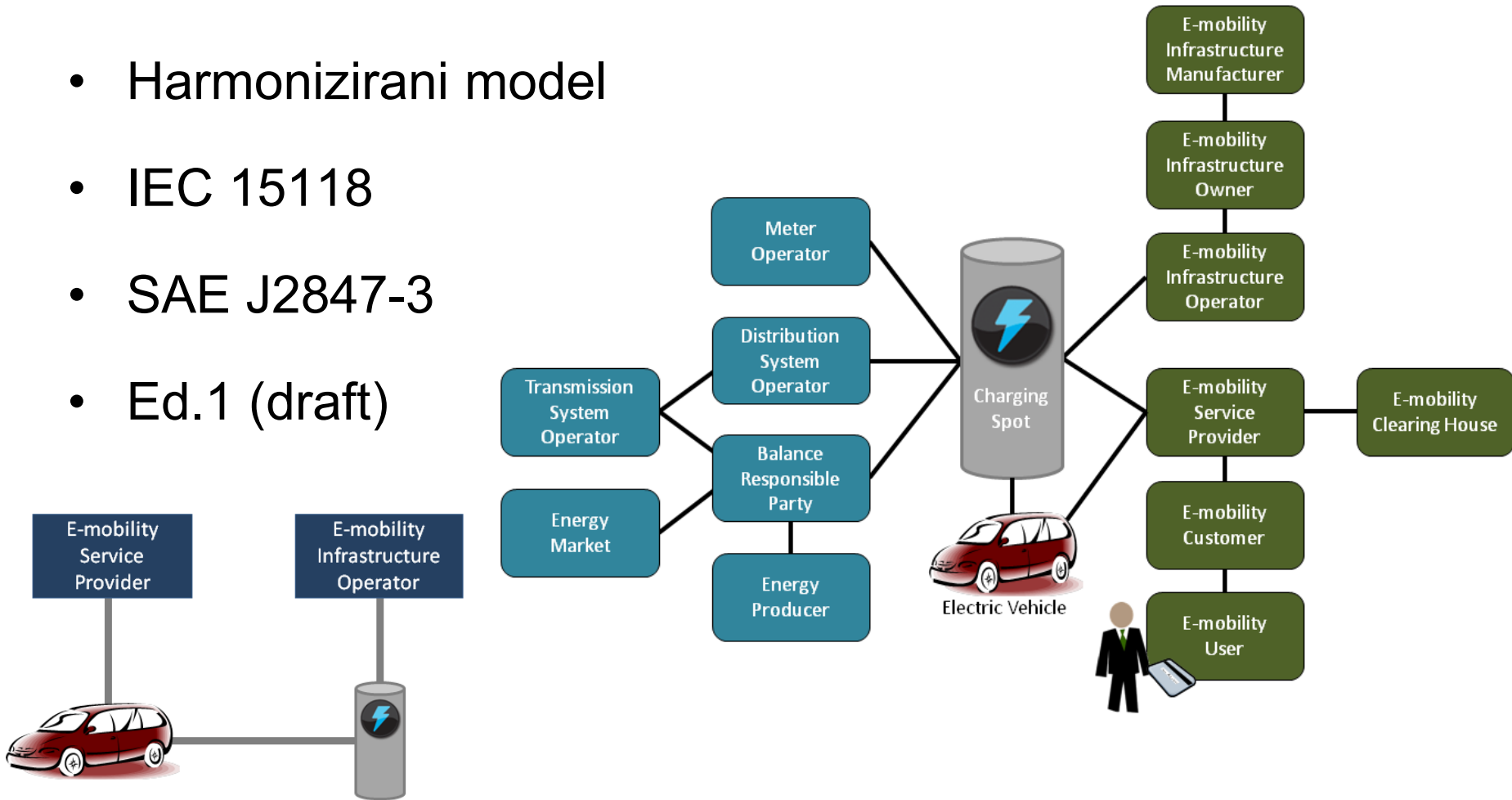
IEC 61850-90-7 – Inverteri

- TC57 WG17
- DC-AC pretvorba
- LN modeli
- Funkcije podešenja
- Ed.1 (draft)



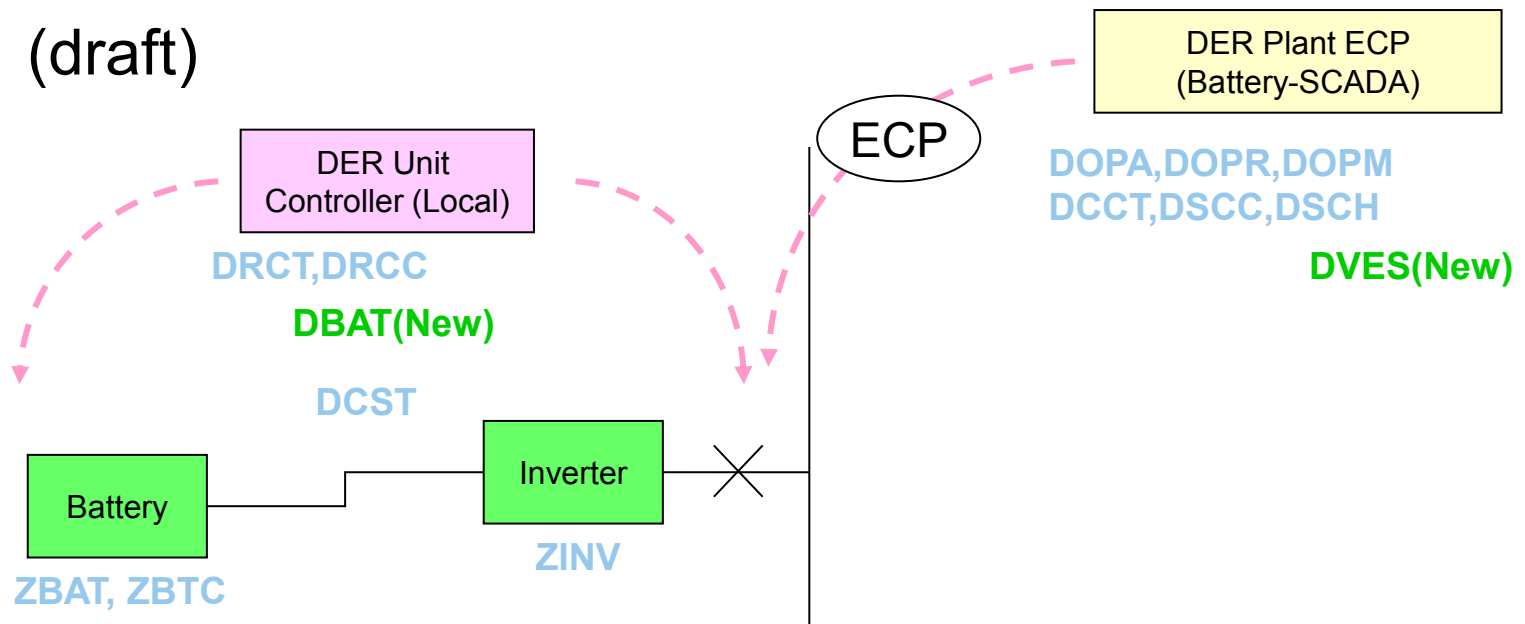
IEC 61850-90-8 – Punionice elektromobila

- TC57 WG17
- Harmonizirani model
- IEC 15118
- SAE J2847-3
- Ed.1 (draft)



