



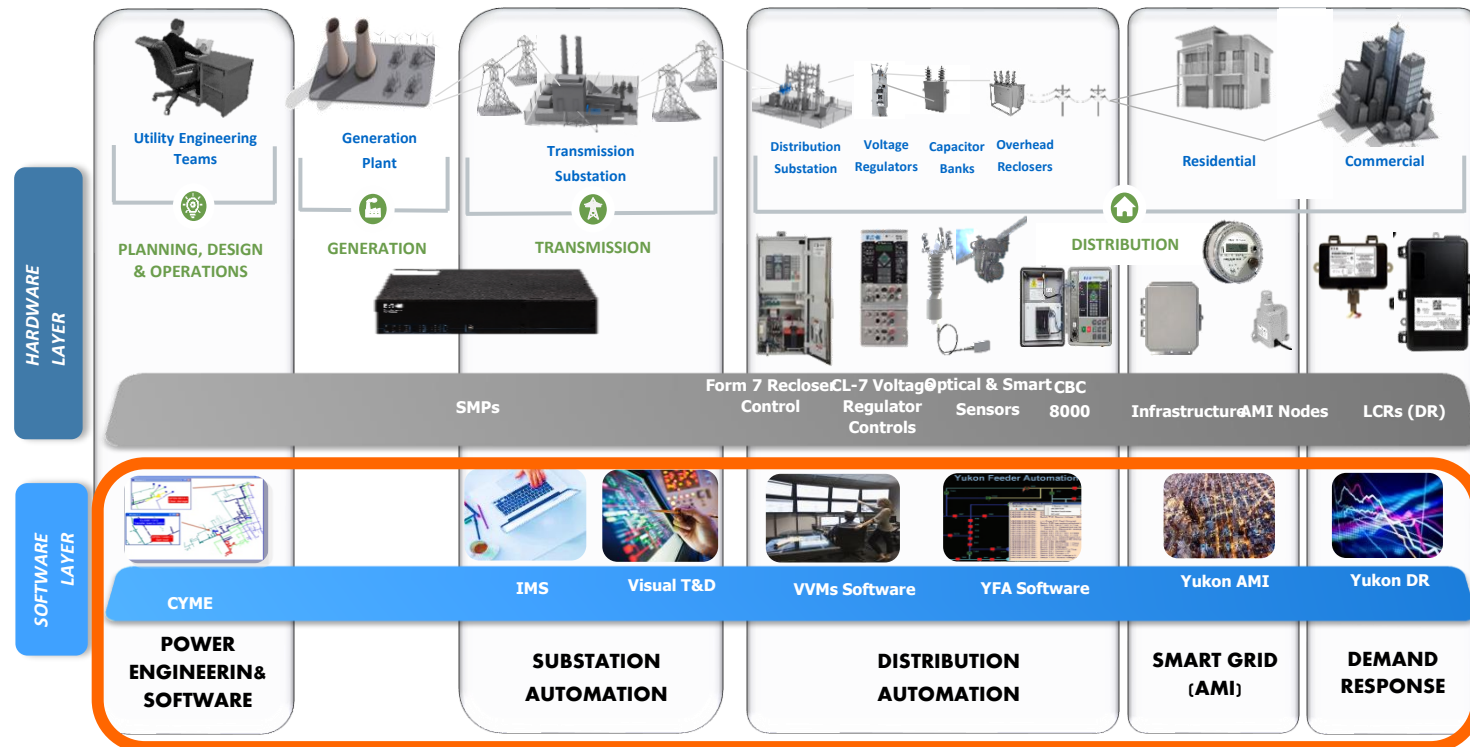
SMP's Substation **M**odernization **P**latform
I/O Platform

VT&D Visual **T**ransmission & **D**istribution

IMS **I**ED **M**anager **S**uite

Maricelly Rivera / Alejandro Guzmán
October 2022

Brightlayer Utilities Suite



Getting even more from the SMP Gateway Automation Platform

*The **SMP** Gateway - Automation Platform*

SMP = **S**ubstation **M**odernization **P**latform



Eaton's SMP Gateway

Main Functions

One Box Multiple Functions

- ✓ Data Concentrator
- ✓ Protocol Translator
- ✓ Data Distributor
- ✓ Local / Remote HMI
- ✓ Automation Processor
- ✓ Port Switch
- ✓ Cybersecurity Appliance
- ✓ Passthrough Device
- ✓ And More.....

