SUBNET™ SOLUTIONS INC.

ANY GRID PROJECT.
ONE INTEGRATION SOLUTION.

ETED Dominican Republic Substation Improvement Project

Alan Lytz | System Architect

Dominican Electricity Transmission Company

- State-owned electric company
- 140 Substations
- 4,700 KM of Transmission Lines
- Lots of aging infrastructure

DOMINICAN REPUBLIC

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LEYENDA

138 kV	
69 KV	
34.5 KV	
125 KV	

Doble circuito

Central Hidroeléctrico — H

Central Térmico — T

Subestaciones

Sistema Aislado

Oceano Atlántico

Mar Caribe

Canal de la Mona

Area de Santo Domingo

ORGANISMO COORDINADOR DEL SISTEMA ELECTRICO INTERCONECTADO

UBICACION DE CENTRALES Y DE LINEAS DE TRANSMISION

ACTUALIZADO JUNIO 2001

Project Motivation

1. Unreliable SCADA data and controls
2. 26 substations lacked data concentrators, 9 with no SCADA at all
3. Problems with the IEC103 (IEC60870-5) protocol
4. Outdated alarm annunciator panels in all substations
5. No local HMI for monitoring and operation
6. Diversity of relays and protocols in substations
7. No secure remote access to protection & control devices
8. Slow fault location analysis
9. Constant troubleshooting

Initial Substation Architecture
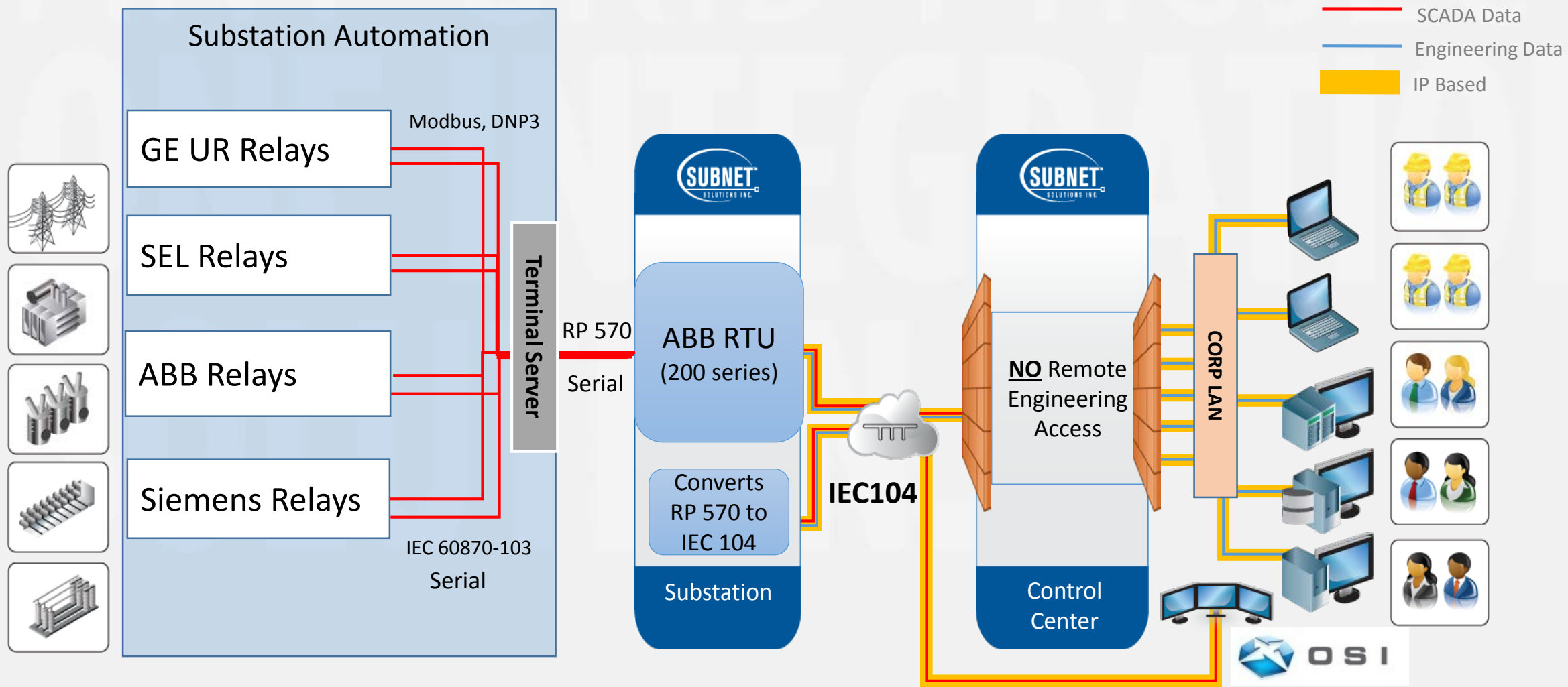
Technical Challenges