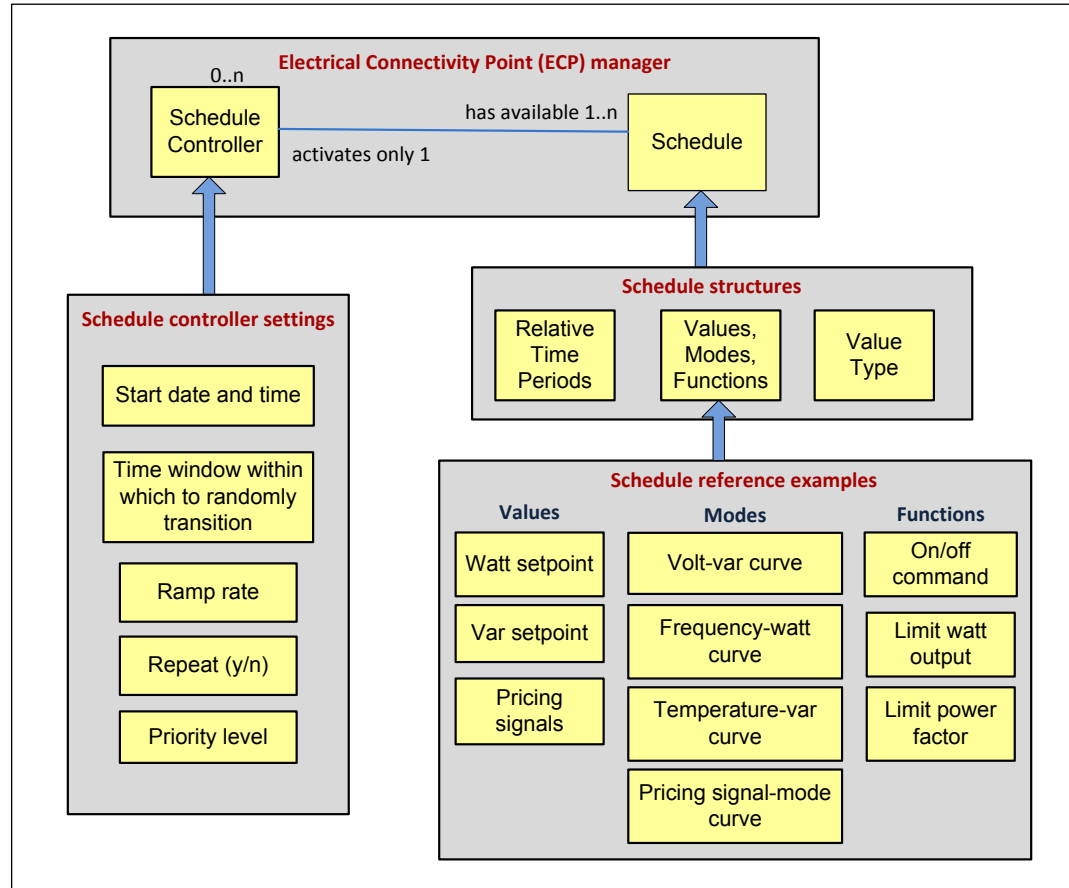
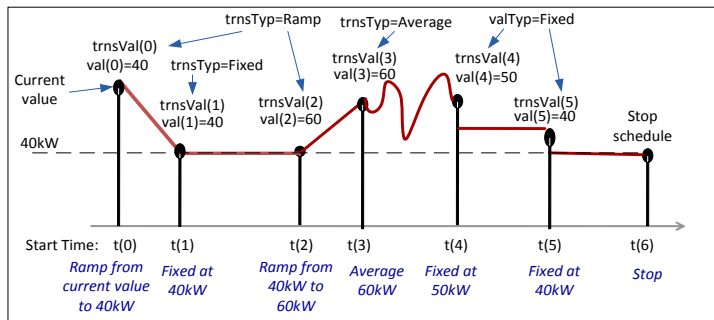
IEC 61850-90-9 – Baterijski sustavi

- TC57 WG17
- Centralizirano upravljanje
- LN modeli
- Ed.1 (draft)



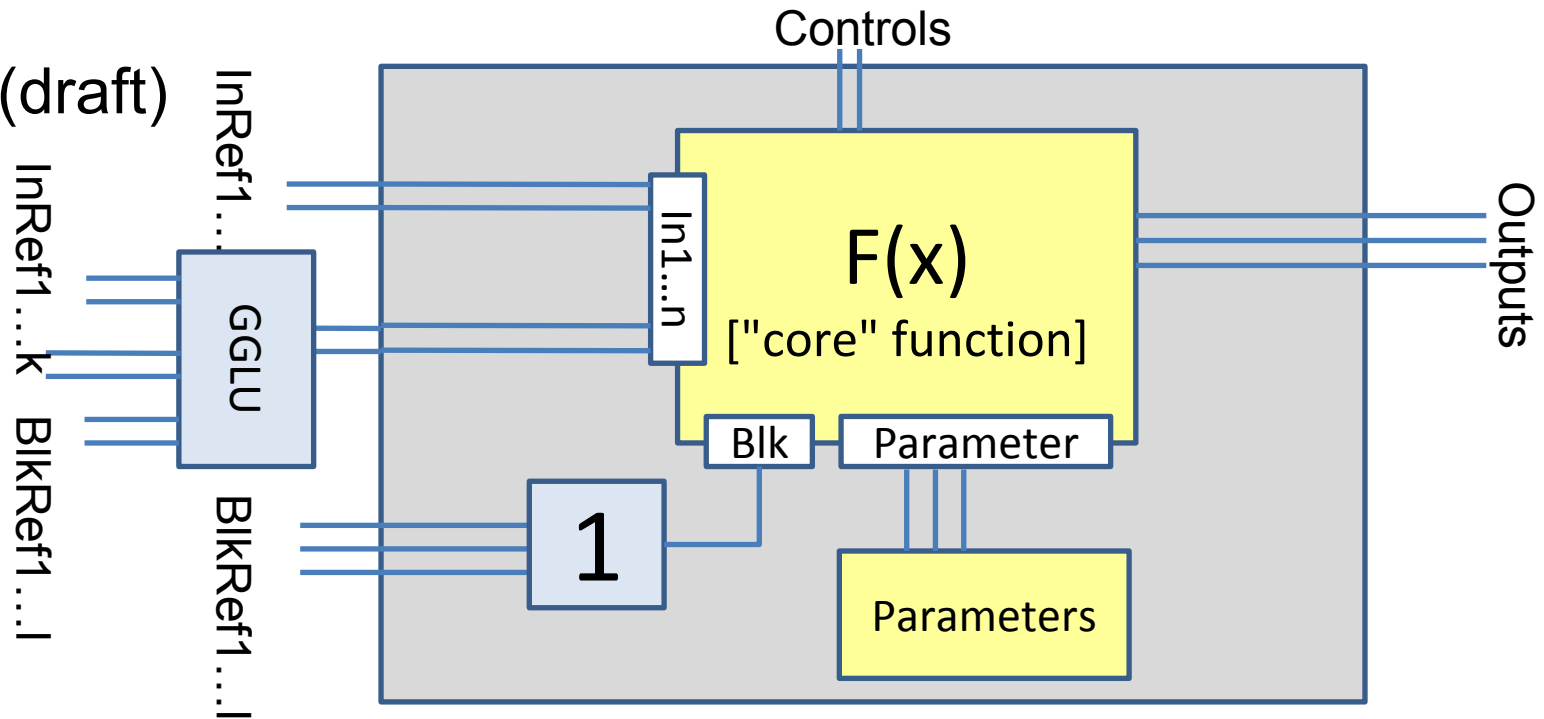
IEC 61850-90-10 – Planiranje rada DIE

- TC57 WG17
- Dan, mjesec, godina
- LN modeli
- Ed.1 (draft)



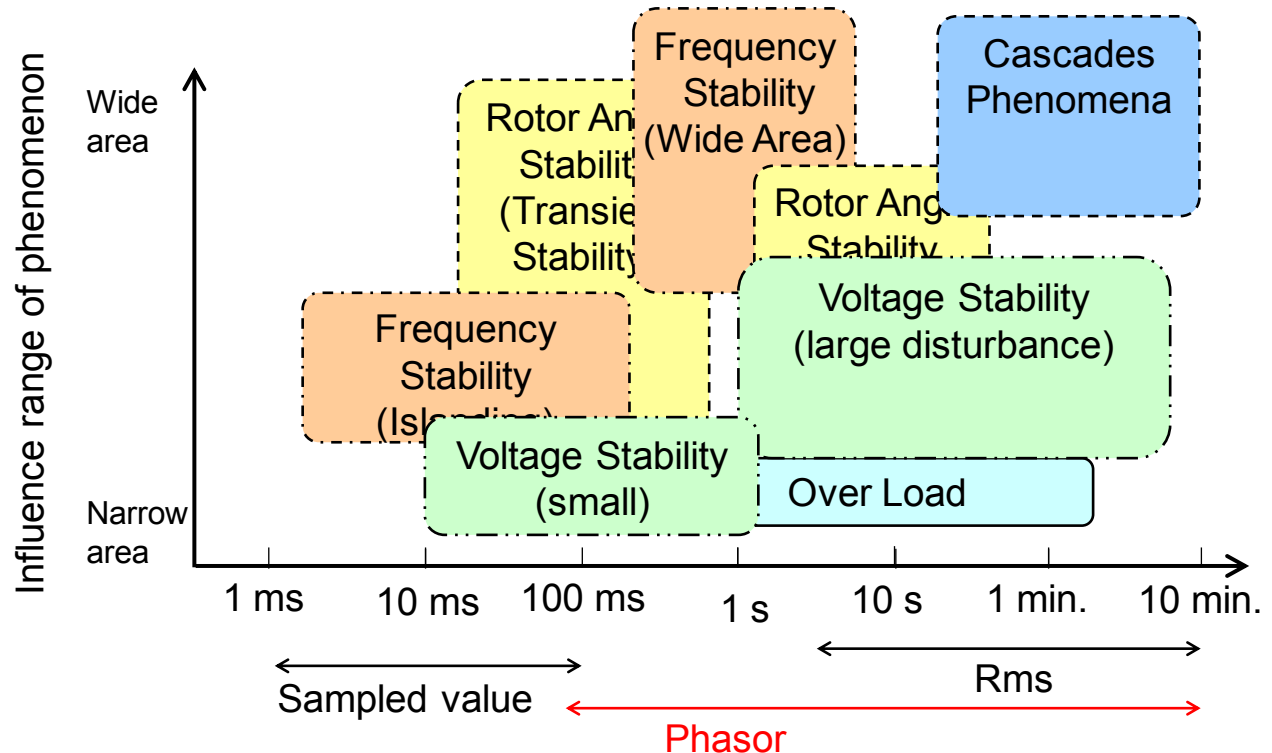
IEC 61850-90-11 – Modeliranje logičkih funkcija

