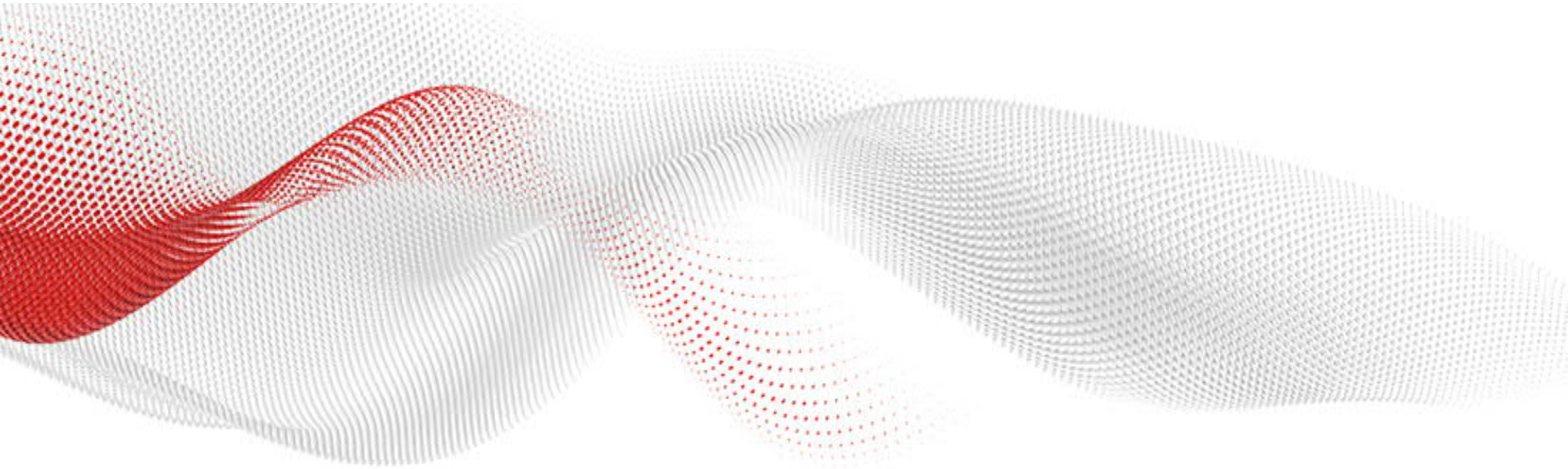


JUN 11, 2020

ABB Ability™ Electrification Monitoring and Control, **ABB ZEE600**

Phạm Trần Anh / Product Specialist – MV Relay and Distribution Automation Solution

Content

Duration: 60 mins

Phạm Trần Anh

Product Specialist– Distribution Automation Products and Solutions

- ZEE600 Introduction and Functions
- Application area
- References
- Conclusion
- Introduce software with demo project
- Q&A

ABB ZEE600

Part A: Introduction and Functions

ABB ZEE600 – Solution definition

"Based on zenon Energy Edition SCADA and ABB Ability™ Operations Data Management zenon, the ABB Ability Electrification Monitoring and Control for distribution networks ZEE600 advantageously inherits all their features and versatility in visualization, data communication and control.

ABB ZEE600 seamlessly integrates ABB's electrification products and applications to deliver the next generation on-premise digitalization solutions for state-of-the-art electrification systems."

ABB ZEE600 - A propelling agent for Digital Solutions

Versatility at work

Why ABB ZEE600?

- Versatile across multiple segments:
  - Utilities (Power generation, Sub-transmission, Distribution, Renewables…)
  - Industries (F&B, Oil & Gas, Chemicals, Metals, Electronics & Semi-conductors…)
  - Commercial and Industrial buildings (Data Centers, Hospitals…)
  - Transportation infrastructure (Railways, e-mobility, airports…)
- Easy, wide-range, seamless device & system integration
- Fast deployment using libraries
- Well accepted & proven

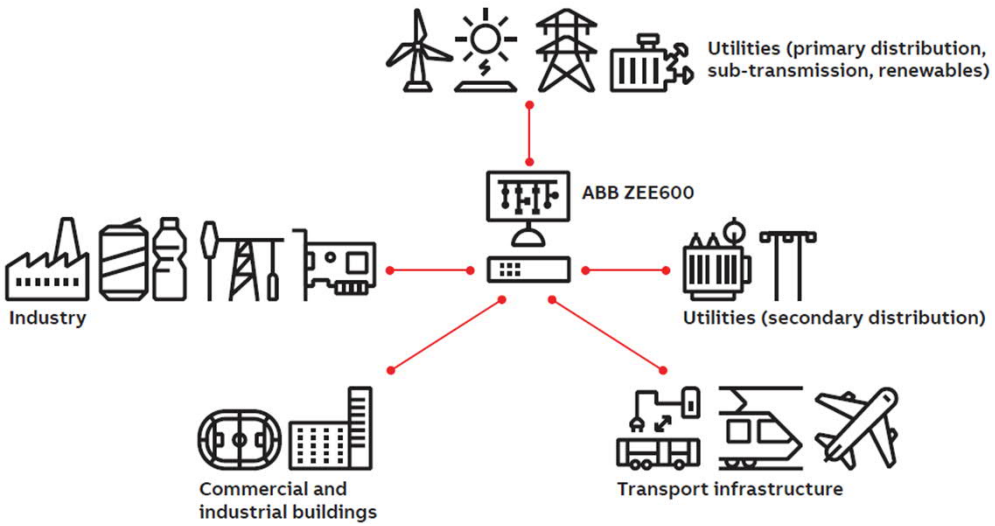


ABB ZEE600 – Coverage

Operational facets

A 360° view

Handles several essential facets of substation and electrical process monitoring, control and data management.

- Process awareness
- Process control
- Process monitoring
- Cyber security
- Connectivity to downstream and upstream devices or systems
- ABB electrification libraries

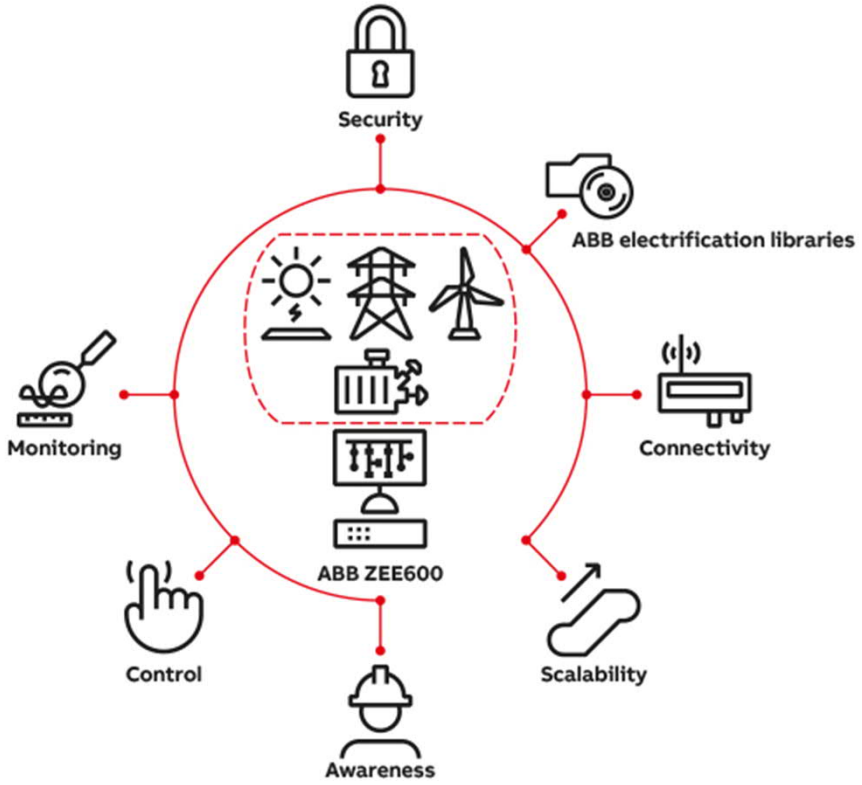
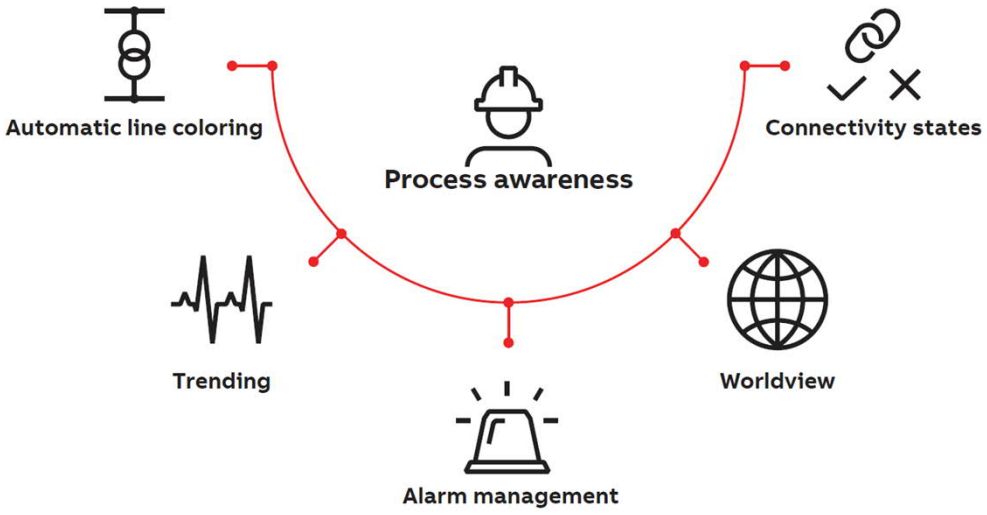


