Schneider Electric
IT/OT – Utility Transformation
Utility Business Case

Novi Sad

May 19, 2016

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Tipičan scenario rada dispečera kod incidenta

Npr. tokom oluje grana pada na nadzemni vod i tada …

zaštitna oprema reaguje (zbog npr. zemljospoja) i isključuje napajanje

- status zaštite se automatski prosleđuje u ADMS i dispečer dobija alarm
- softver za podršku potrošača prima dojave o problemu sa napajanjem

dispečer locira mesto kvara

- više načina-tehnika
- šalje se ekipa na teren da potvrdi kvar

dispečer i ekipa izoluju mesto kvara

dispečer pokuša da napoji deo mreže gde nije kvar (a nema napajanja) iz alternativnih pravaca (druge TS)

ekipa izvrši popravke

skloni se izolacija kvara i normalizuje (restaurira) napajanje

Tipičan scenario rada inženjera na kratkoročnom planiranju

Npr. projektovanje napajanja za novi trgovinski centar i tada …

Inženjer ucrta napajanje u GIS alatu (off-line rad)

Unete izmene se prenesu u ADMS softver

- Koristi DMS GUI alat da dopuni podatke o novim elementima

Simulacijama proveri ispravnost rešenja (off-line rad)

- Proverava opterećenje mreže, zaštitu, …

Softver formira opis izmena (datoteke) (off-line rad)

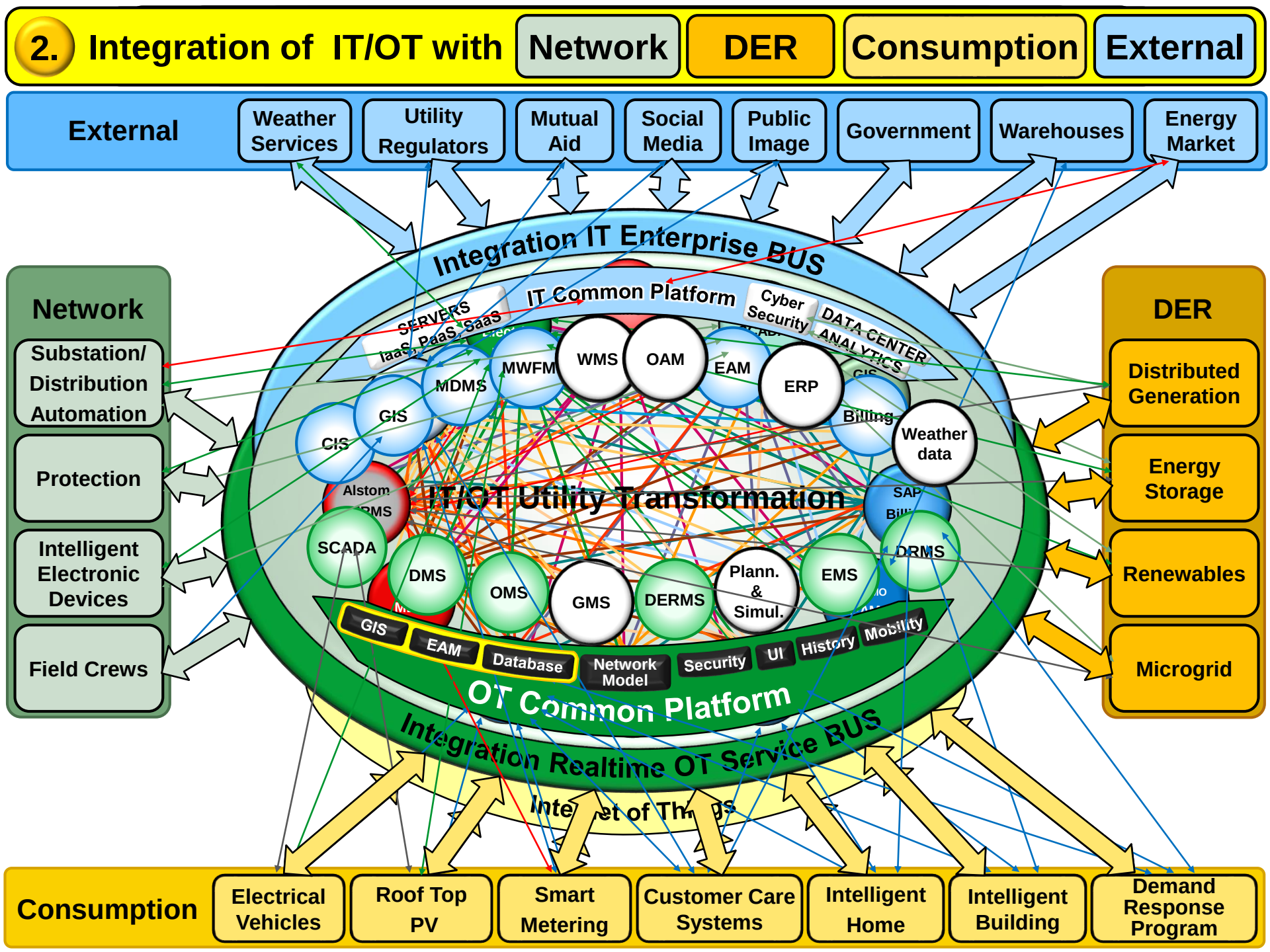
- izmene modela podataka
- operacije pre početka radova
- operacije nakon završetka radova

Izmene se primenjuju u pogodnom trenutku (on-line rad)

- sprovode se u sinhronizmu sa ekipom na terenu

Namena ADMS

Nadzor i vizualizacija – uvid u tekuće stanje sistema
Posredno upravljanje – slanje komandi upravljačkim uređajima
Pomoć simulacija radi donošenja odluka
Podrška terenskog rada (incidenti i planiran rad)
Automatsko upravljanje (FLISR and VVO)
Integracija sa drugim aplikacijama