- TC57 WG10
- IEC 61131-9
- PLC domena
- Ed.1 (draft)



IEC 61850-90-12 – WAN komunikacija

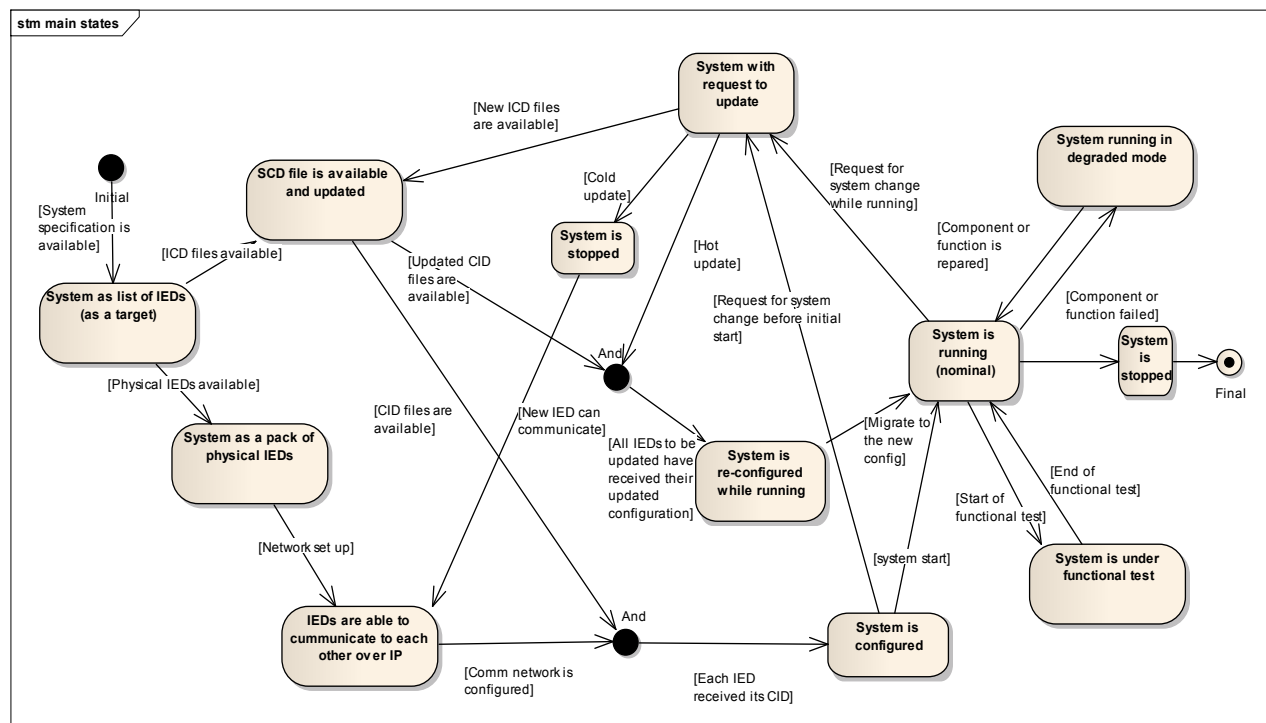
- TC57 WG10
- Tehnologije:
 - GPRS
 - PLC
 - SONET
 - MPLS
 - SIPS
 - ...



- Ed.1 (draft)

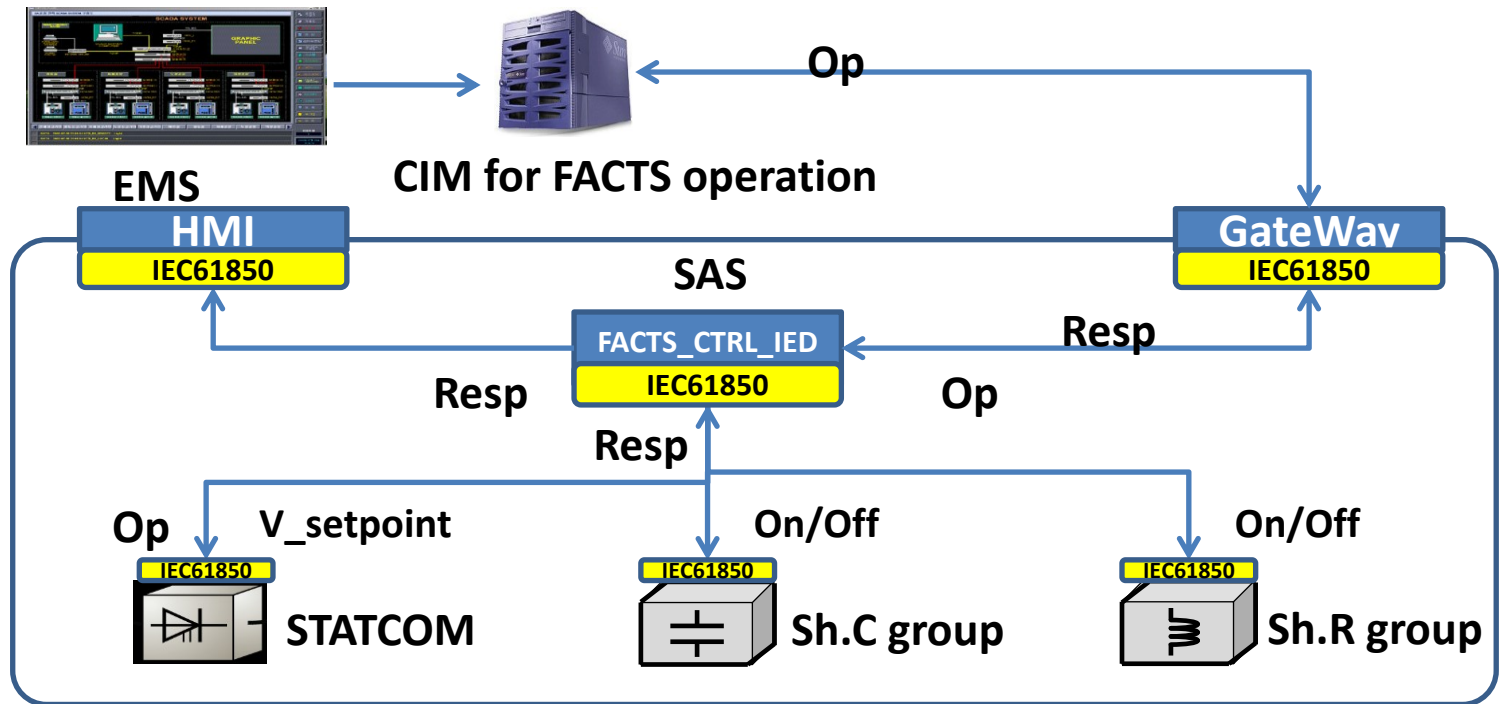
IEC 61850-90-13 – Upravljanje sustavom

- TC57 WG10
- Faze upravljanja sustavom i uređajima
- Integracija
- Nadogradnje firmware-a
- Ed.1 (draft)