ABB ZEE600 – Multiple facets

Splitting the dimensions (1/3)

Process awareness



Process control

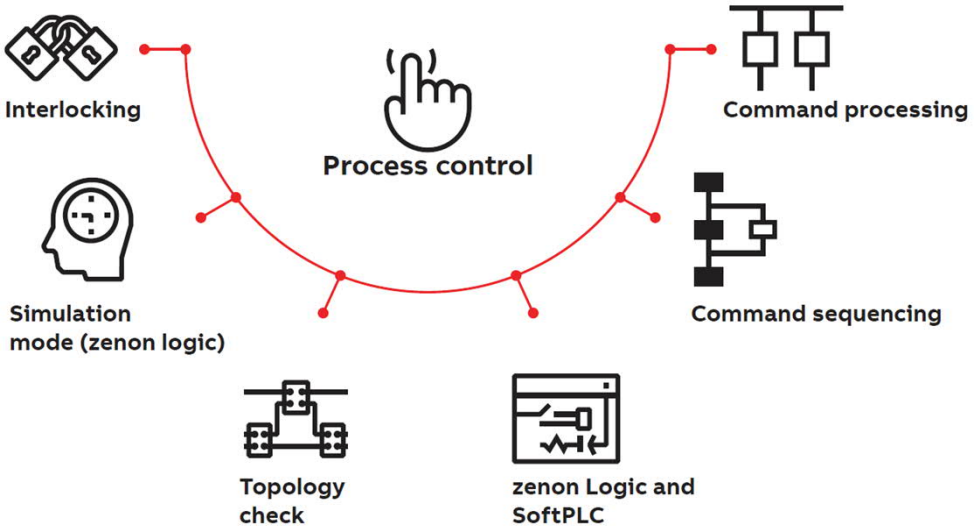
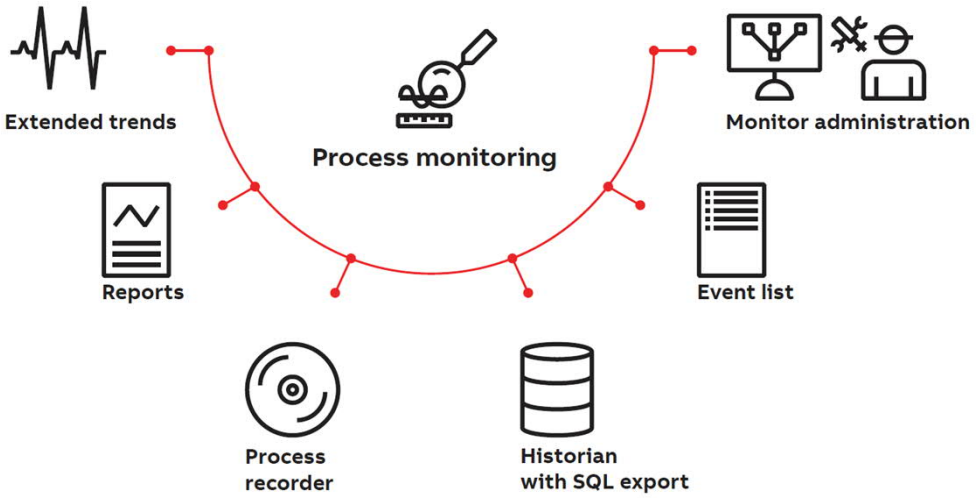


ABB ZEE600 – Multiple facets

Splitting the dimensions (2/3)

Process monitoring



Secure access and operation

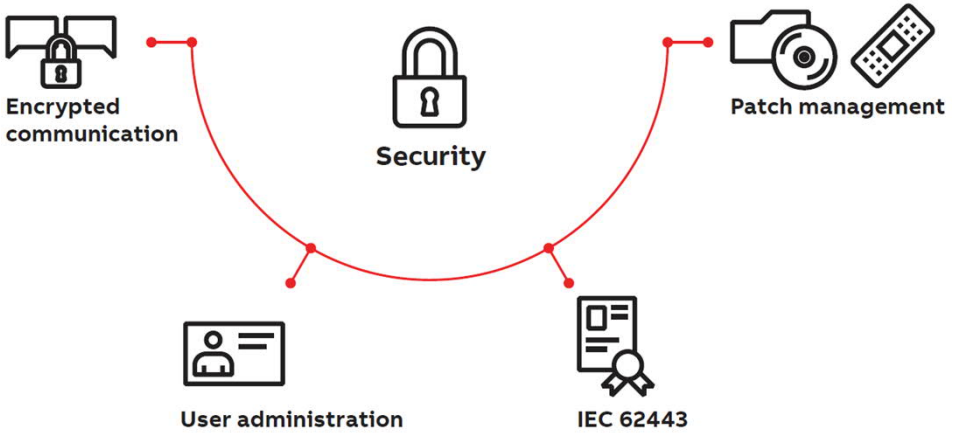
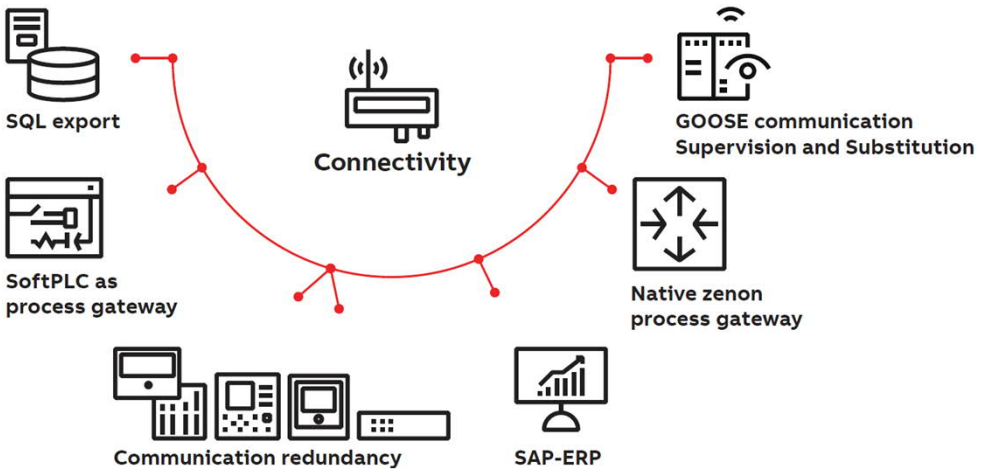


ABB ZEE600 – Multiple facets

Splitting the dimensions (3/3)

Connectivity



Electrification libraries

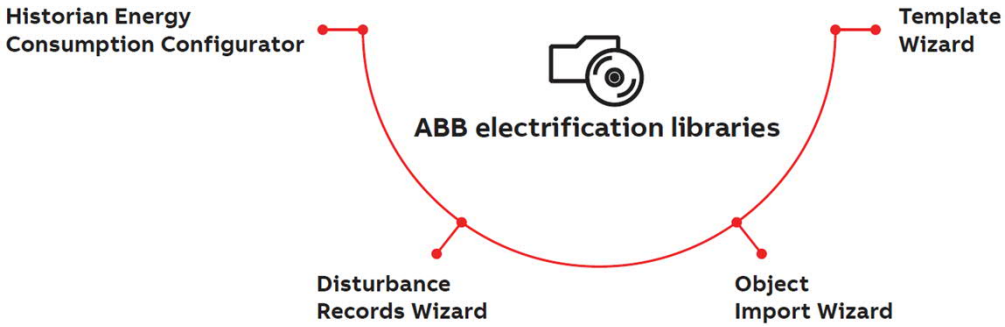


ABB ZEE600 – Solutions eco-system

An integrated picture

The eco-system…

- ABB protection and control relays
  - Relion series (611, 615, 620 and 630 series and REX640) for medium voltage
  - ABB Ekip Up series for low voltage
- 3rd party devices or legacy relays
- PLC and IO devices (AC800M, AC500 or RIO600)
- Intelligent circuit breakers (Emax)
- Multifunction meters (M4M or third party like SATEC)
- Realizes full-fledged Operational Technology (OT) system