2. Integration of IT/OT with
Network
DER
Consumption
External
External
Weather Services
Utility Regulators
Mutual Aid
Social Media
Public Image
Government
Warehouses
Energy Market
Integration IT Enterprise BUS
IT Common Platform
SERVERS
IaaS, PaaS, SaaS
Cyber Security
DATA CENTER
ANALYTICS
MWFM
WMS
OAM
EAM
ERP
MDMS
GIS
CIS
Billing
Weather data
IT/OT Utility Transformation
Alstom
SCADA
DMS
OMS
GMS
DERMS
Plann. & Simul.
EMS
DRMS
SAP
GIS
EAM
Database
Network Model
Security
UI
History
Mobility
OT Common Platform
Integration Realtime OT Service BUS
Internet of Things
Network
Substation/ Distribution Automation
Protection
Intelligent Electronic Devices
Field Crews
DER
Distributed Generation
Energy Storage
Renewables
Microgrid
Consumption
Electrical Vehicles
Roof Top PV
Smart Metering
Customer Care Systems
Intelligent Home
Intelligent Building
Demand Response Program

Benefits of IT/OT Transformation

- Comprehensive IT/OT transformation which integrates all utility systems and place open platform for adding any new applications, modules and integration with intelligent equipment
- Optimal and safe network operation; interaction with field crew, reduction of ownership costs, long term upgrade and support
- New IT/OT Solution provides benefits for customers: possibility to interact by mobile with Web customer service, reduced outage time trough automation and remote control actions
- SE will provide stable long partnership with clear License &Service Agreement; engineering support/expertize/ and sharing last experiences from advanced customers around the World
- **SE provides strong commitment to understand, design, manage, execute and support all IT/OT transformation up to final IT/OT solution with full responsibility for 3rd party integration**

Utility IT/OT Solution Suite

Empowering the Smart Utility

DER Microgrid

- Renewable Energy
- Demand Side Operations
- Microgrid Controller, Equipment, Services
- Power Forecasting
- Energy Market Interface
- Consulting Services

Central Generation

- Power Control System
- Intelligent PLC Control
- Distributed Control (DCS)
- AGC, Economic Dispatch
- Unit Commitment
- Nuclear and Thermal BoP
- Security Systems

Advanced Distribution Management System

SCADA · MWFM · DMS · OAM · OMS · Planning · EMS · Simulation · DERMS

Data Management

EAM · ArcFM · ADMS

Common Platform

Model · UI · History · Security · Mobility

Asset Management

- GIS with Design
- Enterprise Data Historian
- Operational Asset Mgmt
- Condition Monitoring
- Predictive Analytics
- Enterprise Asset Mgmt
- Weather Services

Grid Automation

- Grid Modernization
- Automation Equipment
- Substations & Feeders
- Metering & Protection
- Video Analytics
- Field Services
- T&D Maintenance

Customer

- Energy Efficiency
- Demand Response
- Home and Building Energy Management
- Smart Metering
- EV Charging
- Smart Thermostats

ArcFM · Avantis PRiSM · Avantis .PRO · WeatherSentry · Easergy T200 · PACiS · ION · PELCO Cameras · MiCOM Relays · EVlink charging solutions · Titanium · EPO · Energy Pool · WiserAir · Schneider Electric