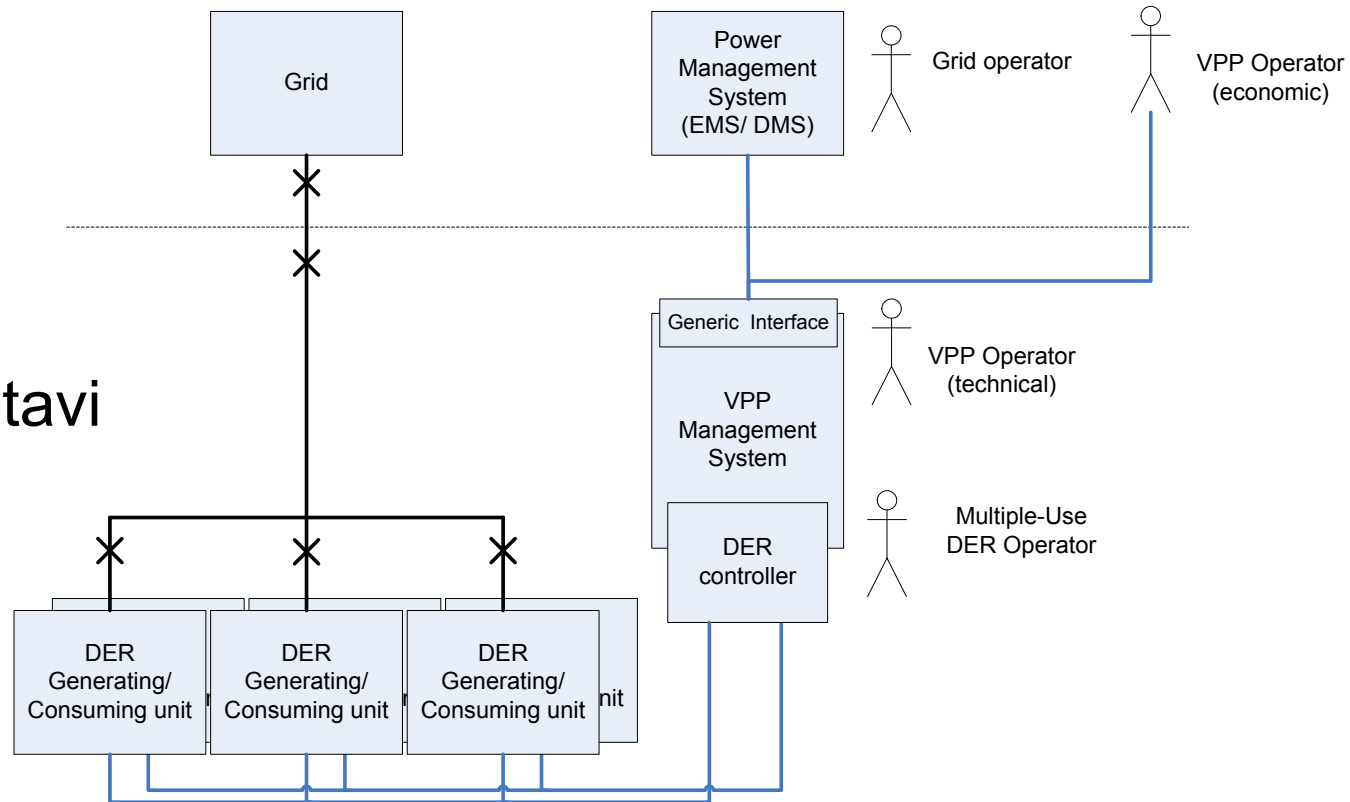
IEC 61850-90-14 – FACTS

- TC57 WG10
- FACTS (Flexible AC Transmission System)
- Ed.1 (draft)



IEC 61850-90-15 – Višestruka prijemna DIE

- TC57 WG17
- Virtualne elektrane
- Mikromreže
- Baterijski sustavi
- Industrijska postrojenja
- Ed.1 (draft)



IEC 61850-90-16 – Alarmi

- TC57 WG10 / TC88

JWG25

- Inteligentna obrada alarma

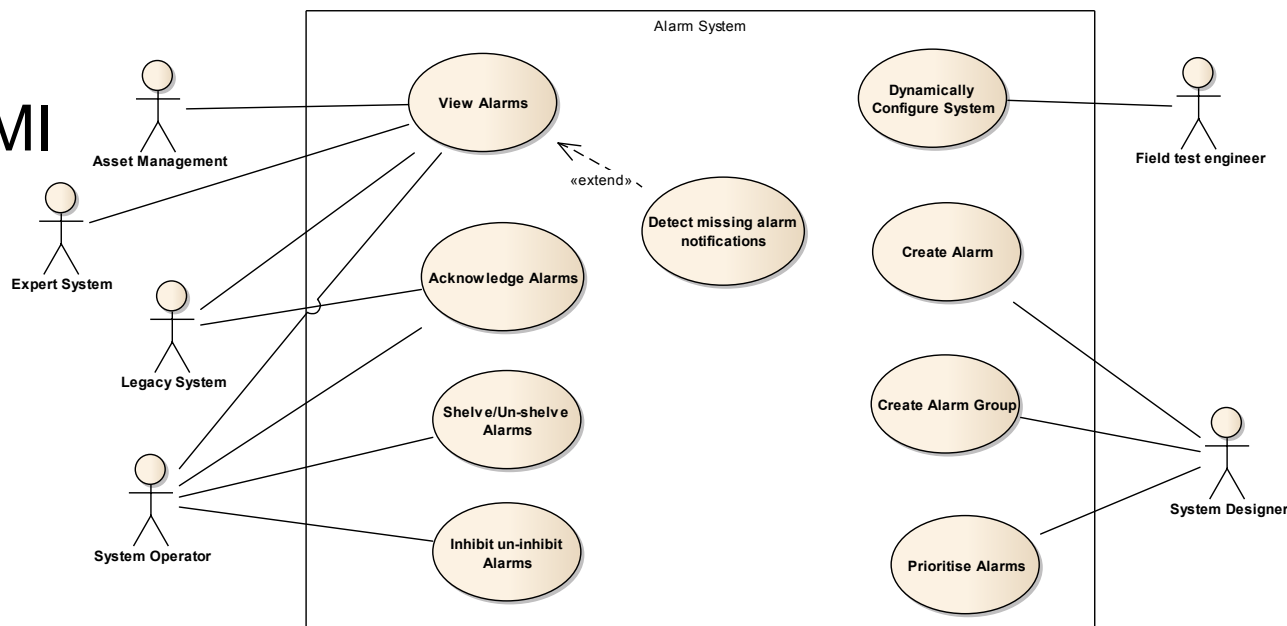
- Event/Alarm

- Distribuirani HMI

- HMI2HMI

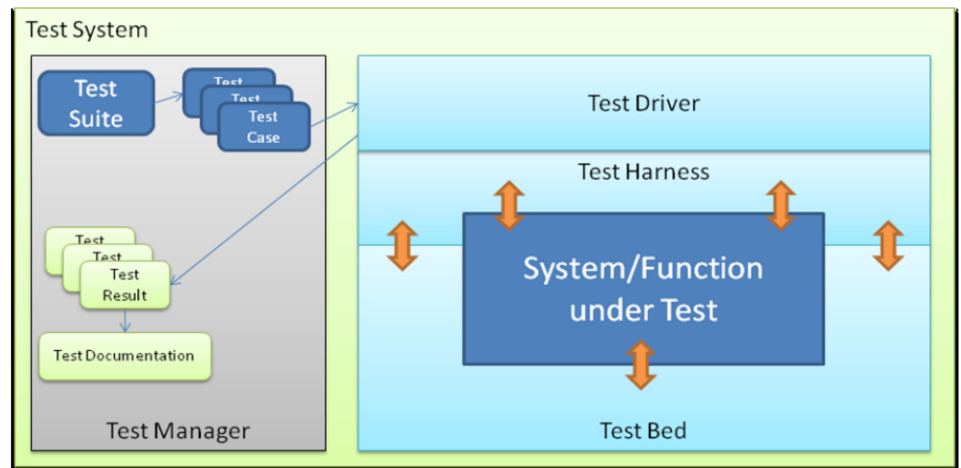
- CEP aplikacije

- Ed.1 (draft)



IEC 61850-100-1 – Funkcionalno testiranje

- TC57 WG10
- Simulacijska okruženja
- Testne procedure
- Provjeravanje semantike i funkcionalnosti opreme
- Usklađivanje različitih proizvođača