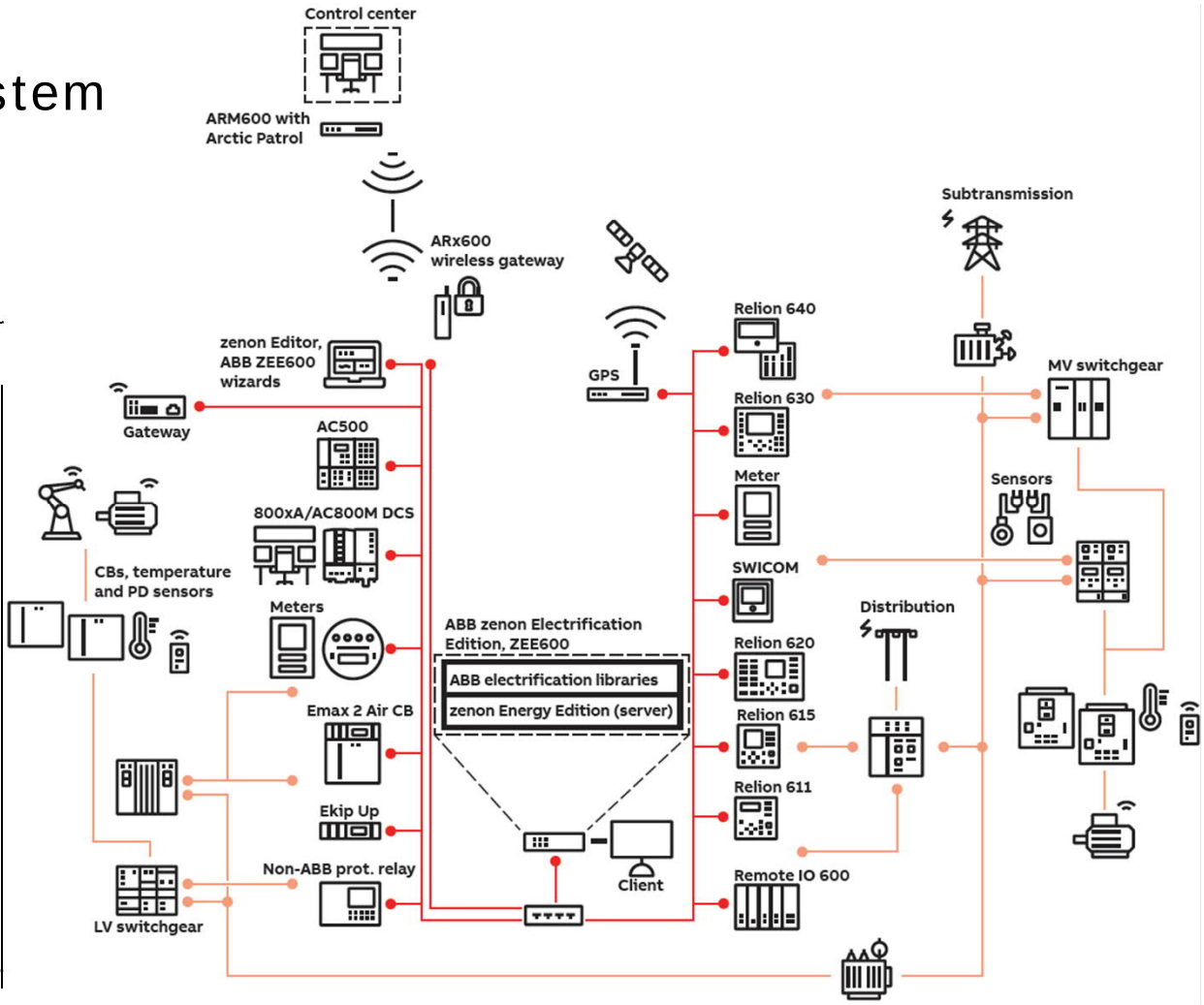


ABB ZEE600 – Application perspective

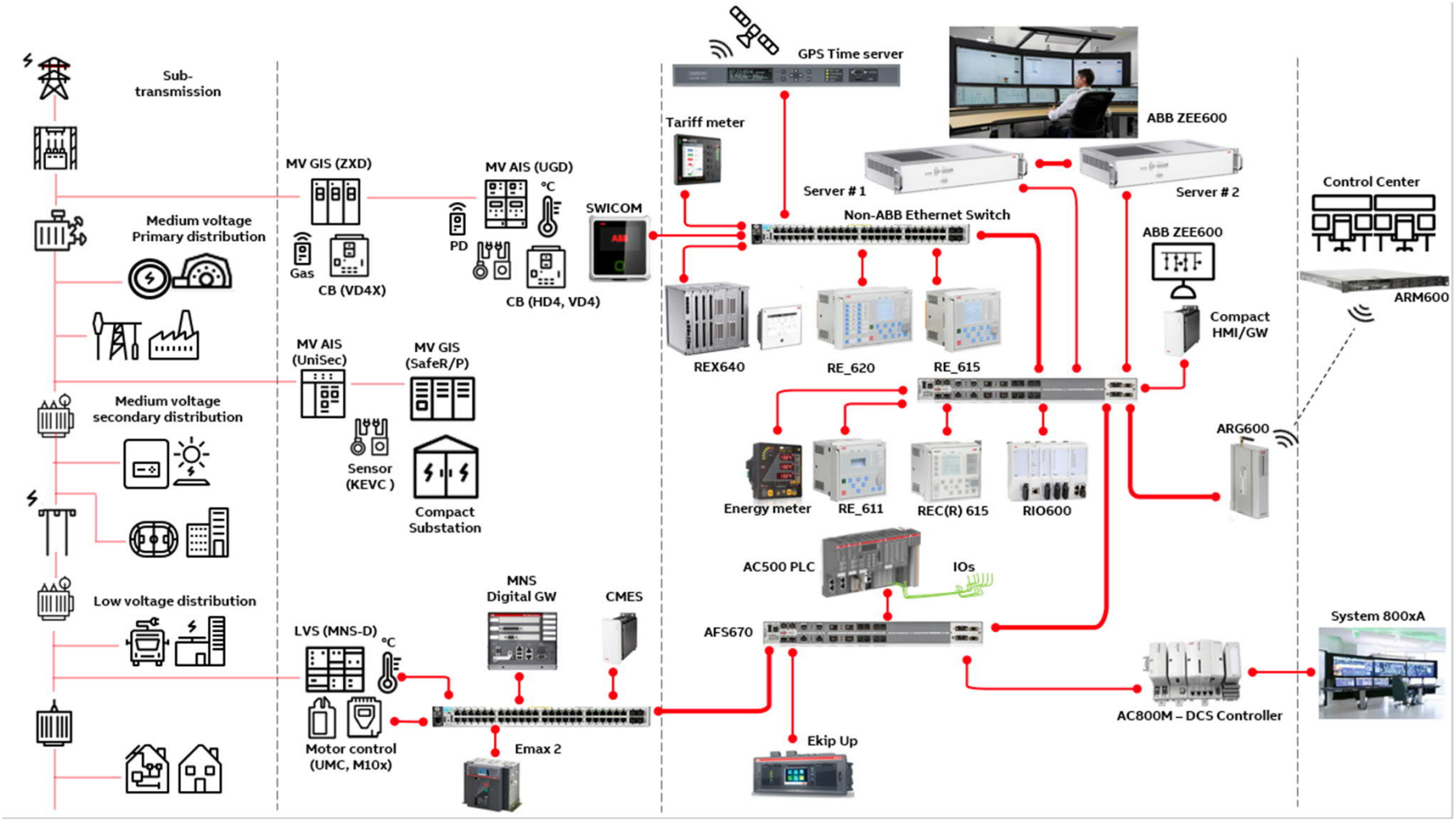
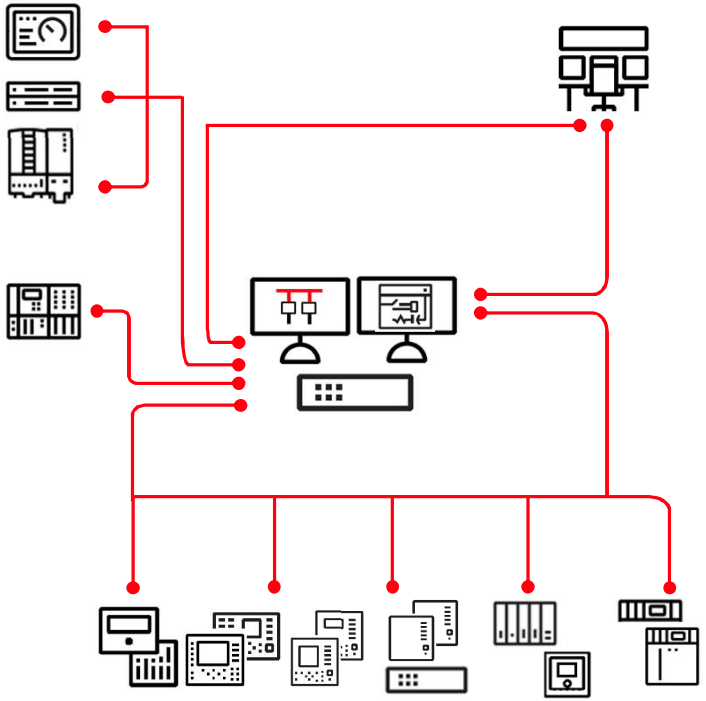


ABB ZEE600 – Connectivity

A subset relevant for Electrification

System connectivity
- DNP3 serial/TCP
- Modbus serial/TCP
- OPC DA, UA
- HTTP
- SQL
- …