Hybrid Cloud IT/OT Solution & HEM Solution

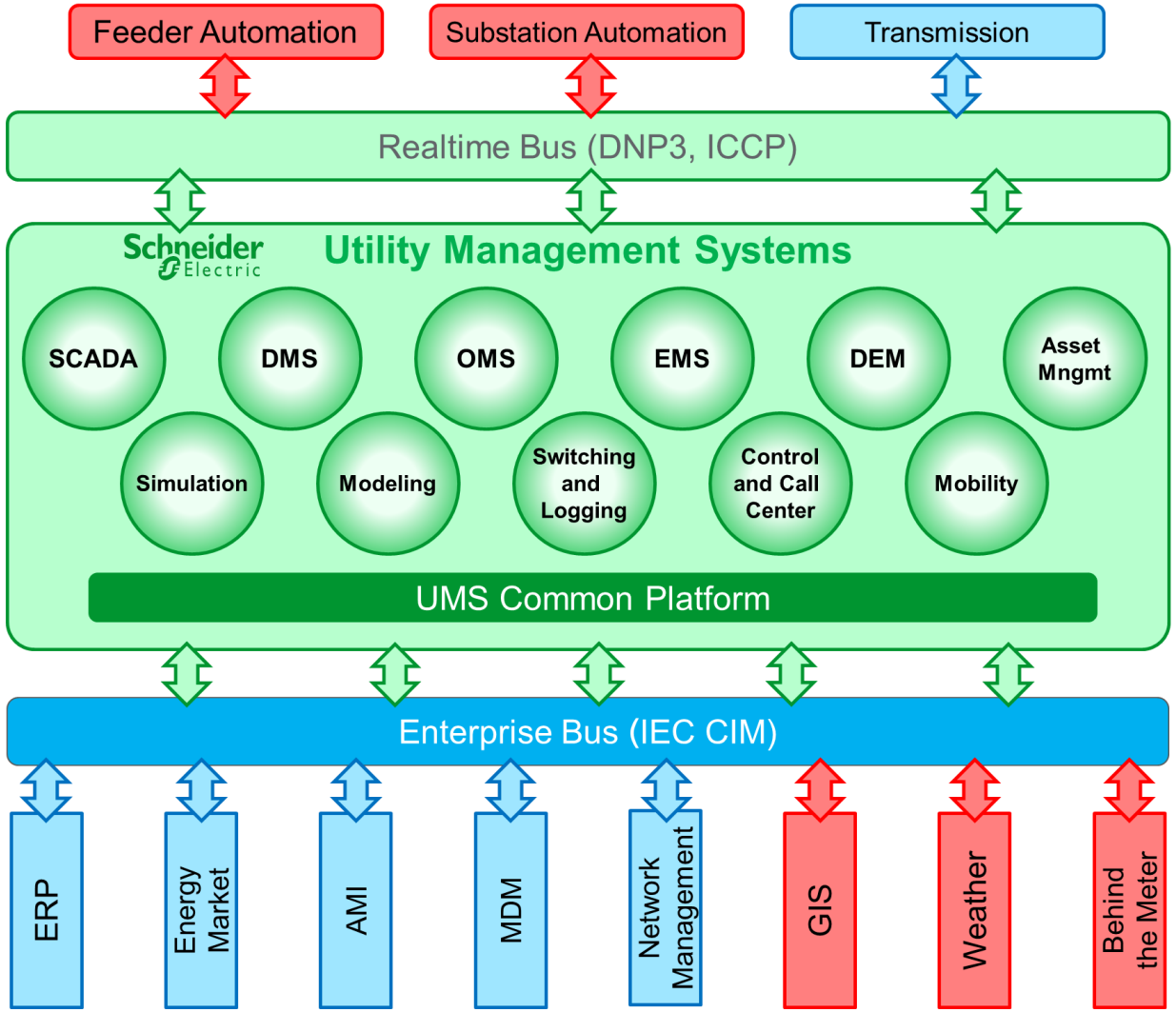
Hybrid Cloud

Traditional IT/OT Solution

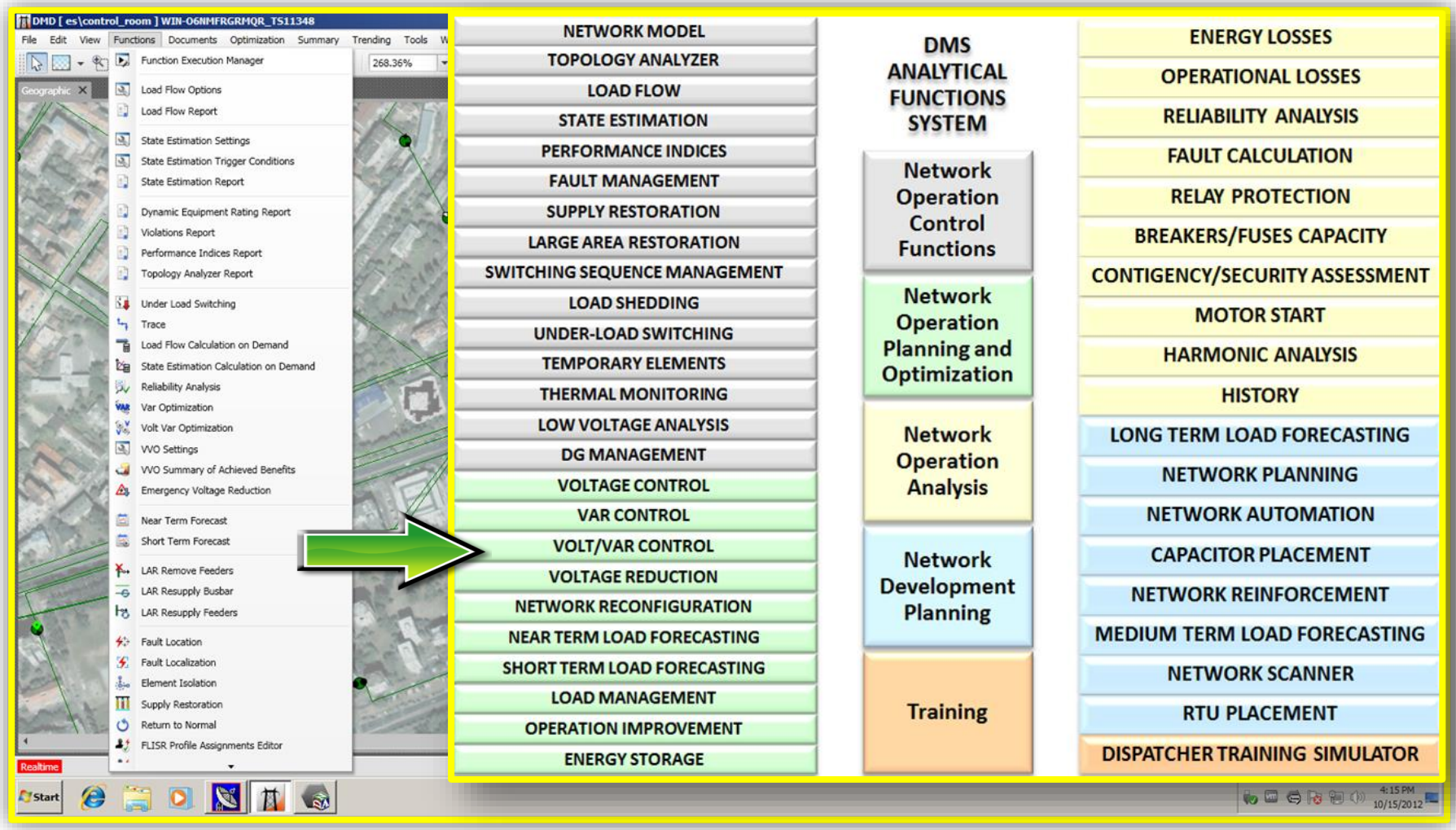
Google Cloud

Microsoft Cloud

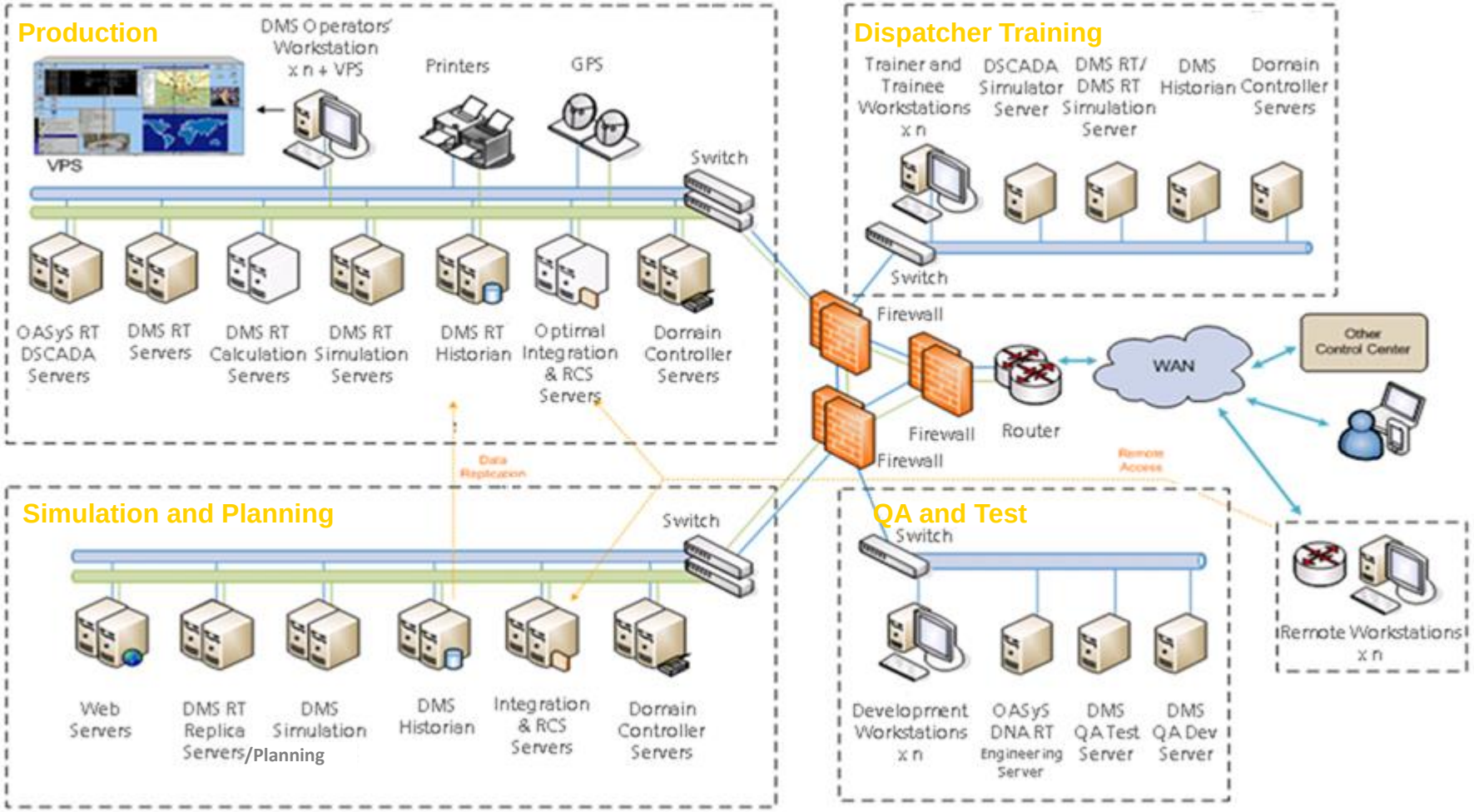
Generalna arhitektura