Sadržaj

1

- Podatkovni modeli

2

- Modeliranje funkcija

3

- SCL proširenja

4

- Komunikacijska proširenja

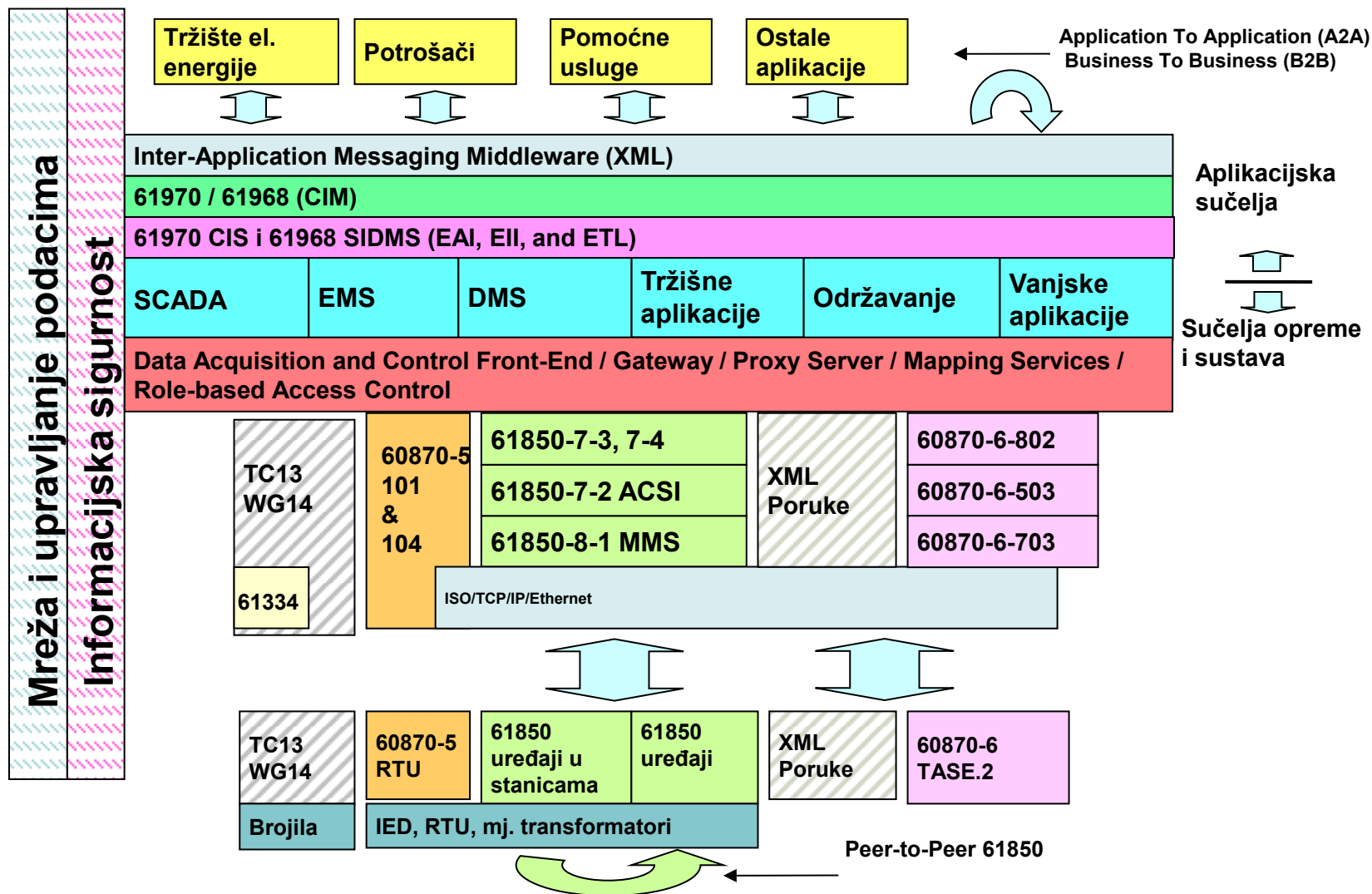
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- Tehnički izvještaji