Process connectivity (client)
- IEC 60870-5-101, 103, 104
- IEC 61850 Ed1, Ed2
- DNP3 serial/TCP
- Modbus serial/TCP
- AC500 driver
- IEC 61400-25 (wind power applications)
- IEC 62056-21 (metering applications)
- Profibus
- OPC DA, UA
- …



zenon logic

Client
- IEC 60870-5-101, 104
- IEC 61850 Ed1 MMS
- IEC 61850 Ed1 GOOSE (publisher/subscriber)
- …

Server
- IEC 61850 Ed1
- IEC 60870-5-101, 104
- Profinet
- …

ABB ZEE600 – Application perspective

IEC view

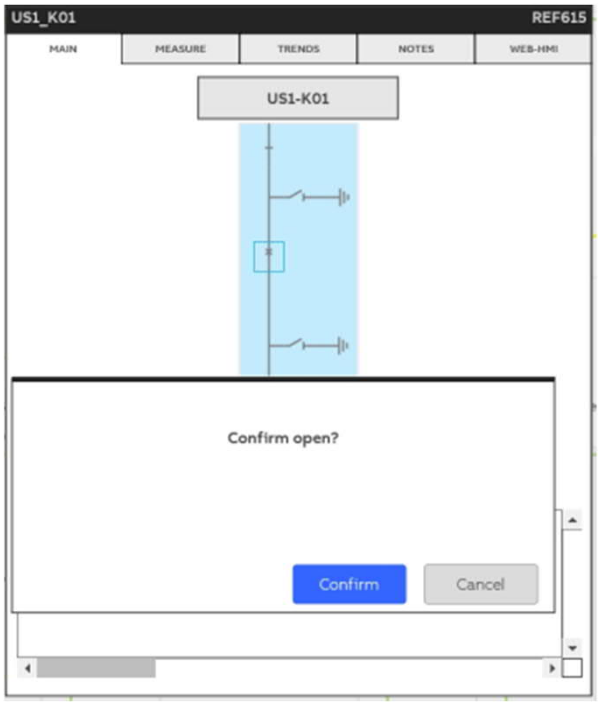
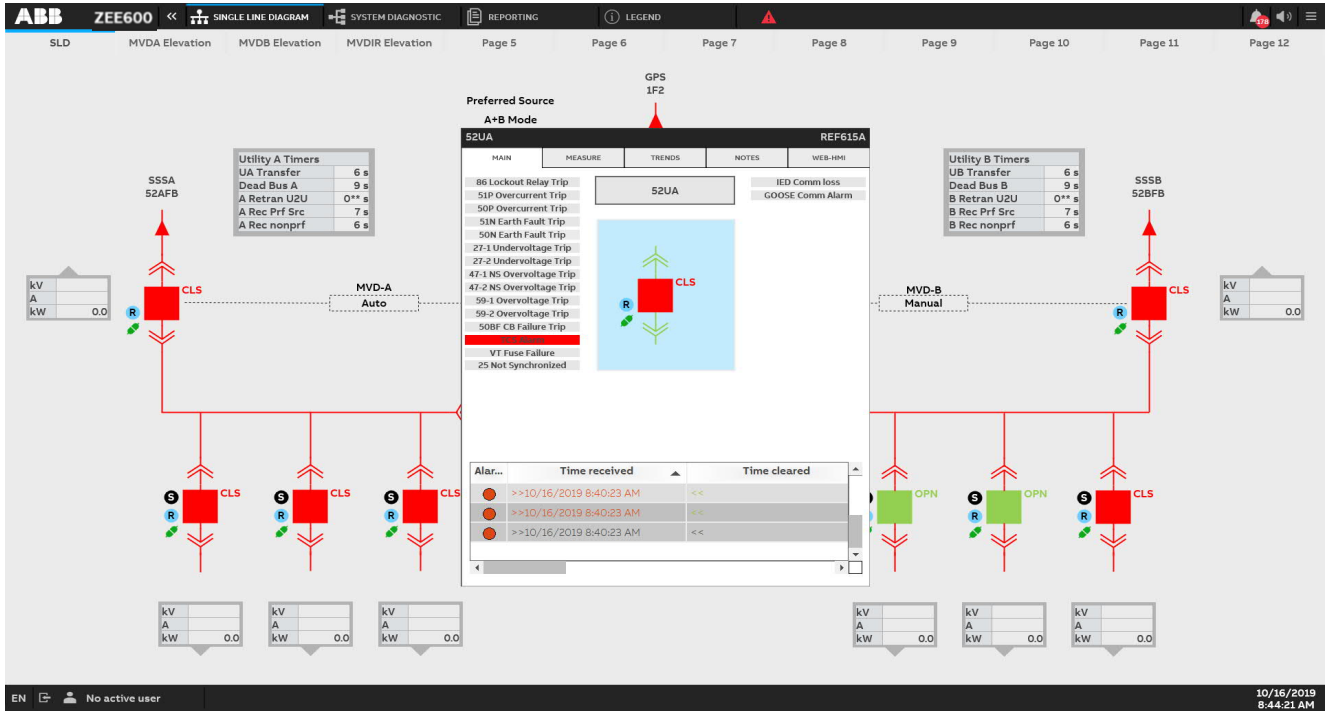


ABB ZEE600 – Application perspective

ANSI view



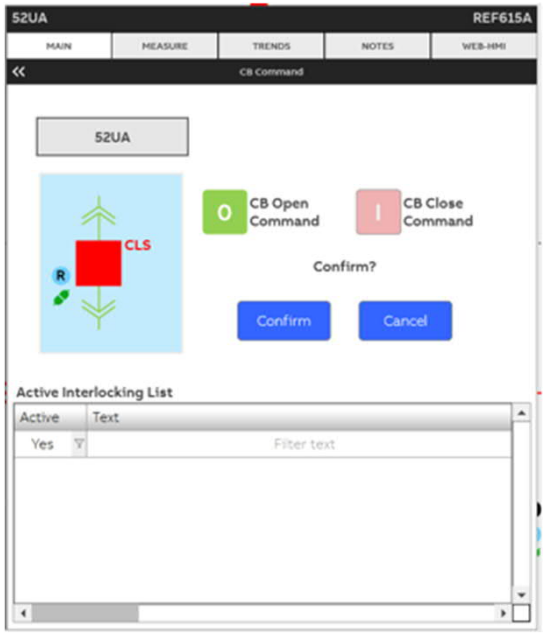


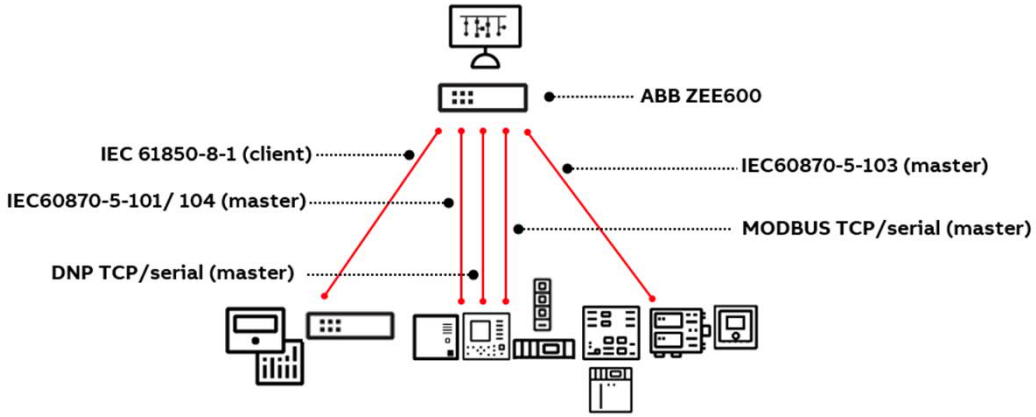
ABB ZEE600 – Application perspective

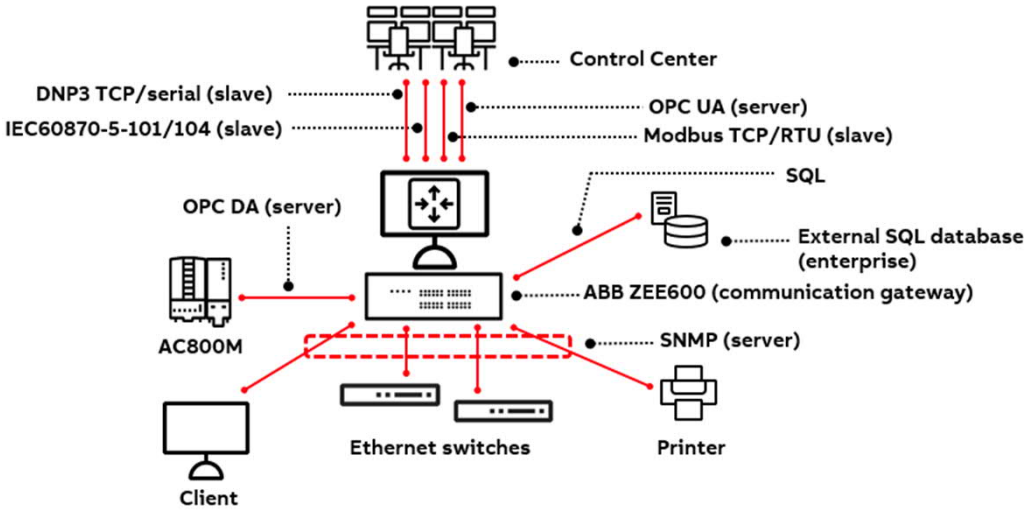
Automatic disturbance record access and viewer