ADMS energetske funkcije



ADMS sistemska arhitektura



IEC 62357-1 TR:
Power systems management and associated information exchange – Part 1: Reference architecture

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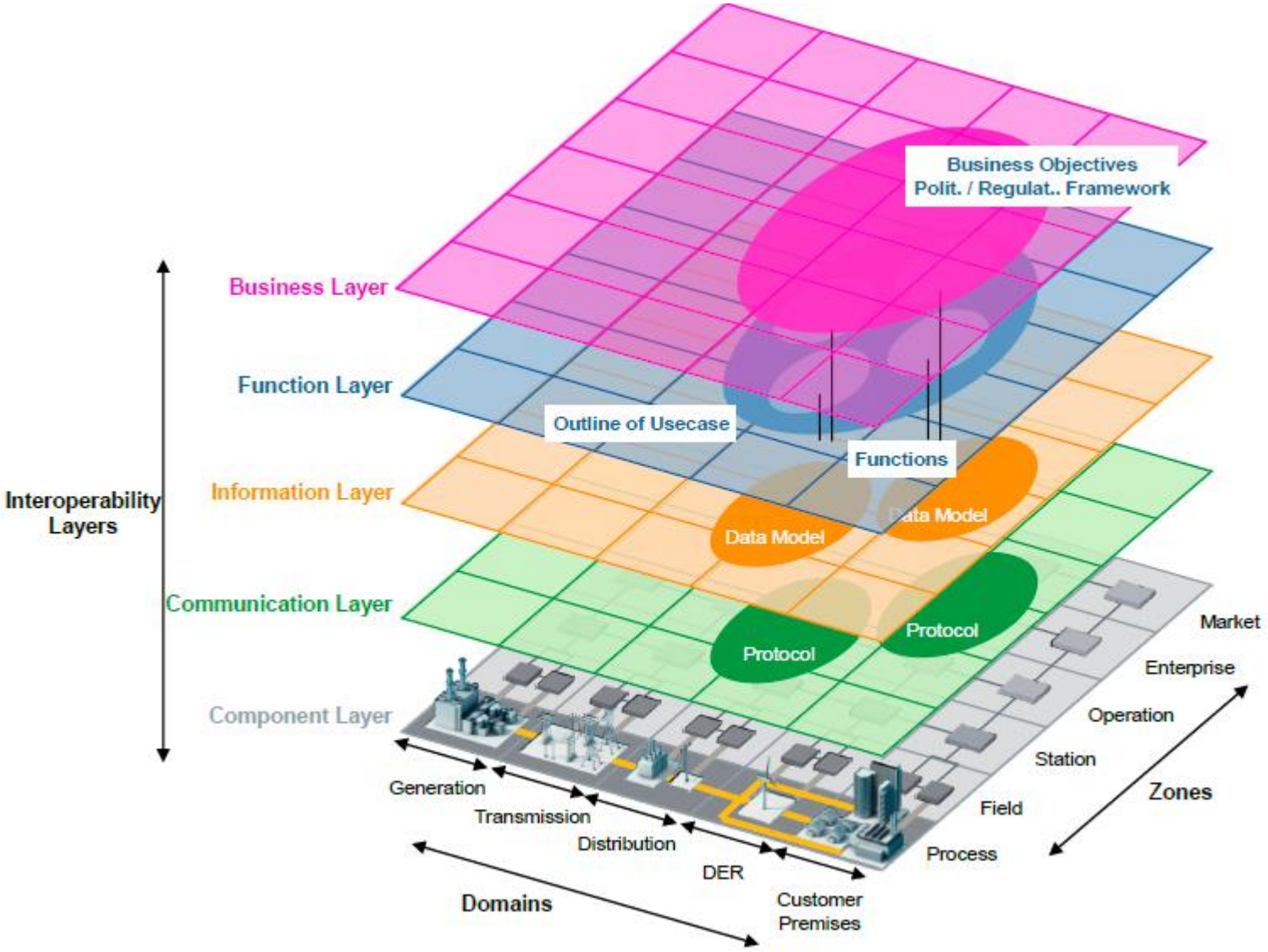
SGAM Model



