

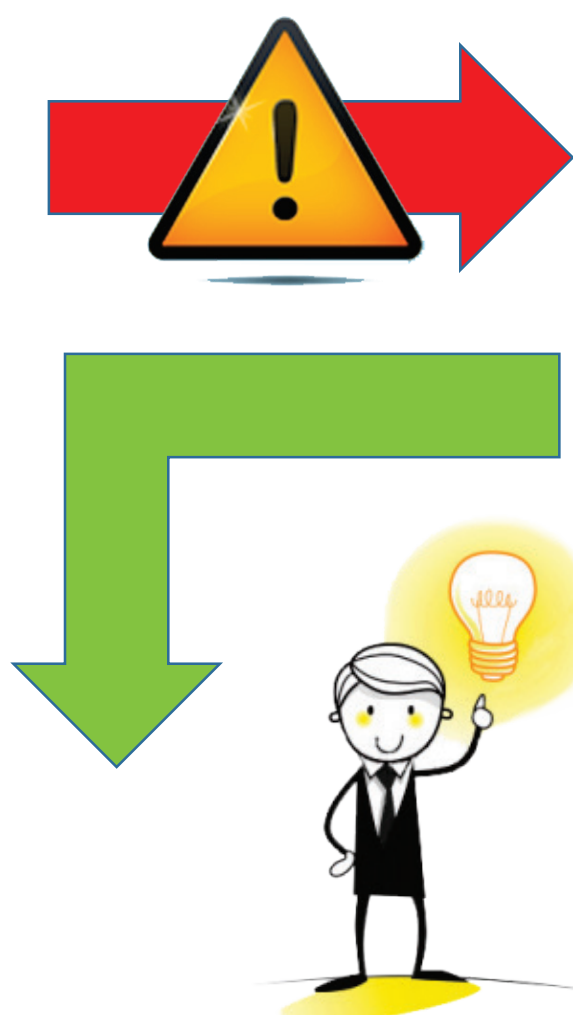


Information Security in Electric Power Utilities' Environment

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IS within Electric Power Utility (EPU):