- COMTRADE files automatically uploaded from protection relays / devices by zenon Runtime
- Use of file transfer mechanism in IEC 61850, IEC 60870-5, DNP3, FTP

ABB ZEE600 – zenon Runtime communication capability

For Distribution Power Utilities, Industries, Smart Grids with renewables based power generation



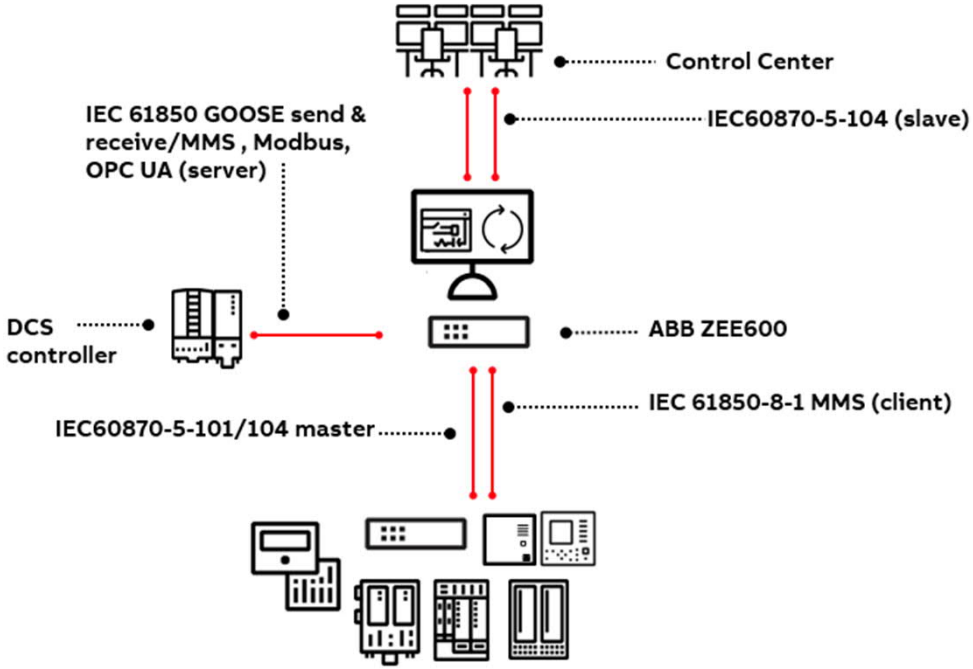


Direct connectivity with devices and systems, no protocol convertors → lowers TCO, better reliability

ABB ZEE600 – zenon logic communication capability

For Distribution Power Utilities, Industries, Smart Grids with renewables based power generation

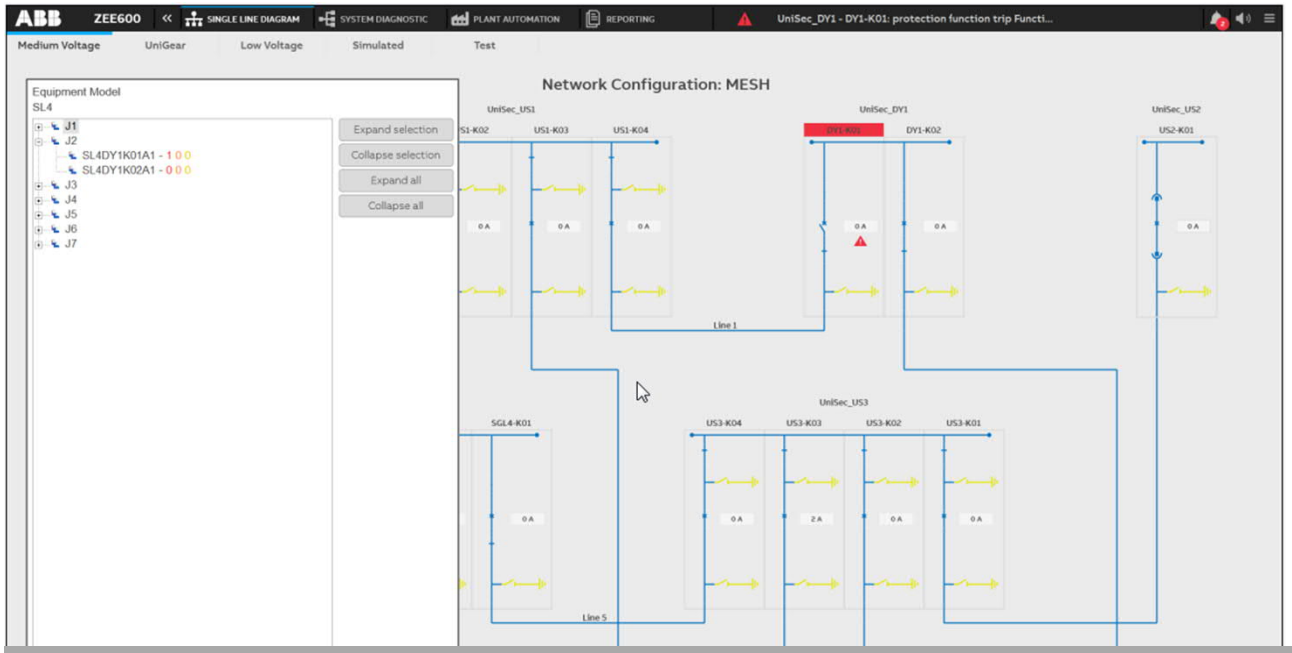
- Using zenon logic
  - Non real-time applications such as interlocking can be realized
  - Lesser interlocking logic and communication configuration between protection relays.
  - Reduced logic complexity in protection relays
  - Output data can be made available for peer and upper level systems
- IEC 61850 GOOSE communication feature covers:
  - Supervision of messages
  - Substituting for a faulty protection relay: Missing signals in an interlocking scheme, like switch object status can be substituted, and can be made functional



Contributes to efficiency, cost of ownership, fail-safe and secure operations

ABB ZEE600 – Aggregated Alarms and Equipment model

For Distribution Power Utilities, Industries

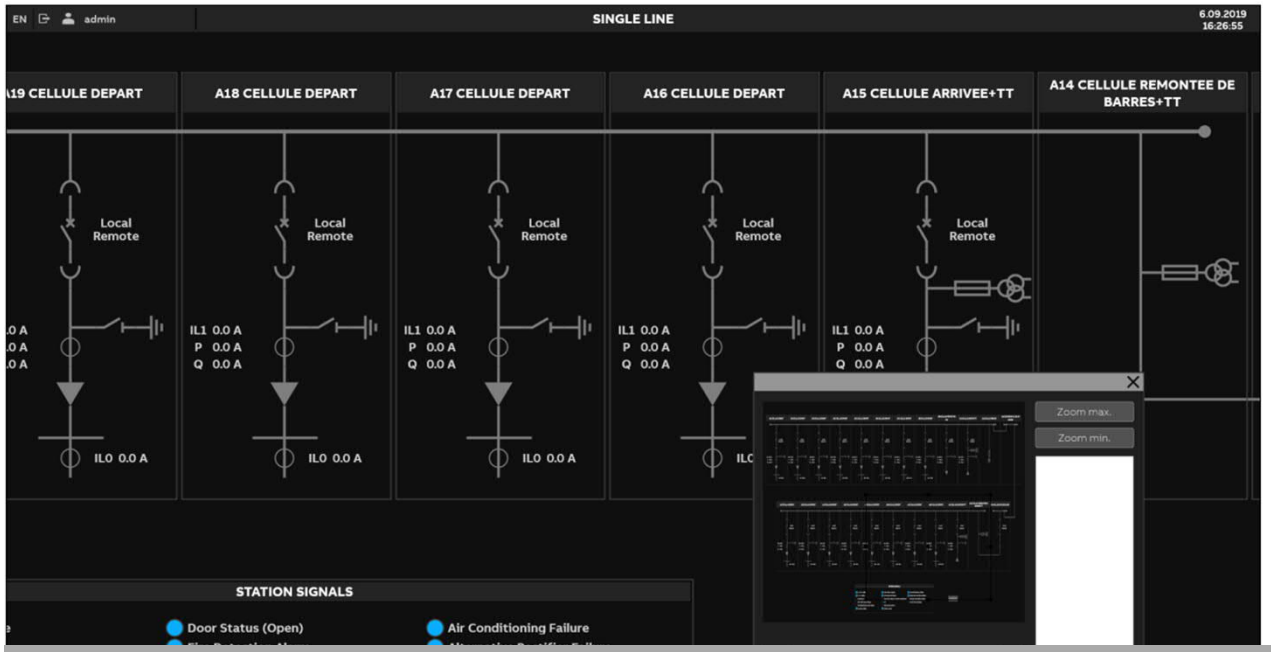


- Use of IEC 61850 based substation object hierarchy and equipment model
- Linking of lower level to higher levels
- Lower level alarms from bay level equipment can be aggregated at bay, voltage and switchgear or substation levels.
- Can also be extended to warning and information related to downstream equipment