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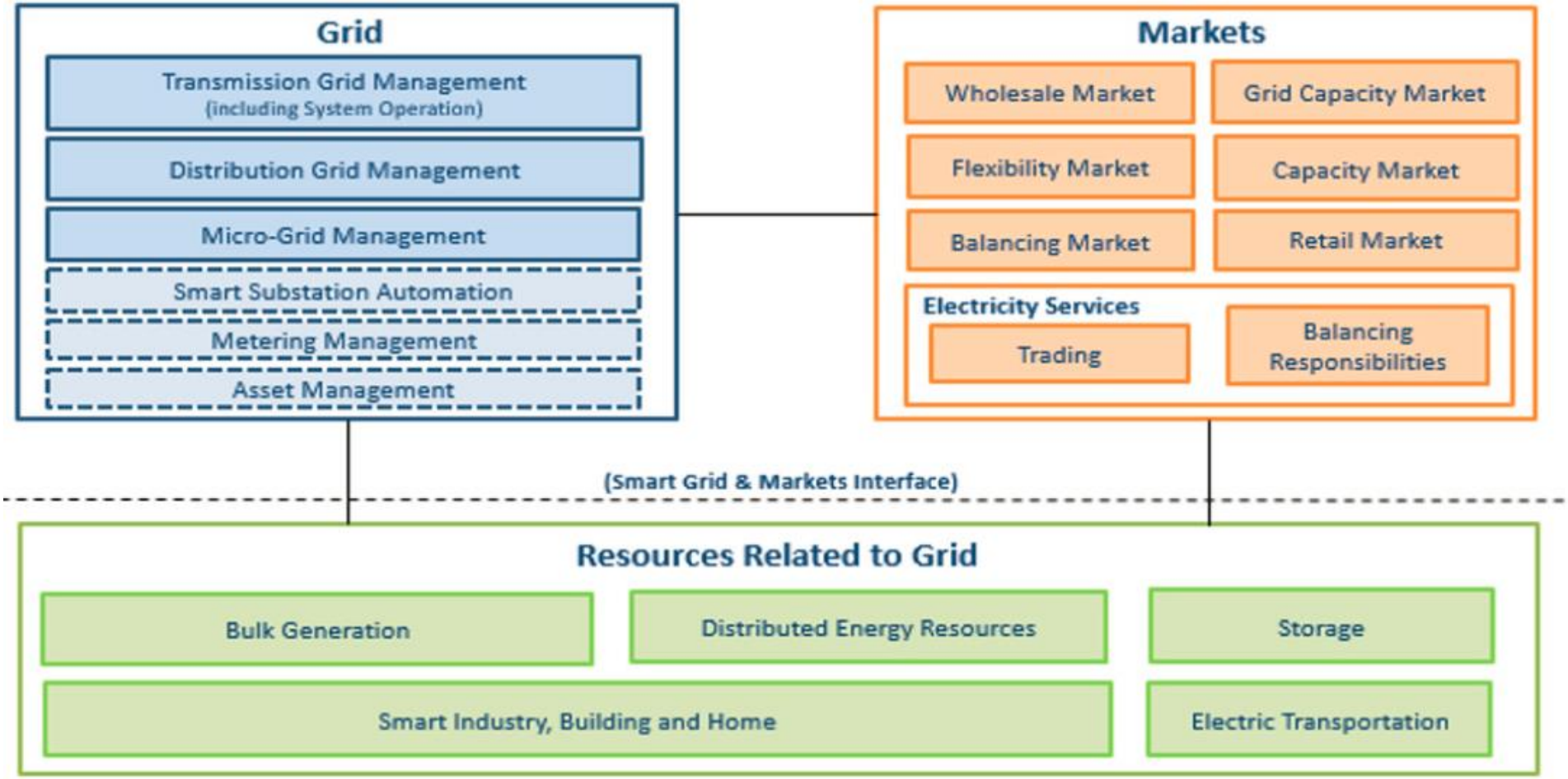
IEC 62913 Conceptual Model