6

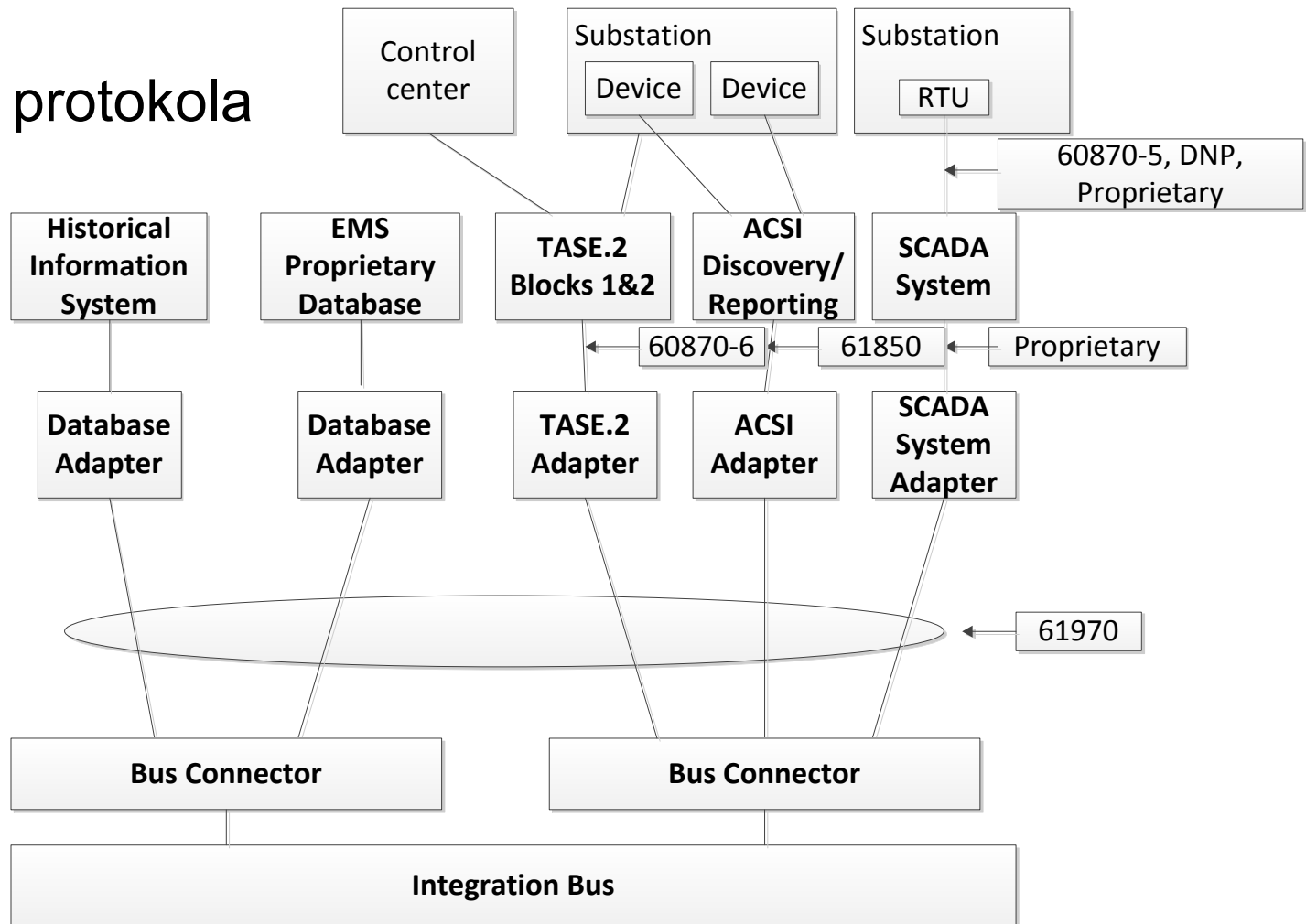
- Referentni model

IEC 62357 – Referentna arhitektura EES-a

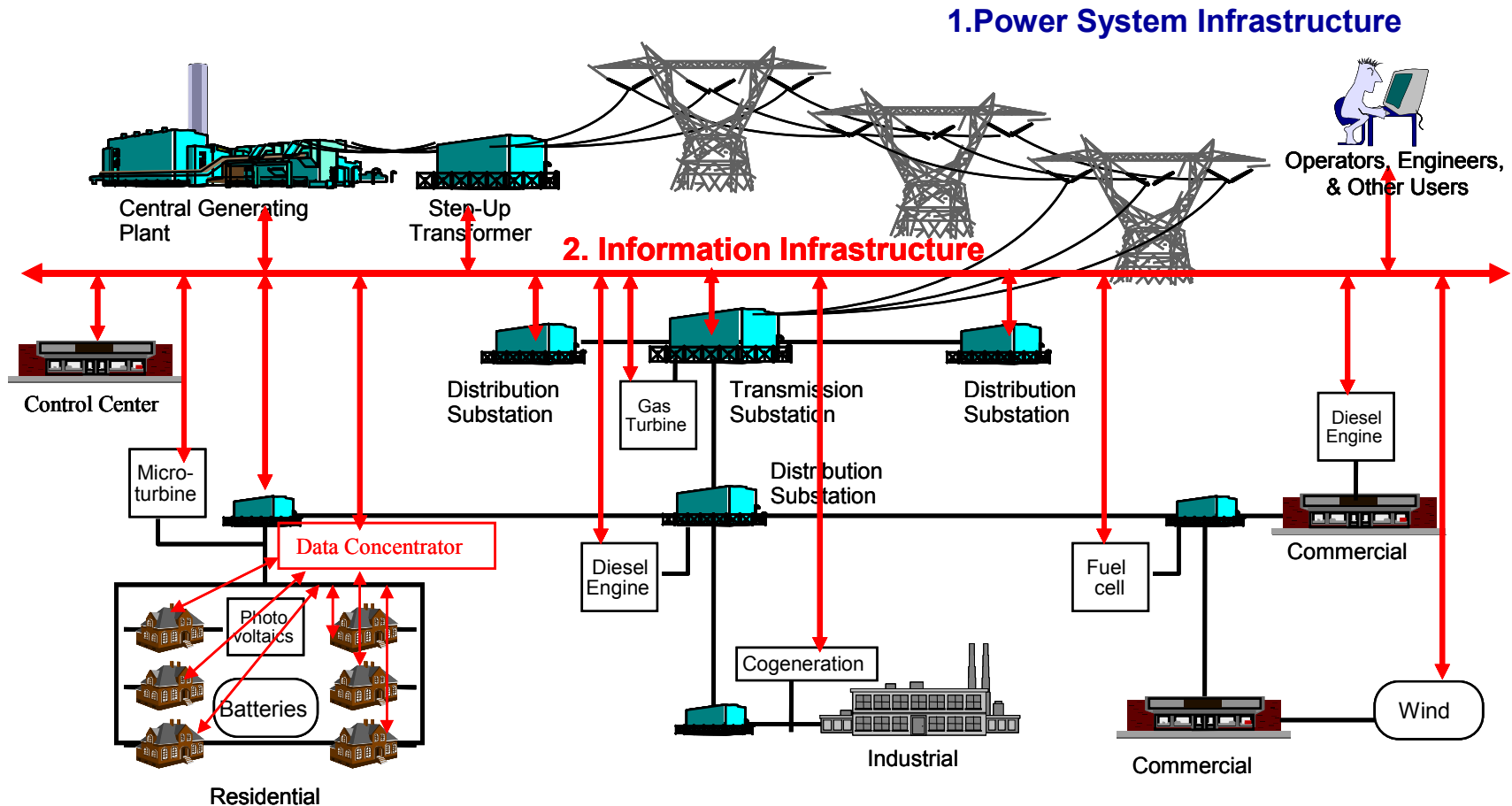


IEC 62357 – Referentna arhitektura EES-a

- Pretvornici protokola
- Adapteri

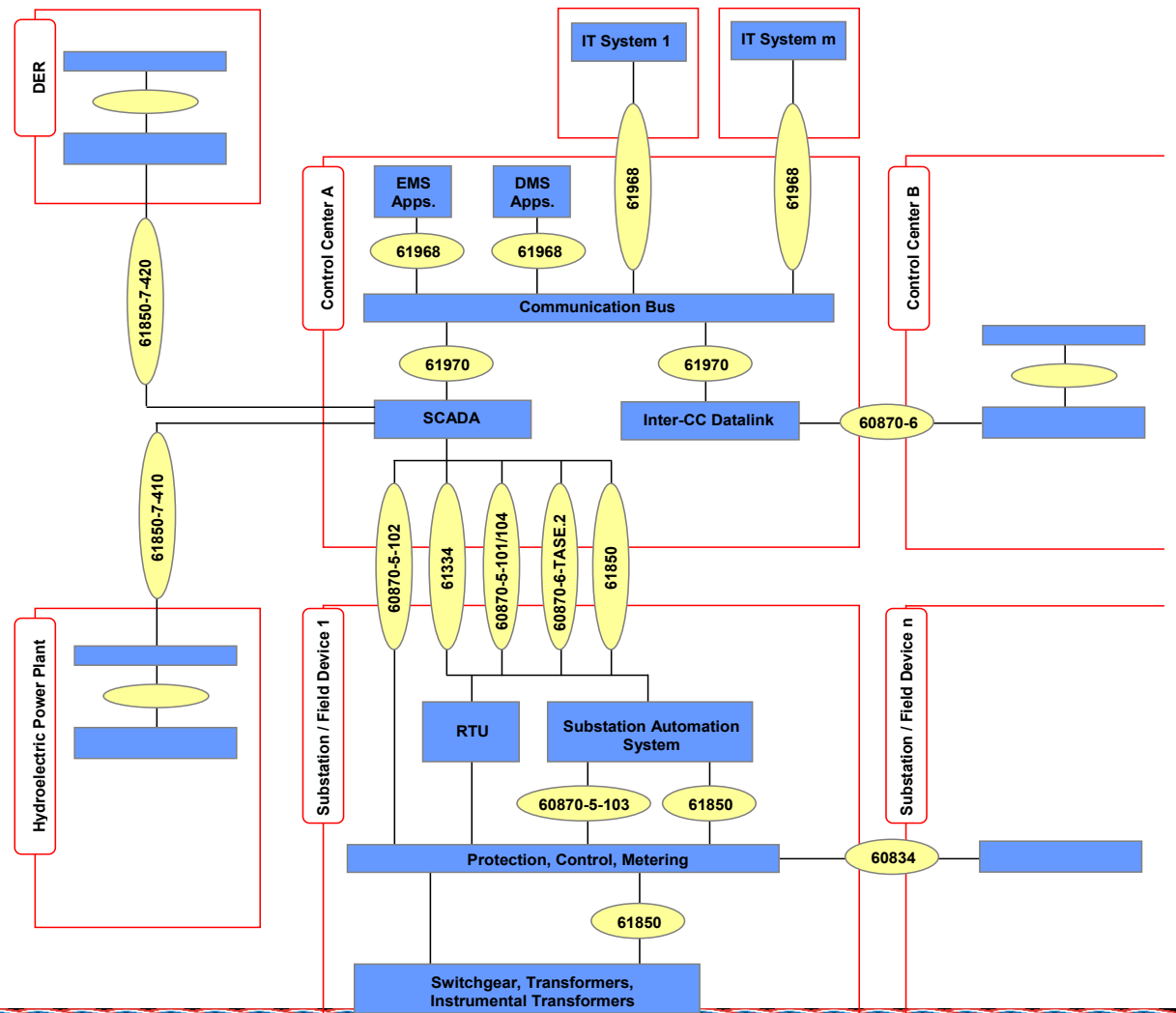


IEC 62351 – Informacijska sigurnost



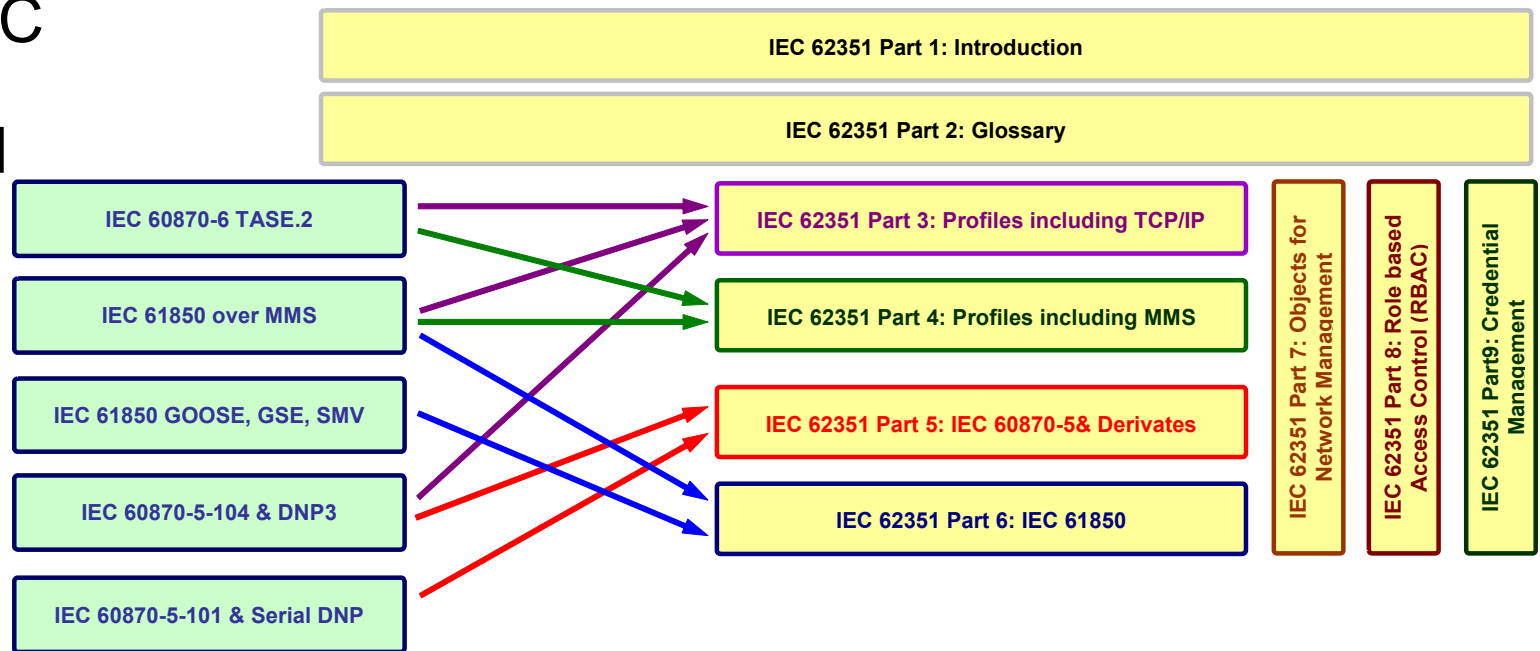
IEC 62351 – Informacijska sigurnost

- TC57 WG15
- Domene primjene IEC standarda
- Sigurnosni propusti
- Strategije integracije



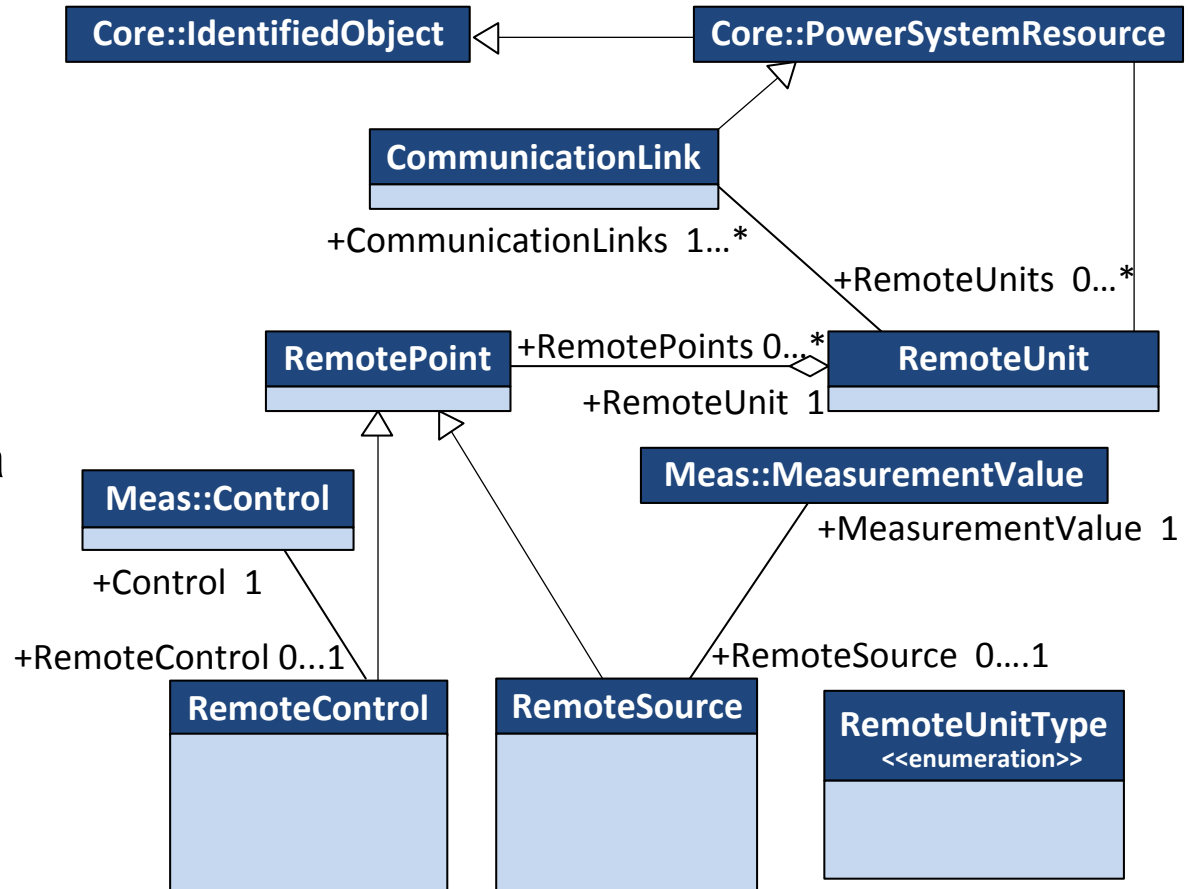
IEC 62351 – Informacijska sigurnost

- TC57 WG15
- Sigurnosna arhitektura