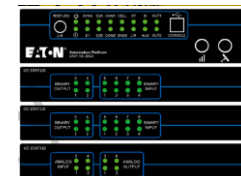
SMP SG-4260



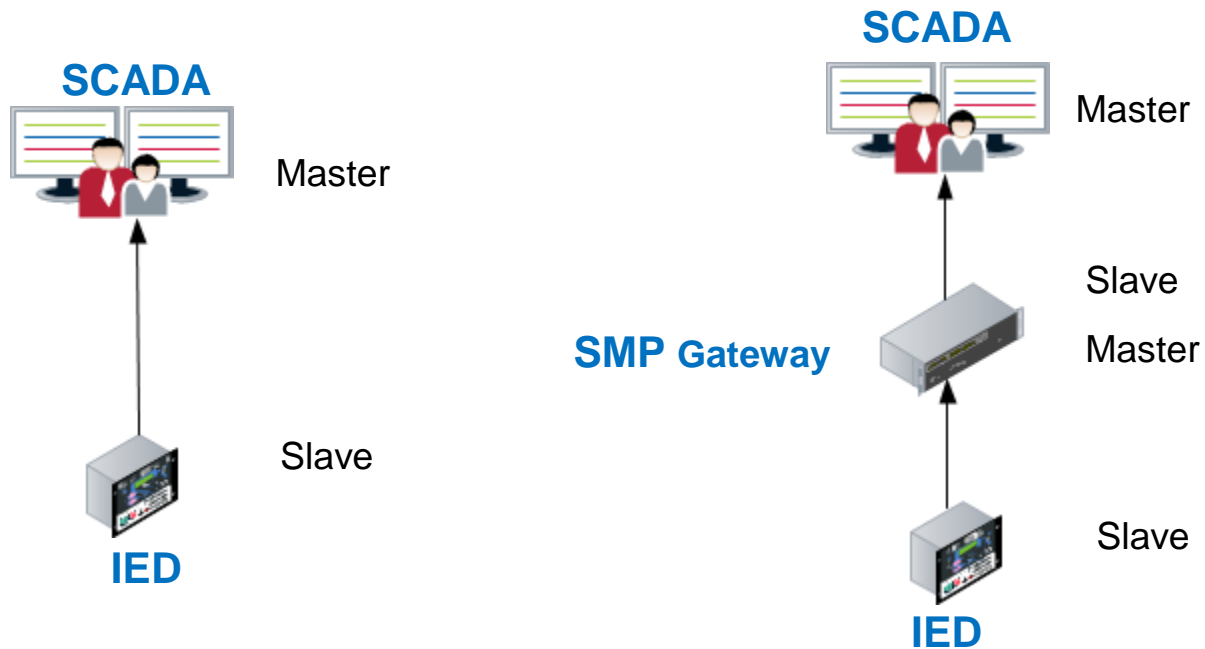
SMP 4/DP



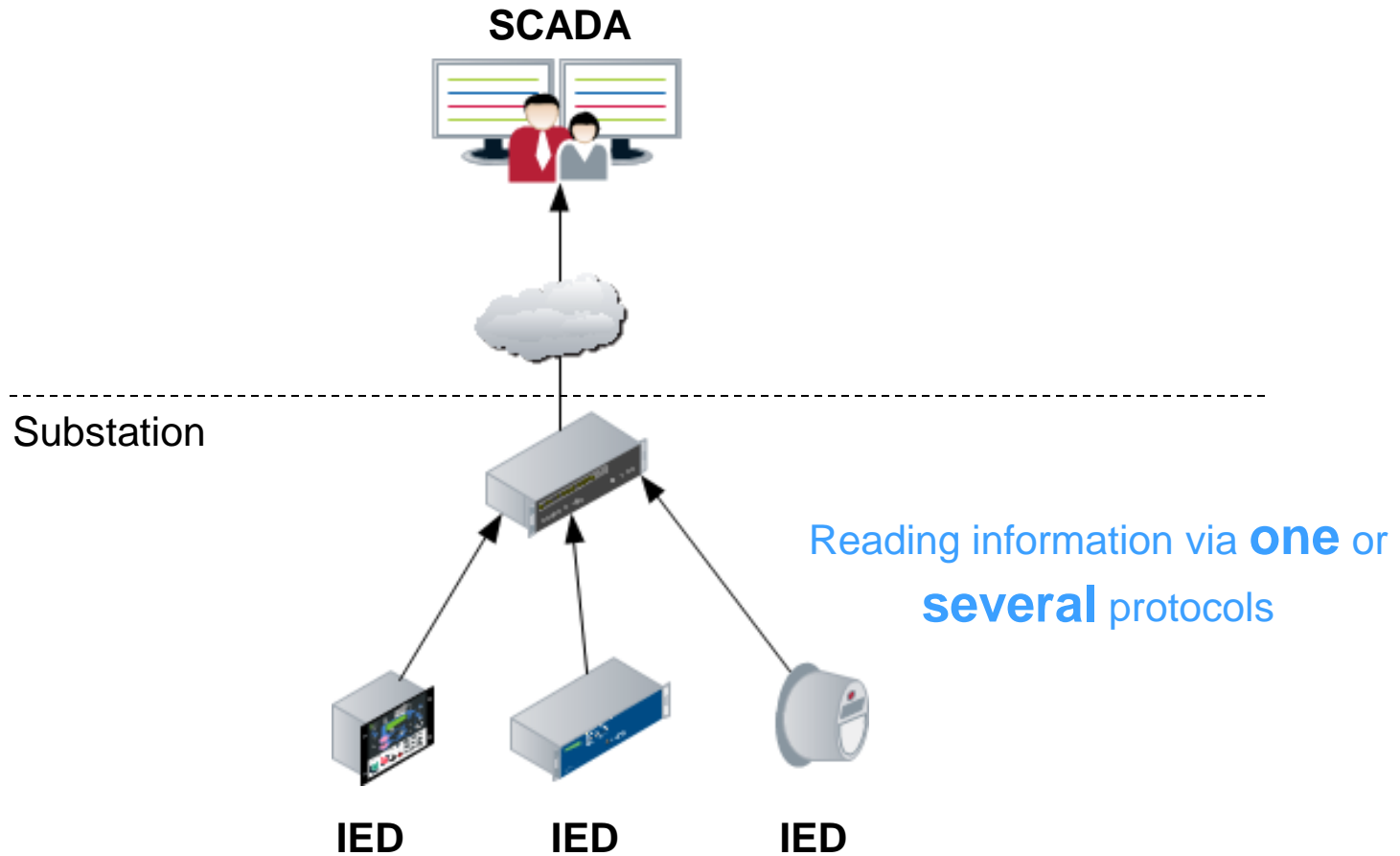