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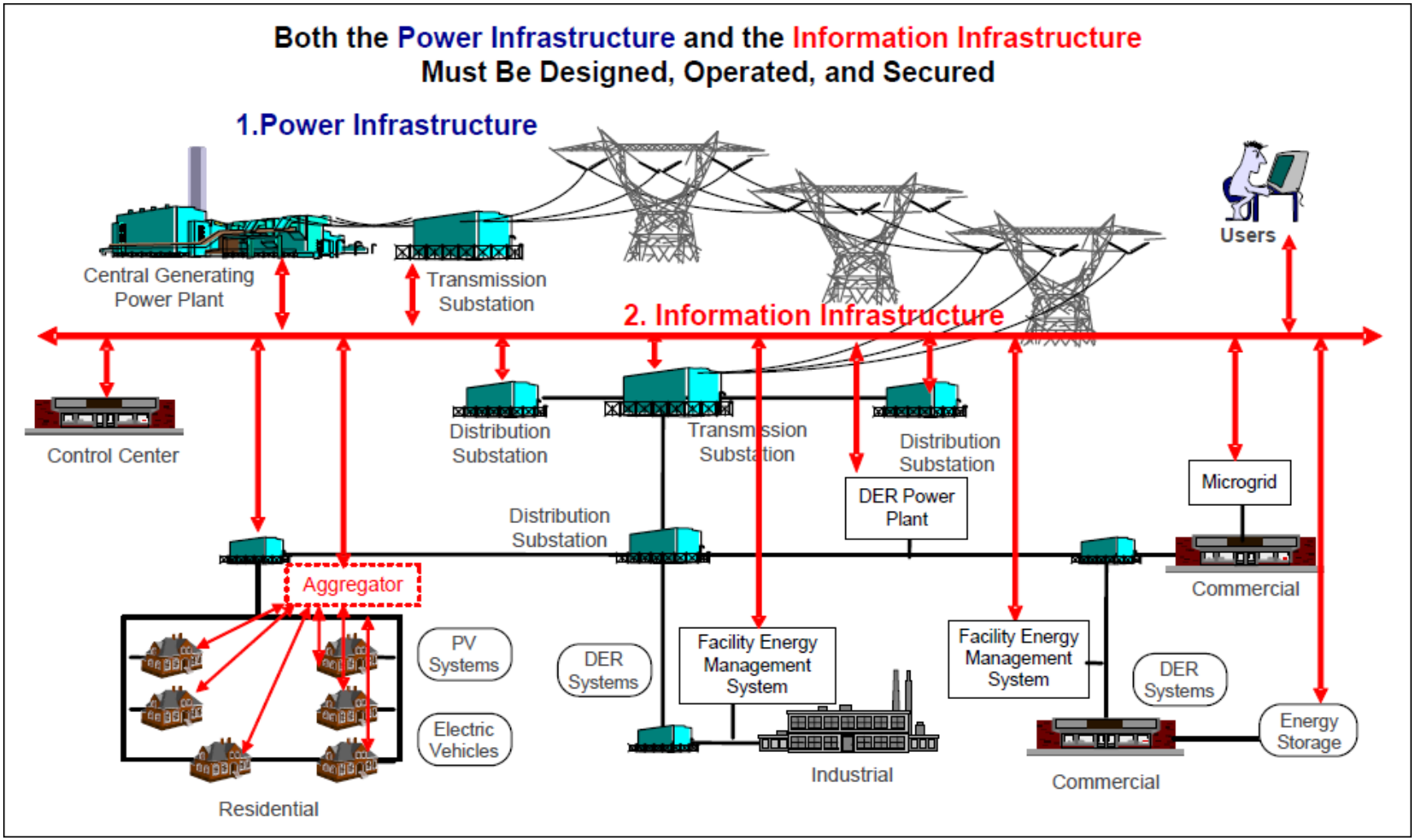
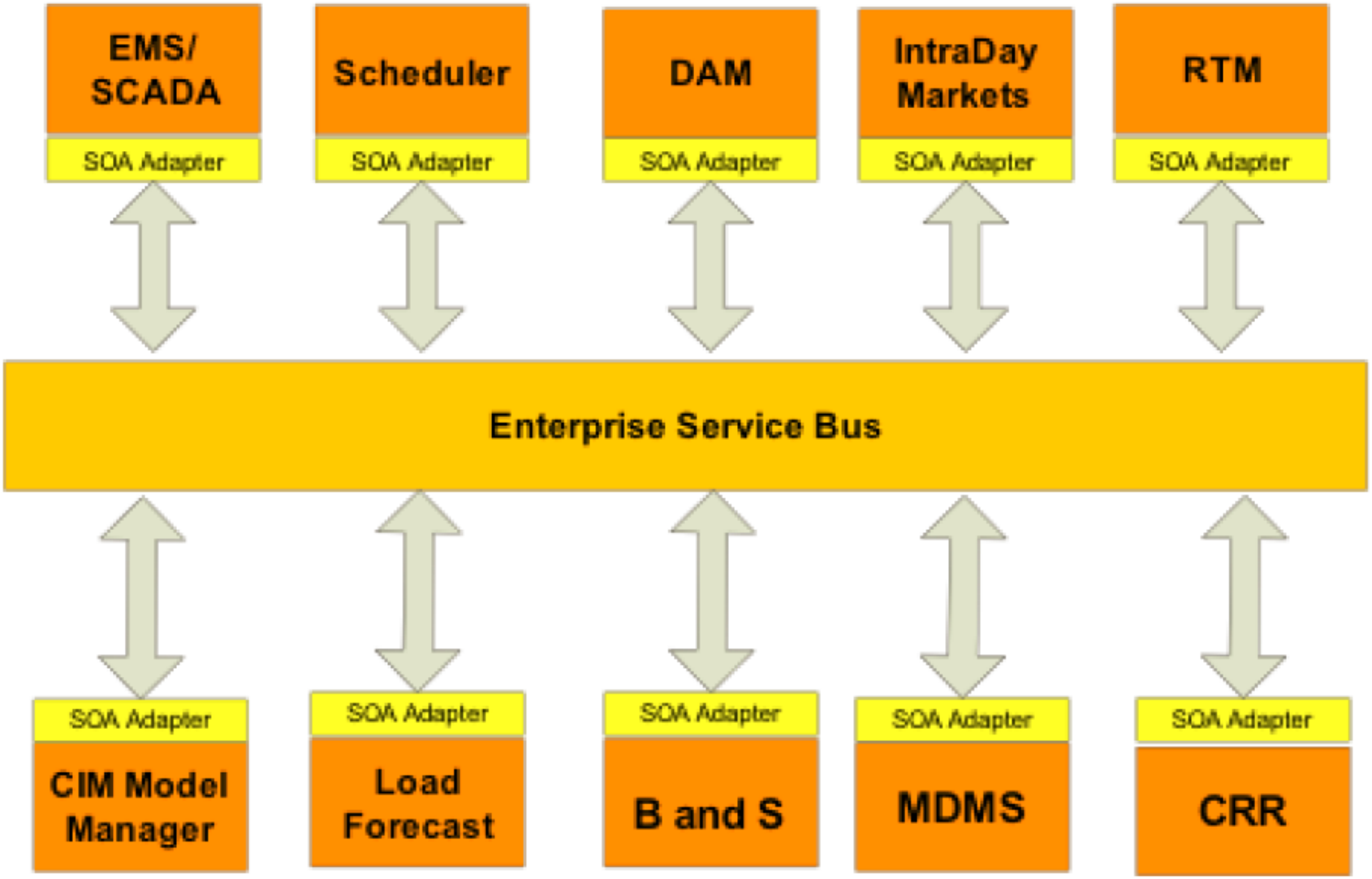
Two infrastructures (OT/IT) must be designed, operated, and secured