Contributes to high level of system awareness

ABB ZEE600 – Worldview

For Distribution Power Utilities, Industries

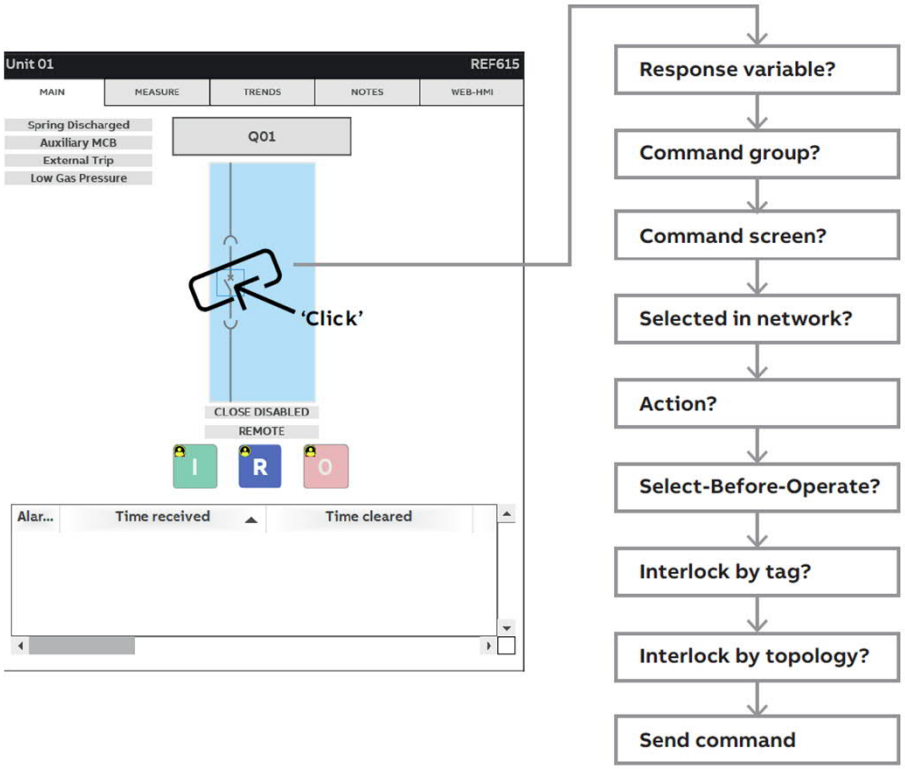


- Displays entire distribution or industrial power network
- Aggregation across different locations can be integrated on a map
- Includes power sources, switching equipment, cable/line feeders etc.
- User can zoom, pan, scroll and declutter on any part of power network or objects
- Enables quicker navigation, faster decision making

Contributes to high level of system awareness, operational efficiency

ABB ZEE600 – Secure switching

For Distribution Power Utilities, Industries, Smart Grids with renewables based power generation



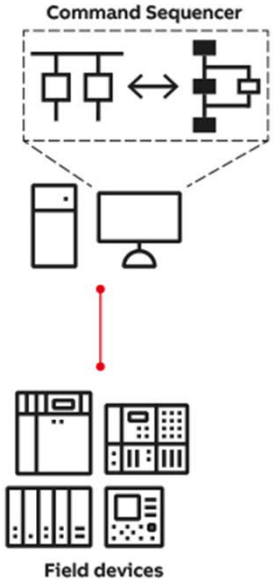
- Ensures error-proof
  - Command processing
  - Circuit breaker tripping detection
  - Interlocking
  - Switch locking (lockout-tagout)

Contributes to operational safety

ABB ZEE600 – Command sequencer

For Distribution Power Utilities, Industries

- Ensures error free switching processes for complex operation sequences
  - Using test simulation before live deployment
- Prevents incorrect switching and unintended switching actions
- Does not need SoftPLC programming

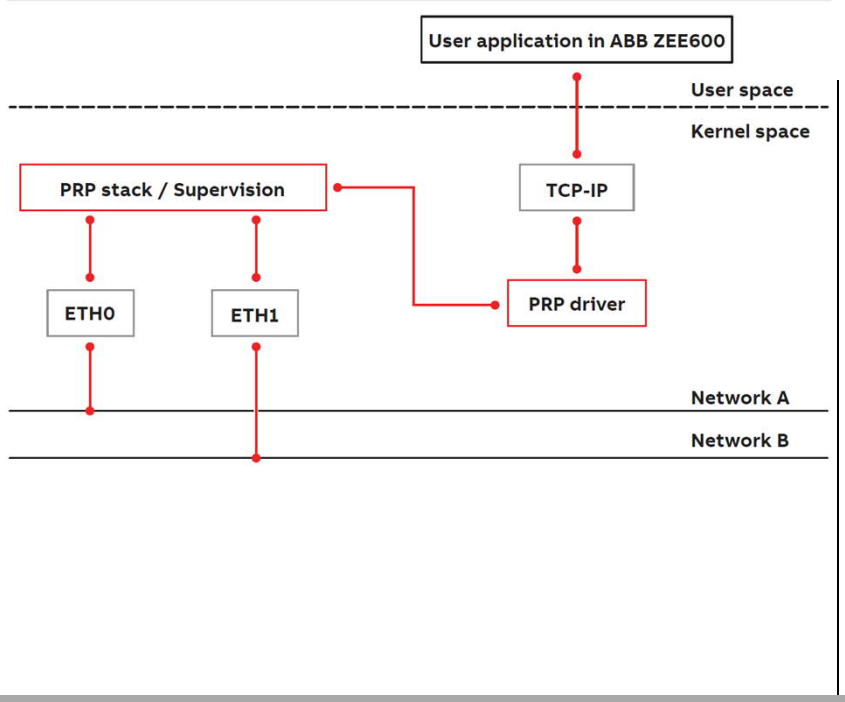


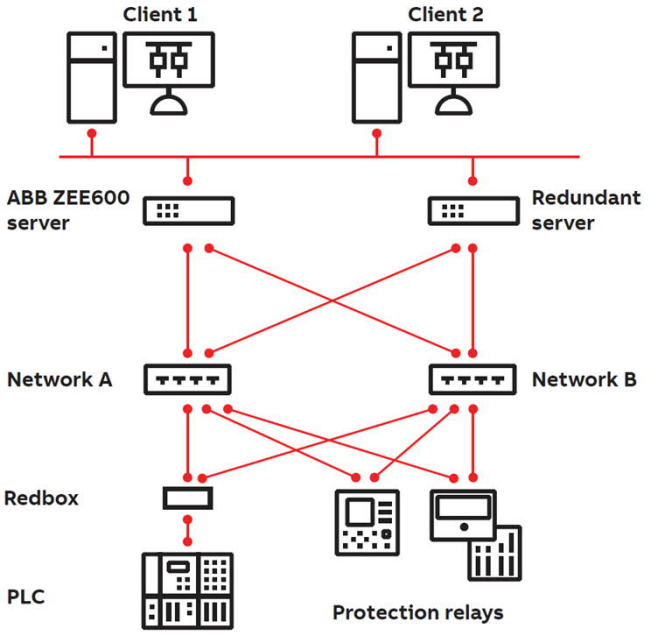
Contributes to saving time and costs, improves operational efficiency

ABB ZEE600 – Communication redundancy (Parallel Redundancy Protocol)

For Distribution Power Utilities, Industries, Smart Grids with renewables based power generation

- Ensures a robust communication solution together with other substation devices on IEC 61850 network.
- PRP ensures seamless redundancy with zero switchover time for critical applications and operations



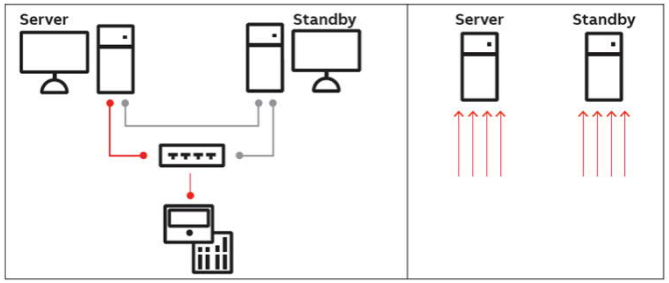


Contributes to operational efficiency

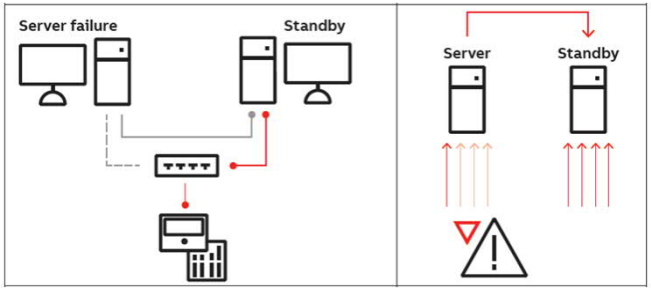
ABB ZEE600 – Circular or rated server redundancy

For Distribution Power Utilities, Industries

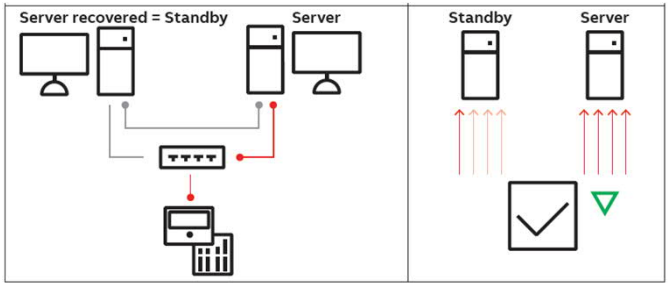
Normal operation



On failure of working server….