SMP DA- 3050



Master / Slave Concept

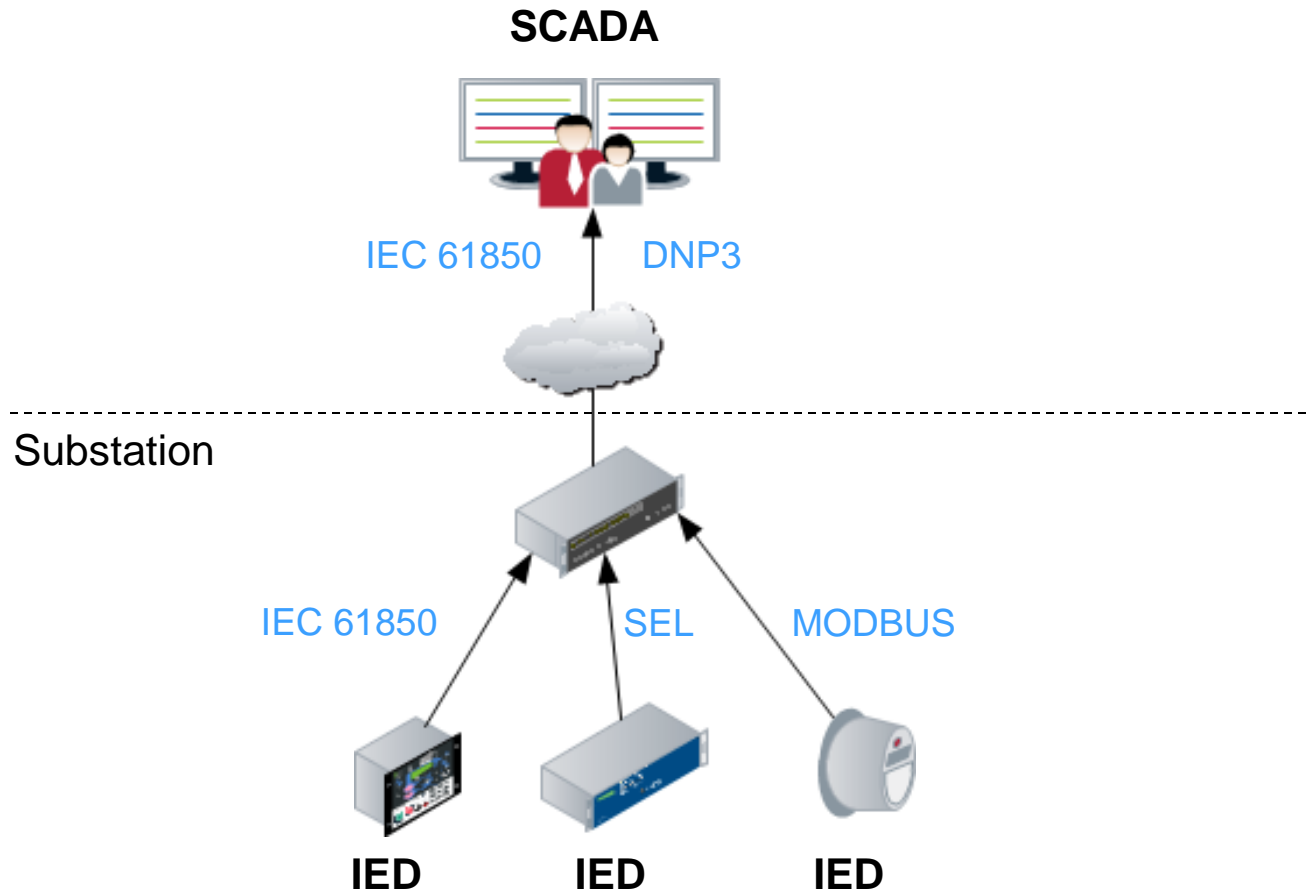


SMP Gateway As Data Concentrator



SMP Gateway As Protocol Translator

- Data acquisition and distribution using **Over 80 Standard and Proprietary Protocols**