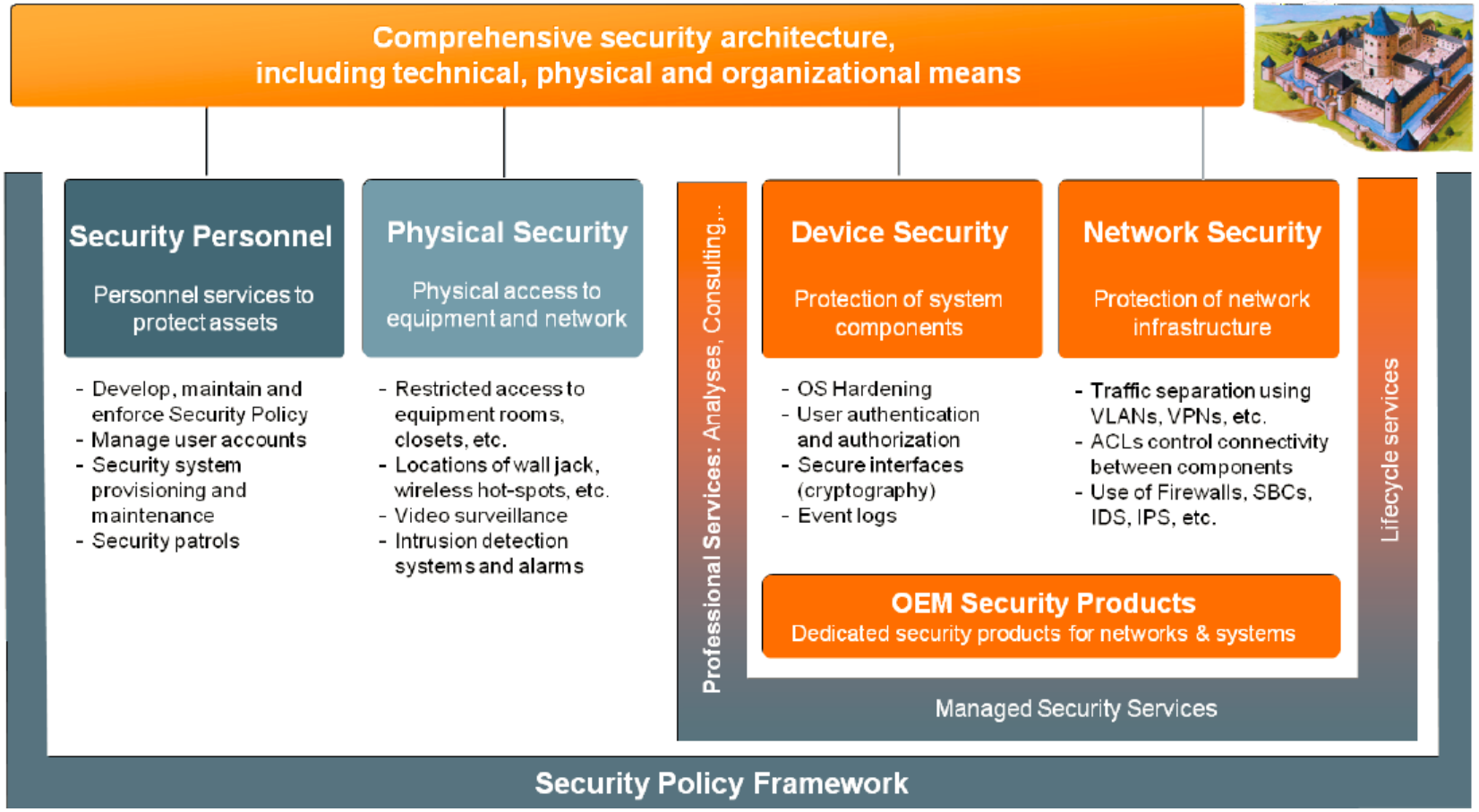
Actors

- Implementing actors
  - Transmission System Operators and Grid Operators
  - Distribution System Operators and Grid Operators
  - Resources related stakeholders
  - Market players
  - Vendors
- Standardisation actors
  - Regulators
  - Standard Development Organisations