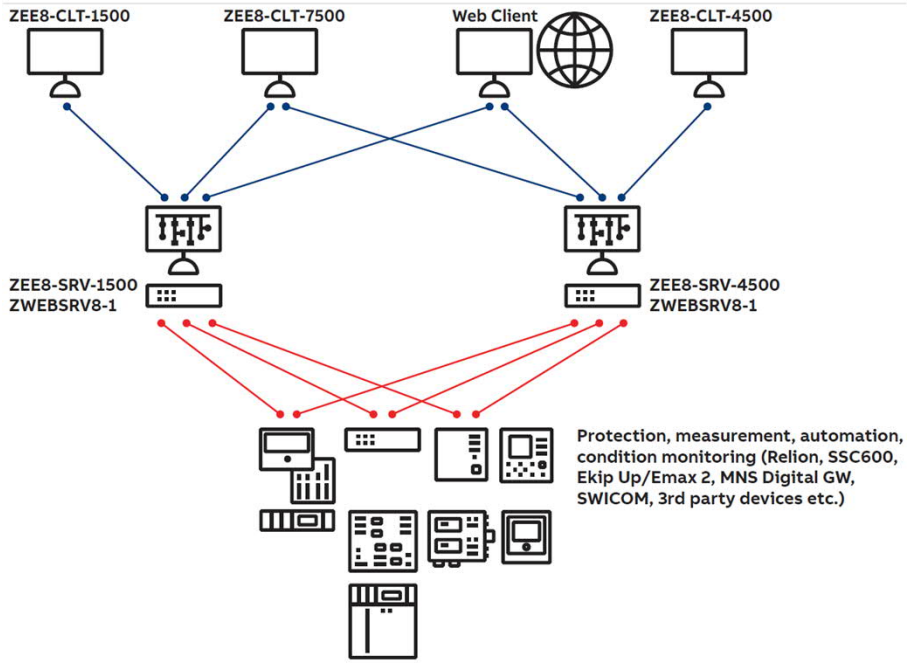
Post failure server status



Contributes to productivity and operational efficiency

ABB ZEE600 – Network handling

For large industries with distributed / independent process areas



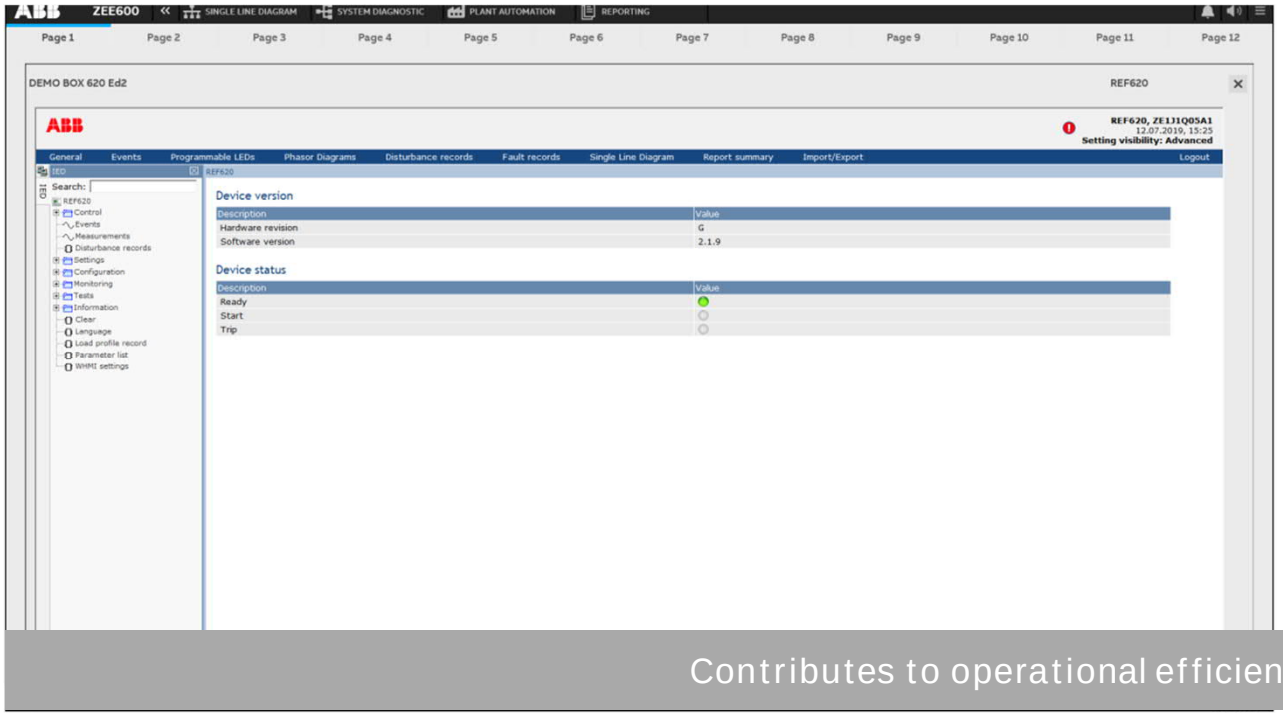
- Distributed architecture with multiple servers and clients
- Different process areas can have separate servers
- Using dedicated or combined clients
- Dedicated client / operator work station for specific process area
- Associations between server(s) and client(s) could be:
  - One server to one client
  - One server to many clients
  - Many server to one client
  - Many servers to many clients

Contributes to productivity and operational efficiency

* Such projects may only be quite uncommon in EPDS Solutions business.

ABB ZEE600 – Relion relays integration

For all customer segments

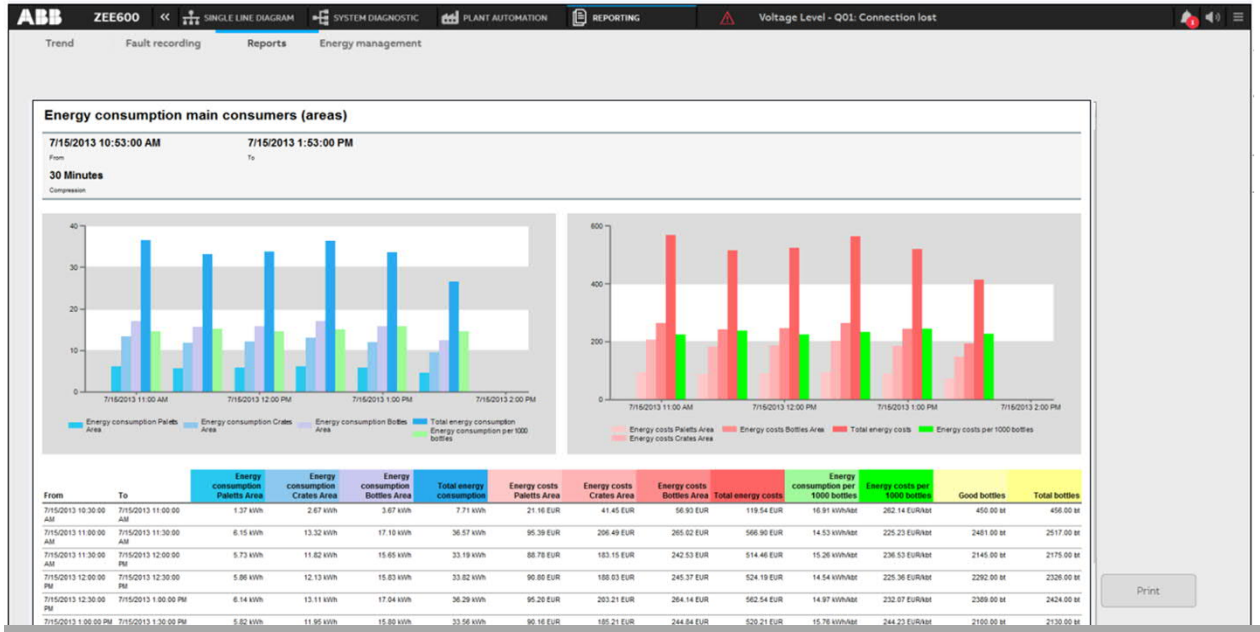


- Possibility to launch downstream Relion protection relays' web HMI from zenon Runtime
- No need for separate laptop for downstream device management