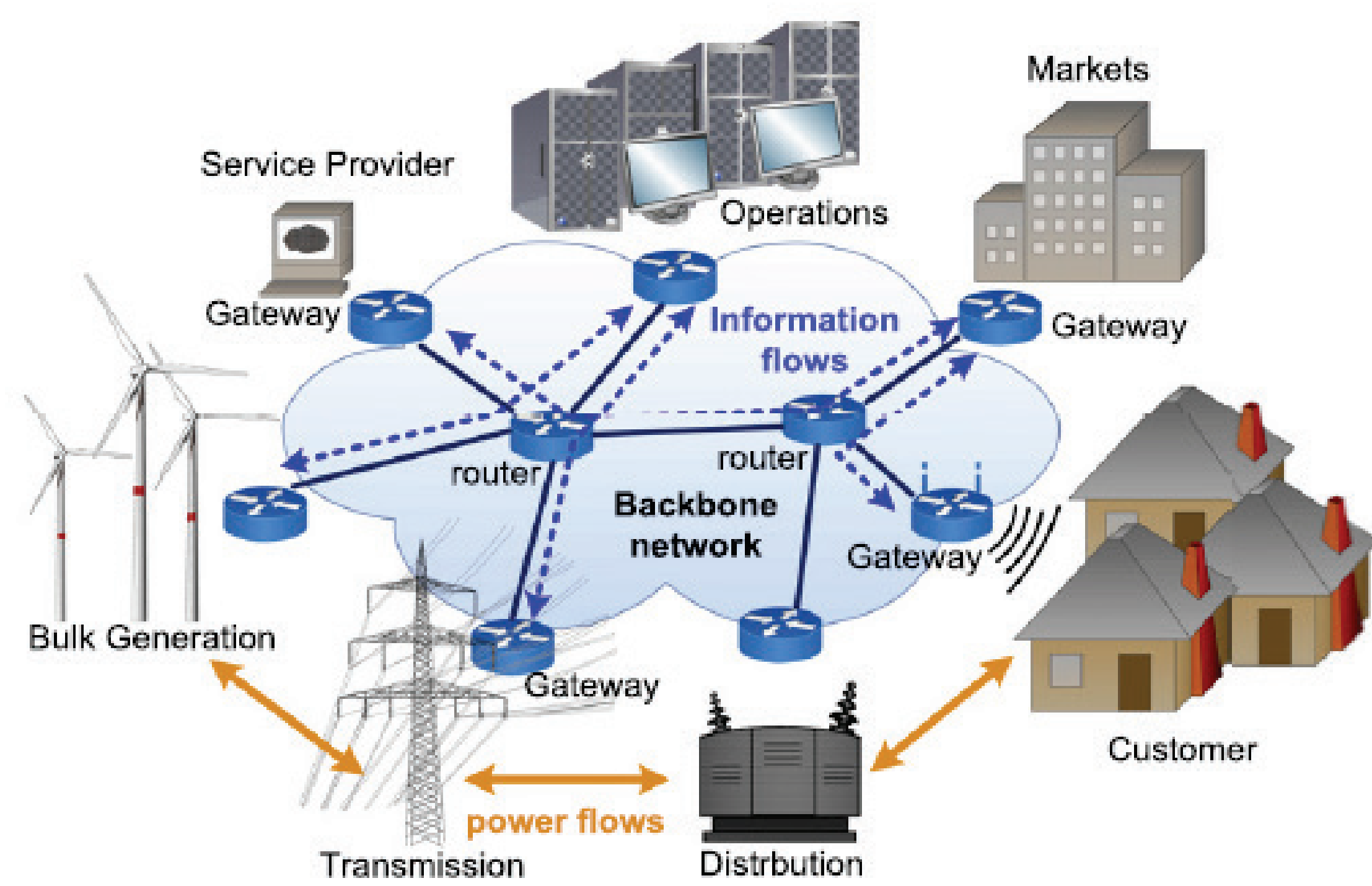
- Real Time (Industrial Control) Systems (... , SCADA, Smart Grid, ...)
- Administrative Operational Systems
- Administrative Systems



Vulnerable because of increased size and functionality, not isolated, open platforms, widespread access, application of wireless technologies, ...