Supported Master Protocols

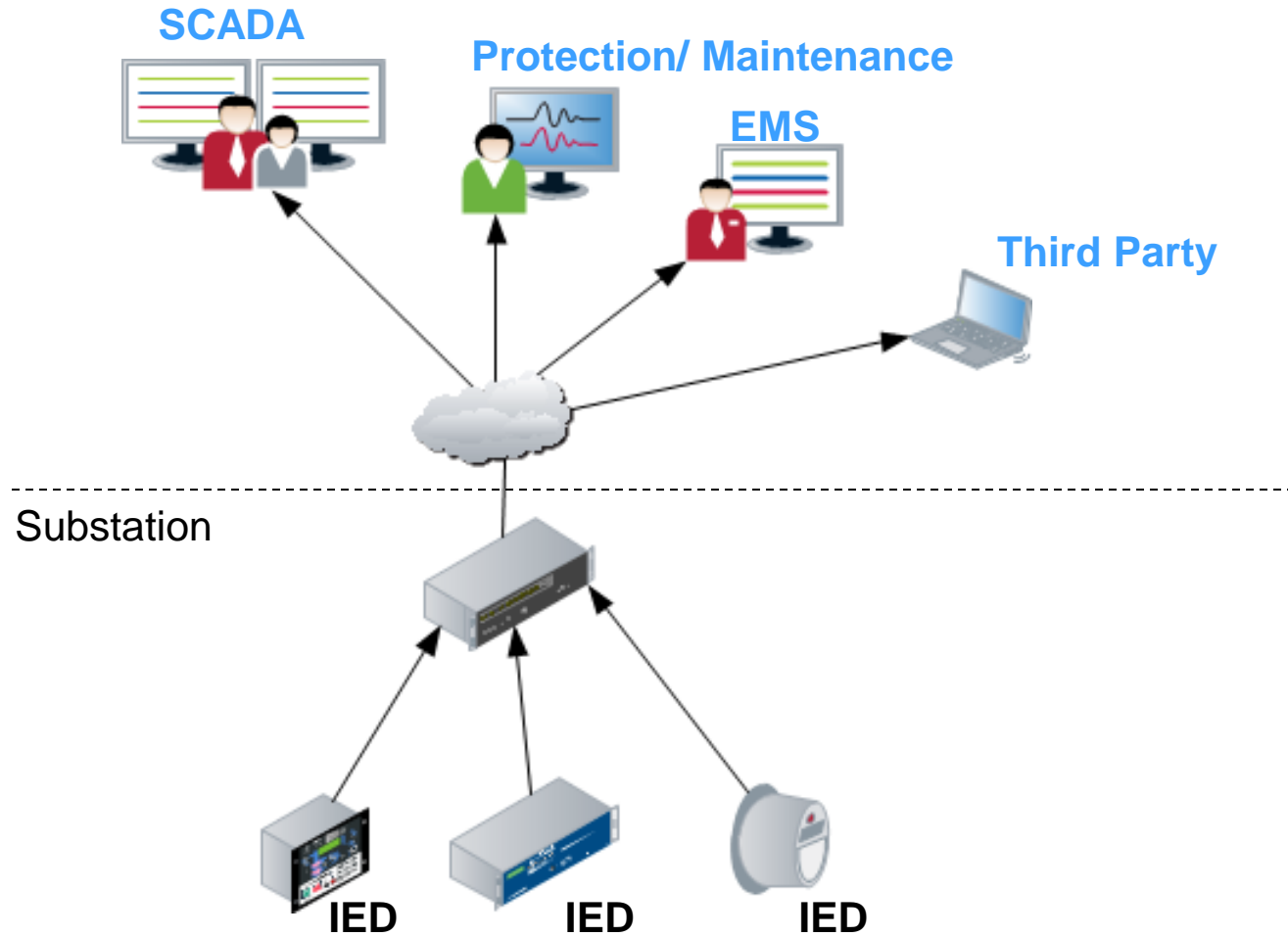
Protocol	SMP SG-4250	SMP 4/DP	SMP 16/CP 16/SG	Notes
DNP3	✓	✓	✓	Supports Secure Authentication versions 2 and 5 (SAv2 and SAv5).
IEC 61850 (MMS)	✓	✓	✓	
IEC 60870-5-101/103/104	✓	✓	✓	
IEC 61850 (GOOSE)	✓	✓	✓	
IEC 62056	✓	✓	✓	
ICCP	✓	-	✓	Supports secure authentication using X.509 certificates at the Application and Transport communication layers.
IEEE C37.118	✓	✓	✓	
OPC	-	✓	✓	For OPC servers that implement the OPC Data Access 2.05a standard interface.
MODICON MODBUS	✓	✓	✓	
ABB Standard Ten Byte	✓	✓	✓	
ABB SPA-Bus	✓	✓	✓	
Algodue	✓	✓	✓	For the UPM 307, UPM 3100 and UPM 315 EU meters.
AREVA (Courier)	✓	✓	✓	
AREVA (Courier with K-BUS)	✓ ¹	-	✓ ²	¹ : Requires universal communication module. ² : Only supported through serial ports A02 and A10.
Beckwith (Beco 2200)	✓	✓	✓	
Bender FTC470XMB	✓	✓	✓	
Conitel	✓ ¹	-	✓	¹ : Since 7.1R1
Datek	- ¹	✓	✓	¹ : Planned for future release.
Domosys (PowerBus)	✓	✓	✓	
FTP	✓	✓	✓	Requires passive mode support from IED.
GE (D20 Family)	✓	✓	✓	Retrieve configuration information from GE D20/D200/D25 substation controllers.
GE (Ethernet Global Data)	✓	✓	✓	
GE Multilin SR Events	✓	✓	✓	
GE Multilin UR Events	✓	✓	✓	
GE Syprotec (Hydran)	✓	✓	✓	
Harris 5000/6000	✓	✓	✓	