Contributes to operational efficiency

ABB ZEE600 – Reports

For all customer segments

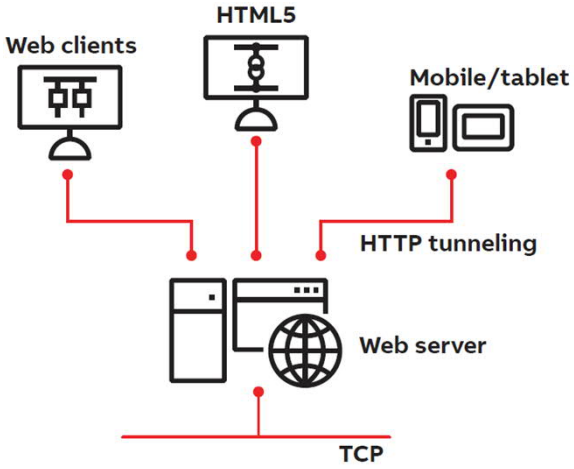


- Enables precise and reliable logging and archiving of process data.
- Serves as documentation, evaluation and presentation forms of real-time and archived data.
- Offers various reporting options from simple KPIs and dashboards to complex calculations using archived data
- No need for any additional software
- Enables generation of energy reports, lists, trends for analyses to get invaluable insight to the electrification process

Contributes to productivity

ABB ZEE600 – Web Server

For all customer segments



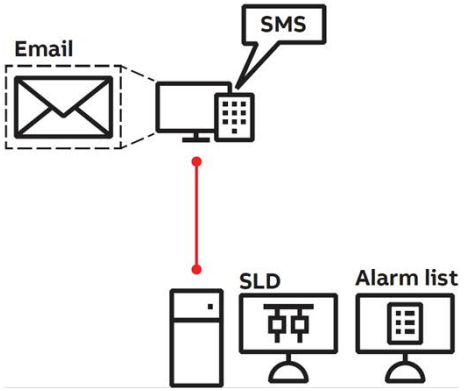
- Enables access of zenon Runtime server over Internet or Intranet, using standard Web browsers, using
  - Web clients based on HTML
  - Web application based on HTML5
- No additional engineering
- Multiple, concurrent users can access zenon Runtime Web server simultaneously.
- Look & feel and functionality* on the Web client are identical of zenon Runtime server
- Basic Web Server offers viewing functionality
- Web Server Pro allows active user actions

Contributes to operational efficiency and cost of ownership

* Some zenon server functionality like command processing or project simulation may not be supported using web server or as HTML5

ABB ZEE600 – Message control

For all customer segments

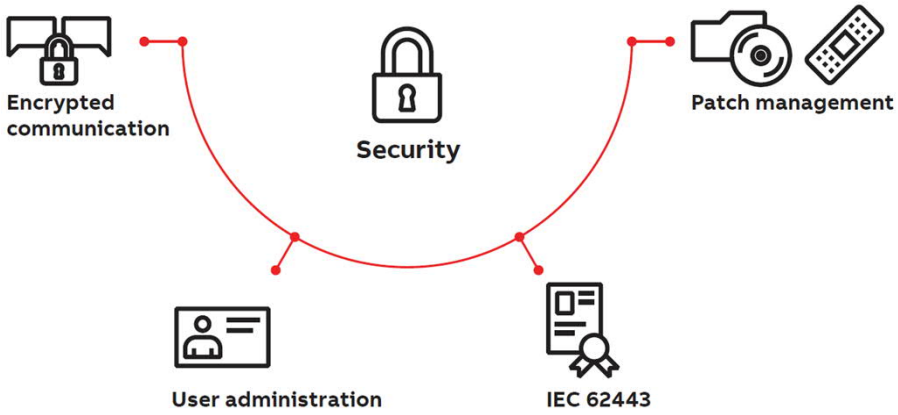


- Ensures that alarms and messages can be automatically sent and acknowledged via
  - Email
  - SMS
  - Voicemail
- Can be triggered based on an event.
- Enables secure access to current power network data anytime and anywhere
- Makes it easier to respond quickly to faults or incidents
- Helps in faster corrective actions

Contributes to operational efficiency

ABB ZEE600 – System security

For all customer segments



- Features to proactively guard and protection against cyber security threats
- Comprehensive user administration up to 128 different access levels
- zenon Runtime developed based on IEC 62443 standard for Industrial Network and System Security
- Patch management ensures updates without system shutdown

Contributes to higher system operational security and safeguards cost of ownership

ABB ZEE600

Part B: Application areas

ABB ZEE600 – Application areas

1/3

Customer segments	Application areas
Power Utilities/Substation automation	On-site control system (HMI), Process visualization in control room (SCADA)
	Communication gateway (interface to higher level control systems)
	Safeguard against failures (Parallel Redundancy Protocol, Command Sequencer)
	Complete automated operation, Efficient engineering, Communications capability
Power Utilities/Energy storage	Managing energy storage and substations; connectivity of energy storage to public grid (Command sequencer in accordance with IEC 61850)
	SCADA functionality for complete overview, Reports and Trend Analyses
	Safety and security (Alarm management, Message Control, Automated reactions)
	Archiving
Power Utilities/Renewables	Management of equipment, electricity generation from renewable energy and for the electricity distribution, secure command processing
	Alarm Management, Reporting

ABB ZEE600 – Application areas

2/3

Customer segments	Application areas
Public transportation	Command sequencer for automated substations and intuitive operations
	Error free engineering and configuration of projects
	Secure operations (process interlocking, topological interlocking)
	Operations integrated into protocol handling
	User Management protection from unauthorized access
	Open connectivity with customization possibilities for controls
	Reporting and Archiving
Industry	Controlling energy consumption (energy data management*, cost saving)
	Connectivity to electrical and manufacturing process
	Alarm Management, Data Historian, Dashboards, Trending
	Load Management

* Separate server license

ABB ZEE600 – Application areas

3/3

Customer segments	Application areas
Smart Buildings	Controlling energy consumption (energy data management, cost saving)
	Automated workflows like Command sequencer to avoid operation errors
	Visualization, Web based access
	Control of elevators, heating and cooling, lighting, water, and energy
	Asset and Alarm administration and Alarm access in real time using SMS, Email
	Comprehensive cyber security including 128 level based RBAC and audit trail of operator actions
	Integration of surveillance cameras, storage of alarm plans
	Connectivity to building automation devices/systems (KNX, BACNet, Modbus TCP) and to BMS on OPC UA/others.

ABB ZEE600

Part C: References

ABB ZEE600 – References

Based on zenon Energy Edition (1/2)

Segment	Country	Year (delivery)	Project	Customer challenge
Buildings/ Public Infra.	Singapore	2019	Thye Hua Kwan Moral Charities	– Tracking of energy usage for each tenant on various buildings – Tabulation of energy cost for the tenant – Tracking of energy usage remotely
Industries/ Data Centers	Singapore	2019	Complete Protection and Automation Solution for Data Center	– Supervision and Control of 22kV GIS using ABB's zenon System and Relion relays in the Protection Relay Network – Compact soft PLC in zenon to perform automatic and manual bus switching – Relays protection scheme from Main Distribution Center to Site Distribution Center
Industries/ Data Centers	Taiwan	2019	Industries/ Data Centers	– As above
Transport /Infrastructure	Turkey	In Prog.	Malatya JSF Military Airbase Scada System	– 3rd party devices from different Vendors – Limited deadline for Commissioning – MV & LV Control & Monitoring , Including 5 pcs Diesel Generator – UPS , Converter & Network Monitoring – L3 Achieving Servers

ABB ZEE600 – References

Based on zenon Energy Edition (2/2)

Segment	Country	Year	Project	Customer challenge
Utility/ Distribution	Turkey	In Prog.	Blida 10 Pcs 66/30/11 kV Substation Project	– IEC 61850 communication with protection relays – Control & supervision of 90/ 66/ 11 kV SWG – Local SCADA and monitoring – IEC60870-5-101 communication with NCC
Utility/ Distribution	Algeria	In Prog.	Sonelgaz Bechar DAM SAS Project	– As above
Utility/ Distribution	Algeria	In Prog.	Sonelgaz Tiziouzou SAS Project	– As above
Industries/ Data Centers	US	2018-19	Complete Protection and Automation Solution for Data Center	– Complex automatic switching/operation sequences for timely power restoration upon loss of main power source – Fast deployment/delivery in modular fashion – Protection and control/automation (P&C/A) system to meet the latest IEC 61850 Ed 2 and PRP redundancy – Large MV busbar protection with over 40 connected breakers

ABB ZEE600

Part D: Conclusion

ABB ZEE600 – Conclusion

Takeaways

Value proposition

- Collects, analyzes, visualizes and manages data
- Provides valuable process insights for better decisions
- Minimizes downtime
- Optimizes energy efficiency
- Fast, dependable, agile automation
- Maximum data security and powerful reporting
- Easy and seamless integration
- Global service and support

Customer benefits

- Turns data into information
  - Communication protocols
  - Key component in Industrial IoT, cloud interface capabilities
- Securing information integrity
  - Integrated data and cyber security management
- Creating insight for better business decisions
  - Certified load/energy management system module, reporting
- Low total cost of ownership
  - Extensive life cycle
  - Simple and cost-effective extensions

Thông tin liên hệ

Phạm Trần Anh

Product Specialist – MV Relay and Distribution Automation Solution

anh.pham-tran@vn.abb.com