- Referentni model
- RBAC
- NSM



IEC 61970 – Common Information Model

- UML model
- Primjena u centrima
- Topologija sustava
- Usklađivanje modela
- IEC 61850 proširenja
- Paketi
- OWL

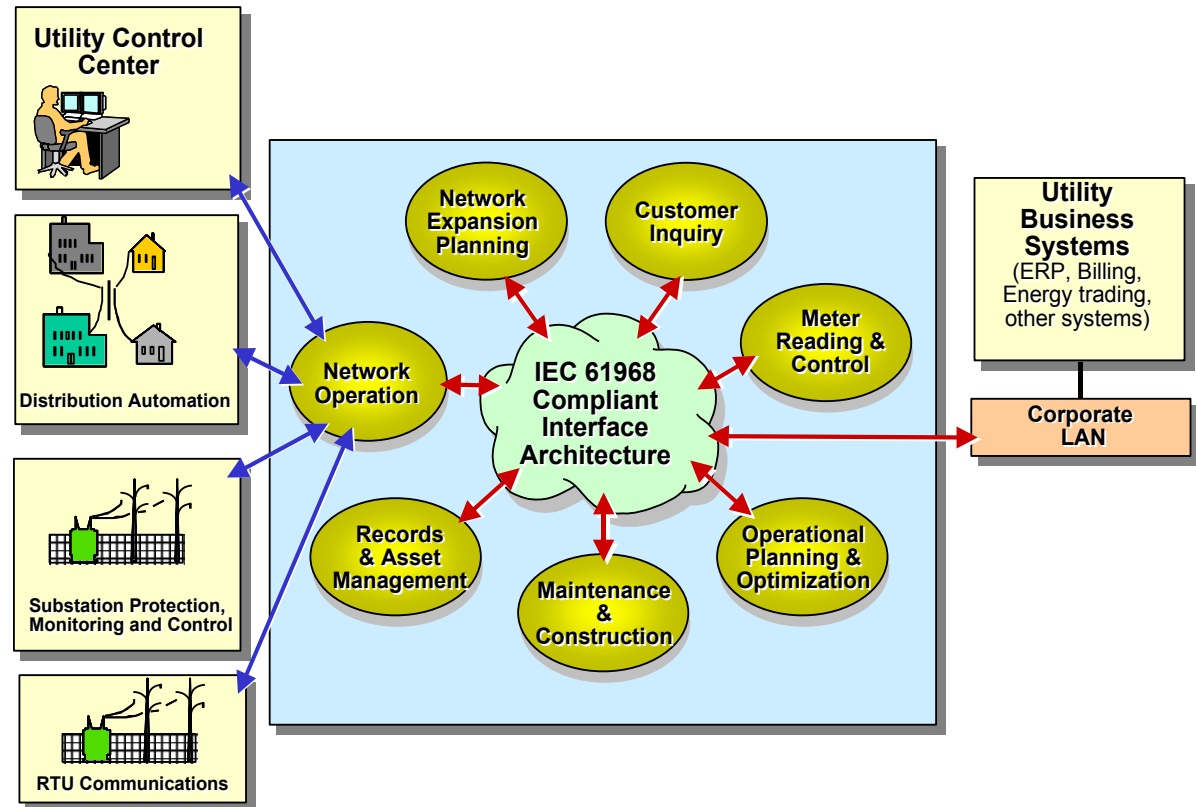


IEC 61970 – IEC 61850

Common features	IEC 61850	IEC 61970 (CIM)
	IEC TC57 standards	
	Information meta-modeling	
	Abstract data-exchange services	
	Widely applied in Smart Grid	
Differences		
	Subsystems	Control centers
	Automation-centric	Enterprise-level
	Devices	Applications
	Function-oriented	Topology-oriented
	Communication protocol	API