Protocol	SMP SG-4250	SMP 4/DP	SMP 16/CP 16/SG	Notes
Landis+Gyr 8979	✓	✓	✓	
Manitoba Hydro (Blue Box)	✓	✓	✓	
Mehta Tech Transcan DFR	✓	✓	✓ ¹	¹ : Requires serial port jumpers reconfiguration.
Morgan Schaffer (Calisto)	- ¹	✓	✓	¹ : Planned for future release.
Motorola (MDAC)	✓	✓	✓	
Opto 22 (Optomux)	✓	✓	✓	
PG&E (Cooper 2179)	✓	✓	✓	
Qualitrol-Hathaway BCM-200	✓	✓	✓	
Qualitrol-Hathaway DFR-1200	✓	✓	✓	
RuggedCom (ROS)	✓	✓	✓	
Schneider Electric (ION)	✓	✓	✓	
SDI-12	✓	✓	✓	
SEL Fast Meter	✓	✓	✓	
SEL Events	✓	✓	✓	
Valmet (TEJAS Series V)	✓	✓	✓	

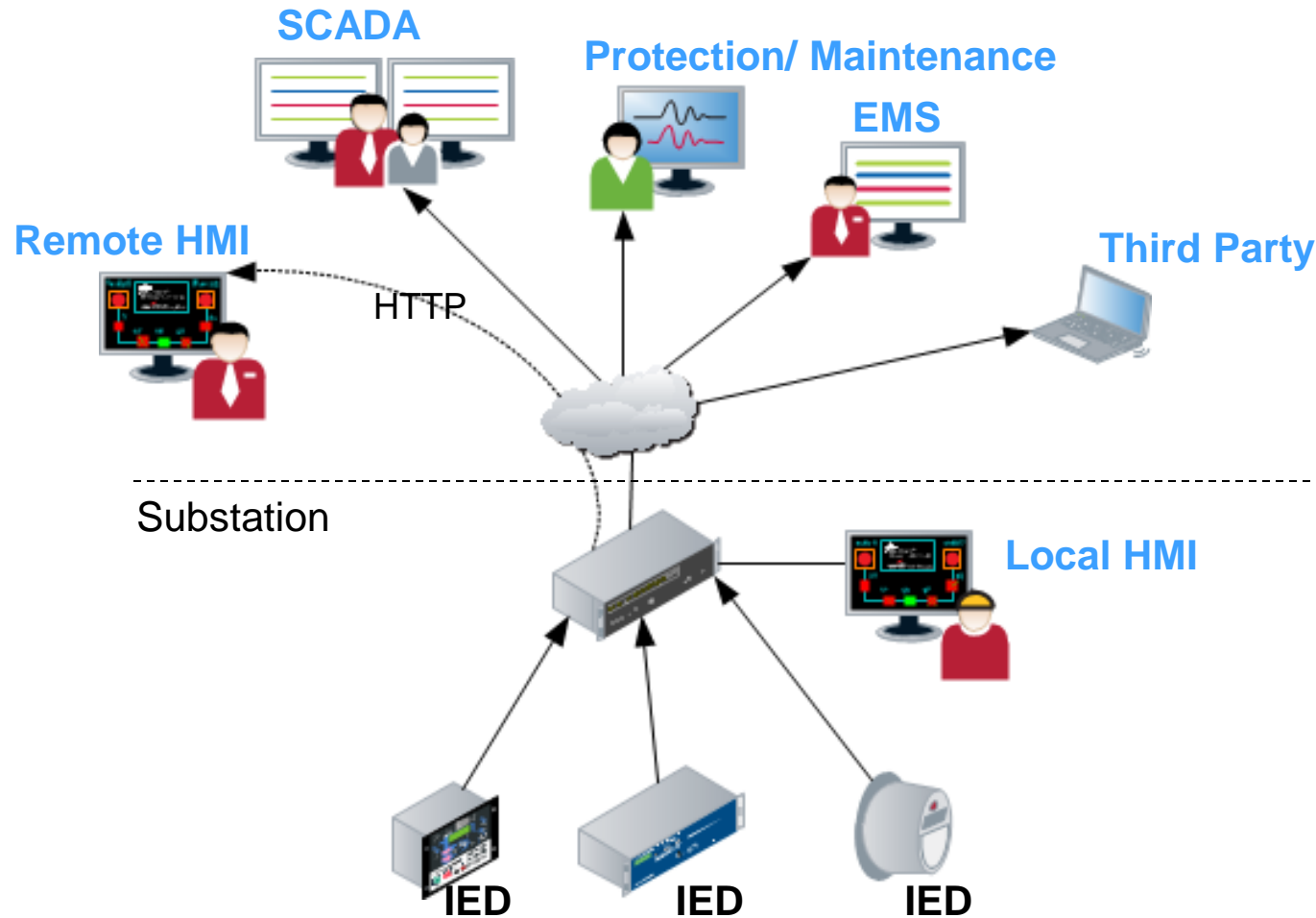
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IEC 60870-5-101/104	✓	✓	✓	
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IEEE C37.118	✓	✓	✓	
MODICON MODBUS	✓	✓	✓	
Conitel	✓ ¹	-	✓	¹ : Since 7.1R1
GE (Ethernet Global Data)	✓	✓	✓	
Harris 5000/6000	✓	✓	✓	
Interconnections – OSIsoft PI	✓	✓	✓	
Interconnections – OPC	✓	✓	✓	Requires SMP OPC Server software on a separate computer.
Landis+Gyr 8979	✓	✓	✓	
SES-92	✓	✓	✓	
Valmet (TEJAS Series V)	✓	✓	✓	