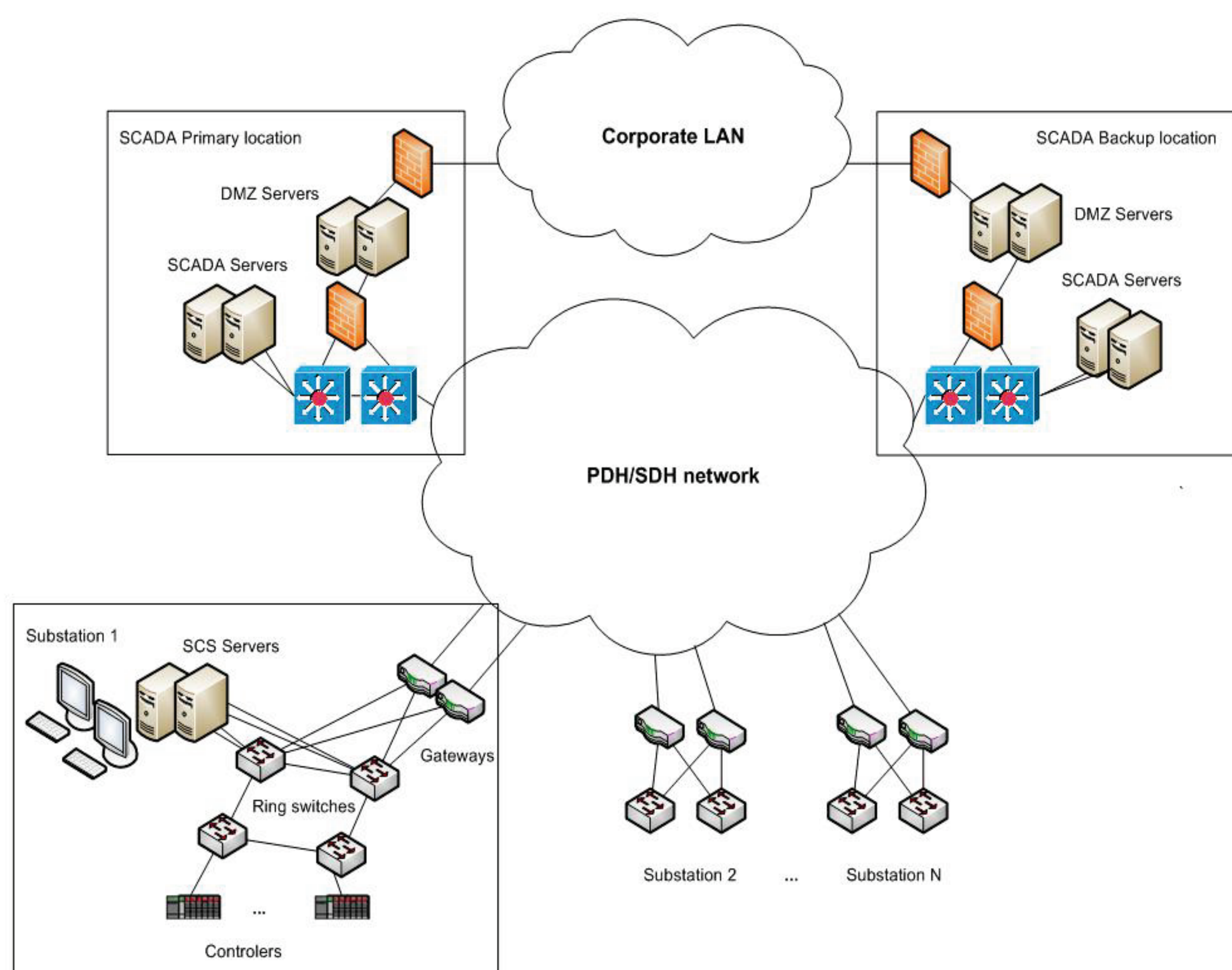
Relevant Information Security Standards:

- ISO 27001:2013 (CIA - Confidentiality, Integrity, Availability, Annex A with 114 Controls)
- Recommendations of CIGRE – Technical Brochures TB 317, TB 419, TB 603 (AIC – Availability, Integrity, Confidentiality!)
- NIST standards (NIST SP-800-82 /ICS, NISTIR 7628/Smart Grid)
- NERC standards (non-continual generation Bulk Electric Systems – BEC)
- USA Department of Energy (DoE) – Model with 10 domains, 4 Maturity Indicator Levels (MIL0 to MIL 3), ISec RM OE-0003, Tier 3/ICS
- ENISA – Smart Grid Security, 12 areas, 10 recommendations (Referent Smart Grid architecture)



Information security EPU – documented attacks:

- Intentional targeted attacks (unauthorized access, Denial of Service – DoS, etc)
- Unintentional consequences or collateral damage (lower speed, „back door“, ...)
- Unintentional consequences (internal mechanisms, human mistakes, ...)



CASE STUDY: HIGH VOLTAGE SCADA

- Substation Control Systems (SCS) in 13 s/s, connected with SCADA servers in centre
- Communication within s/s IEC 61850, between SCS-SCADA IEC 60870-5-104
- Two SCADA centers (Primary, Backup – Disaster Recovery location)
- Hierarchical organization – monitoring, control network, HMI, SCS, controllers, instrumentation (switches, gauges, sensors)
- „Defense in Depth“ concept
- Several layers (physical, network, perimeter, security of computer, application and equipment)
- Segregation of networks
- Segregation of duties
- SCADA – enterprise level via firewall, only to servers in Demilitarized zone (DMZ)

THANK YOU FOR YOUR ATTENTION!