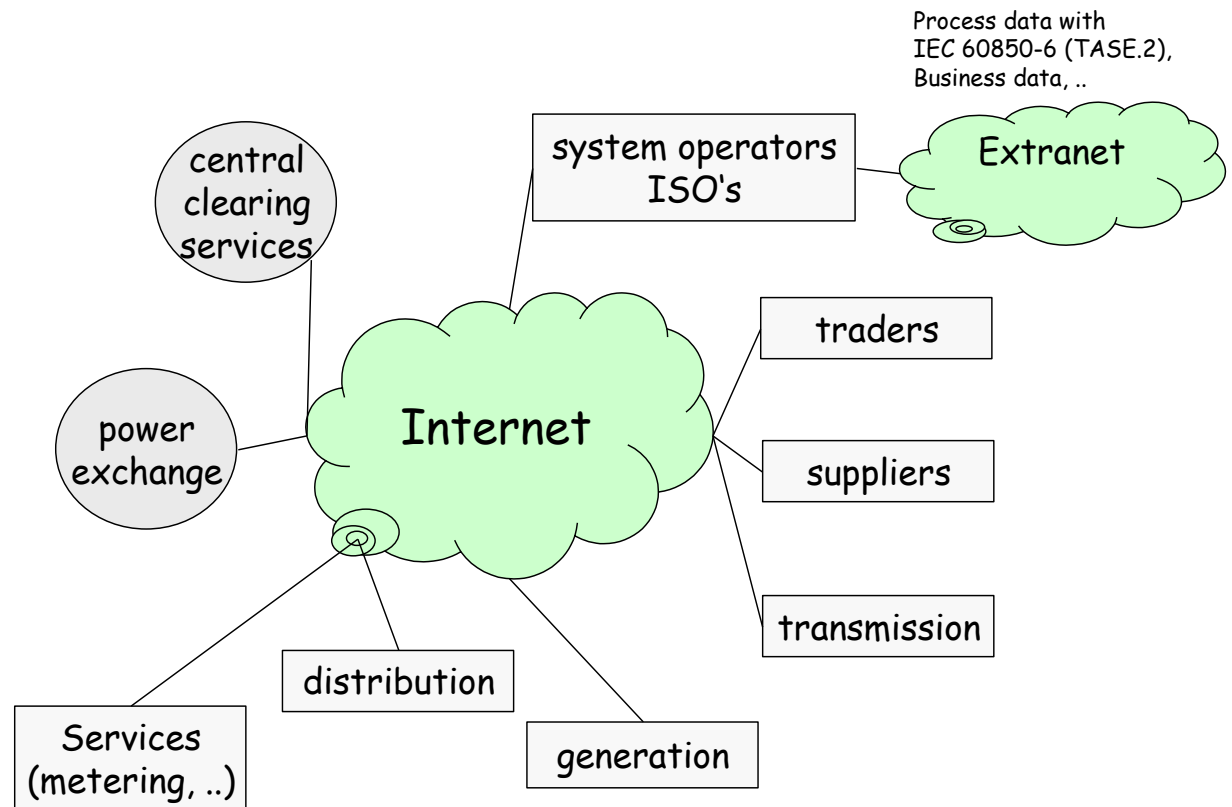
IEC 61968 – DMS CIM

- DMS (Distribution System Management)
- Aplikacijski orijentiran
- Sučelja
- Zaseban protokol
- CIM model



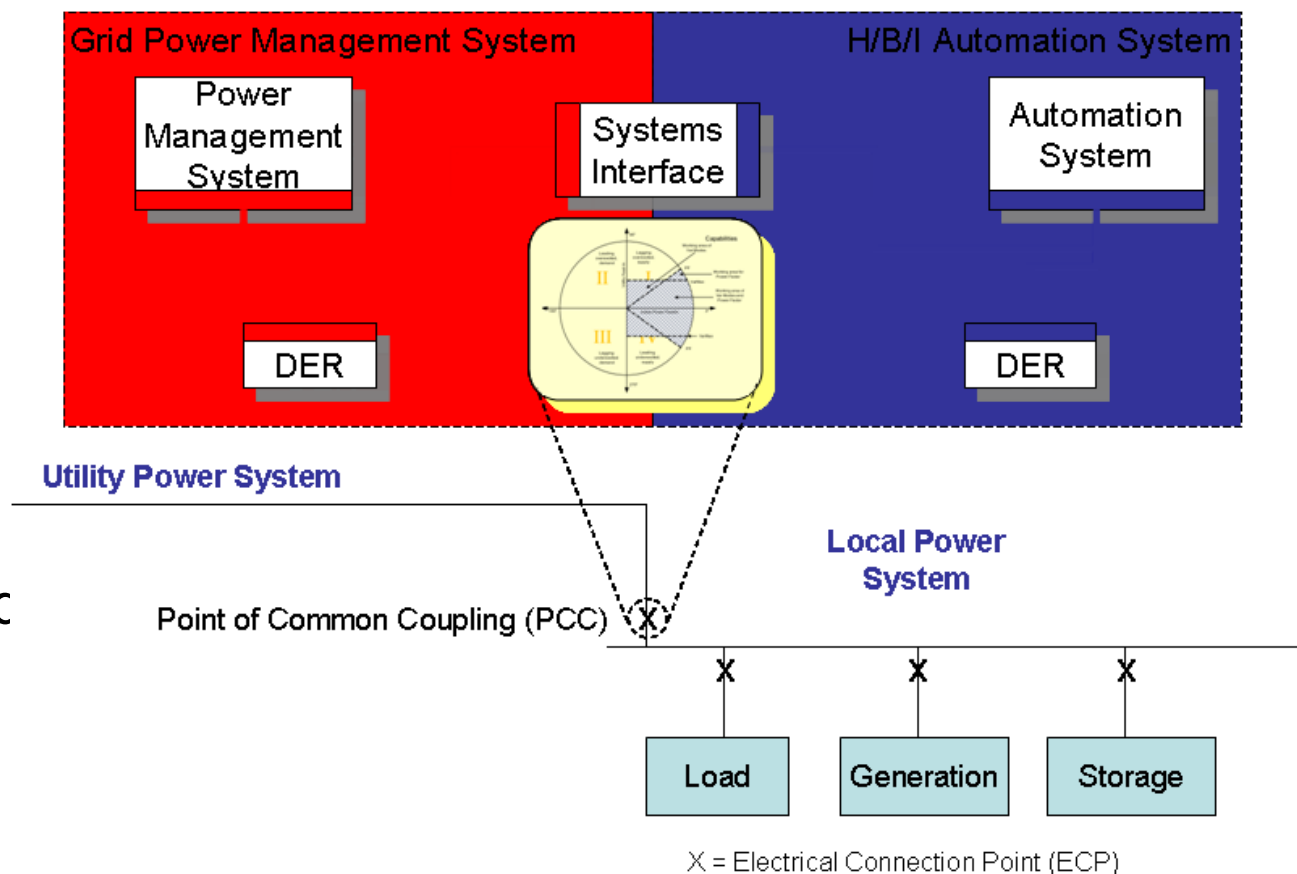
IEC 62325 – Market CIM

- Tržište električne energije
- CIM model
- USA vs. Europe
- Prijenos
- Distribucija



IEC 62746 – Aktivno upravljanje potrošnjom

- TC57 WG21
- Automatizacija kućanstava
- Sučelja
- XMPP
- Podatkovni moc
- TC65



IEC 61850 – Budući razvoj