1. Ensuring that modern SCADA architecture changes are achieved system wide without the need to replace existing relays

2. Interoperability of devices of various manufacturers using IEC 61850 (MMS), DNP3, IEC103 and Modbus with the ETED control center using IEC104 protocol

3. Supporting the specific IEC103 protocol profile deployed in a multi-vendor legacy system

Project Execution

- Replacement of RTUs, transducers, protocol converters and data concentrators with a singular solution
- Modification of the profile of the IEC103 protocol
- Conversion to digital alarm annunciator panels
- New customizable HMI for local monitoring and operation
- Interoperability of protocols in the substations solved
- Remote access to protection and control devices solved
- Fully redundant architecture

Final Substation Architecture
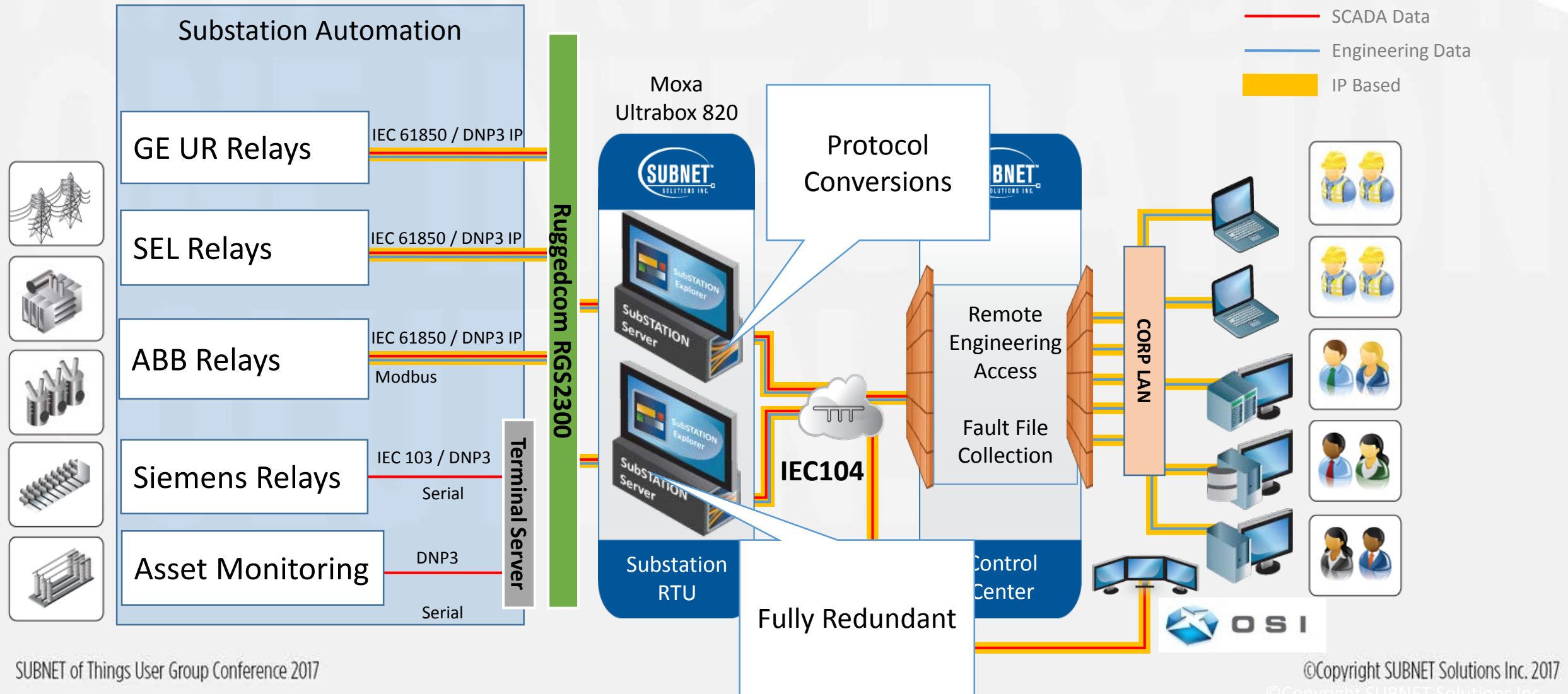
Conclusion and Benefits

- Multiple points of communication failure were eliminated
- Sending commands via IEC61850 MMS, IEC103, DNP3 and Modbus are executed successfully
- Local HMI and digital alarms panel future proofs substation design
- Remote Engineering access to all devices is now possible, with the added ability to extract oscillography files and manage configurations remotely
- Substantial capital investment was saved and O&M costs reduced using a multi-vendor RTU

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THANK YOU!