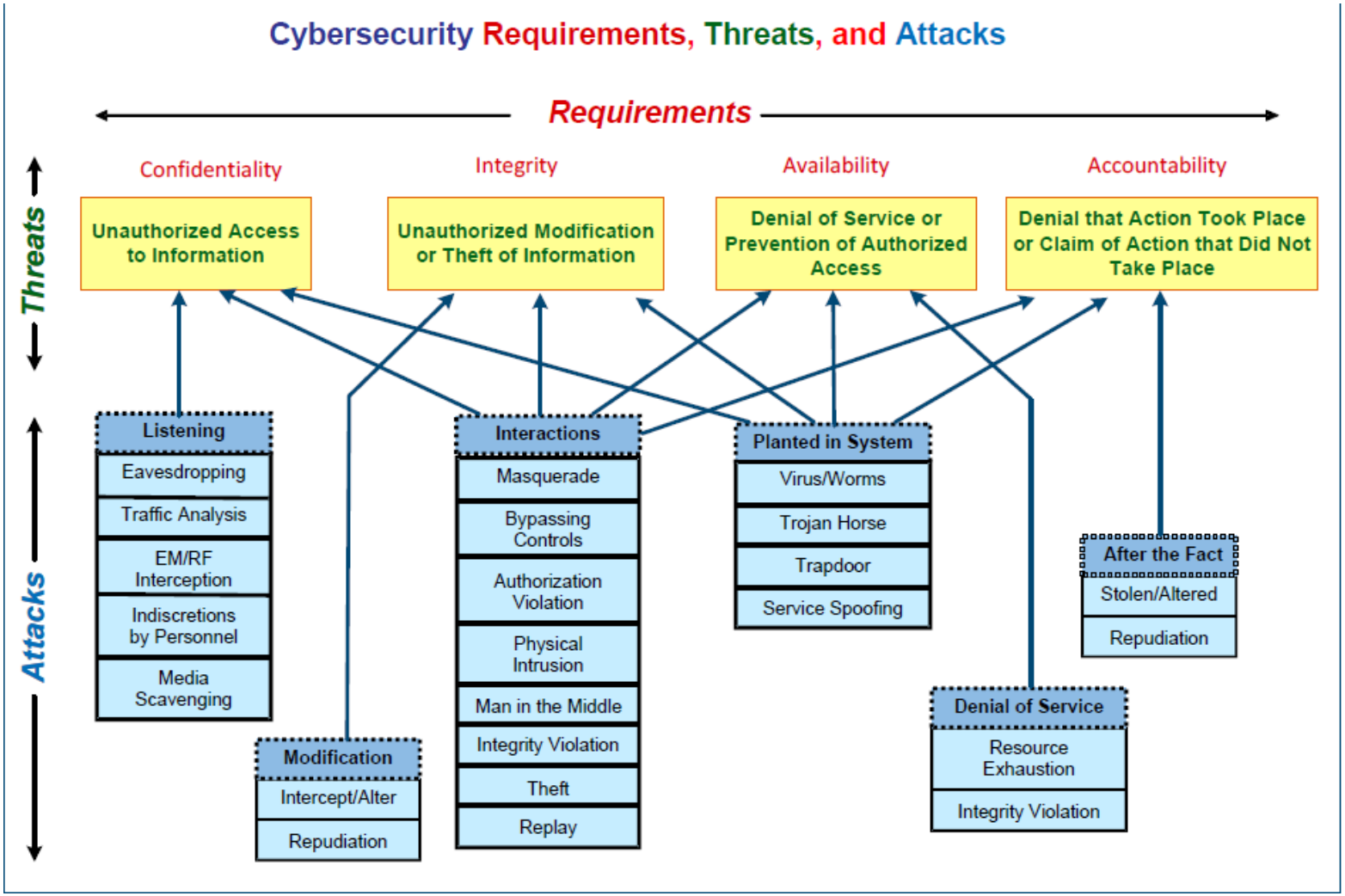
Interface Reference Model or the North American Style ISO/RTO market operations



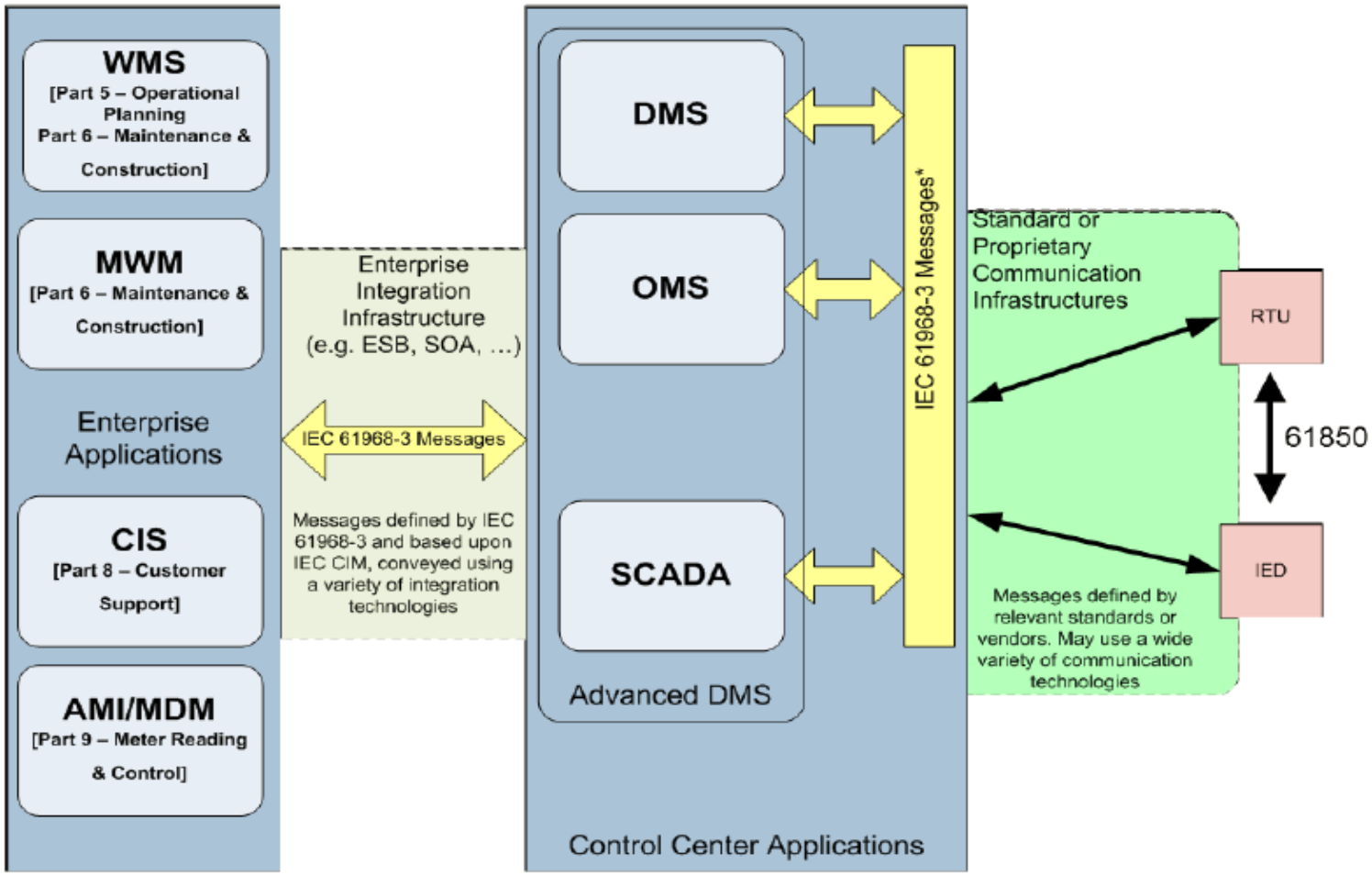
Generic security architecture



Typical cyber security requirements, threats, and possible attack techniques



Example of control centre distribution system and relationships with other 2107 typical distribution systems



* Note, that depending on the