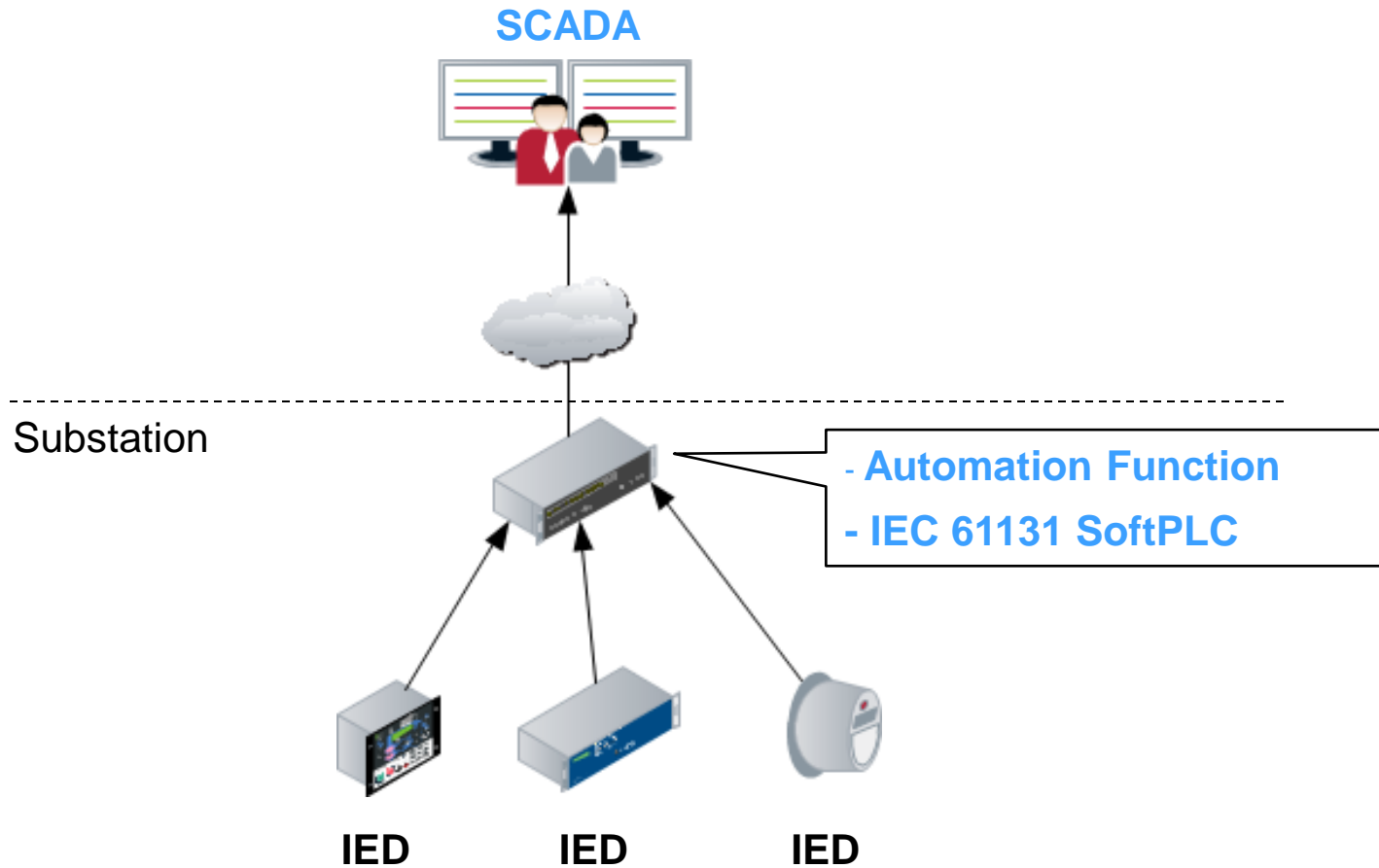
SMP Gateway As Data Distributor



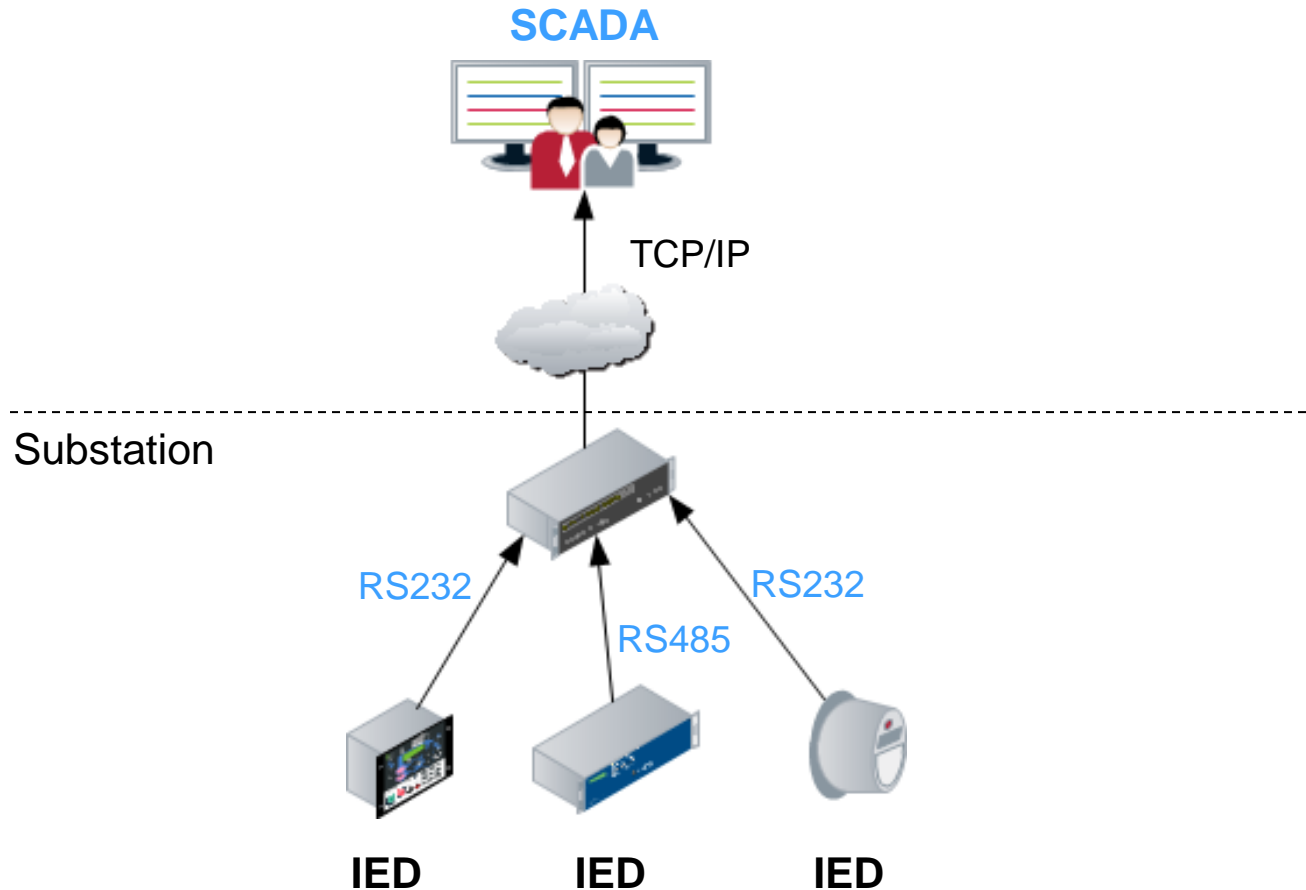
SMP Gateway As Local/Remote HMI



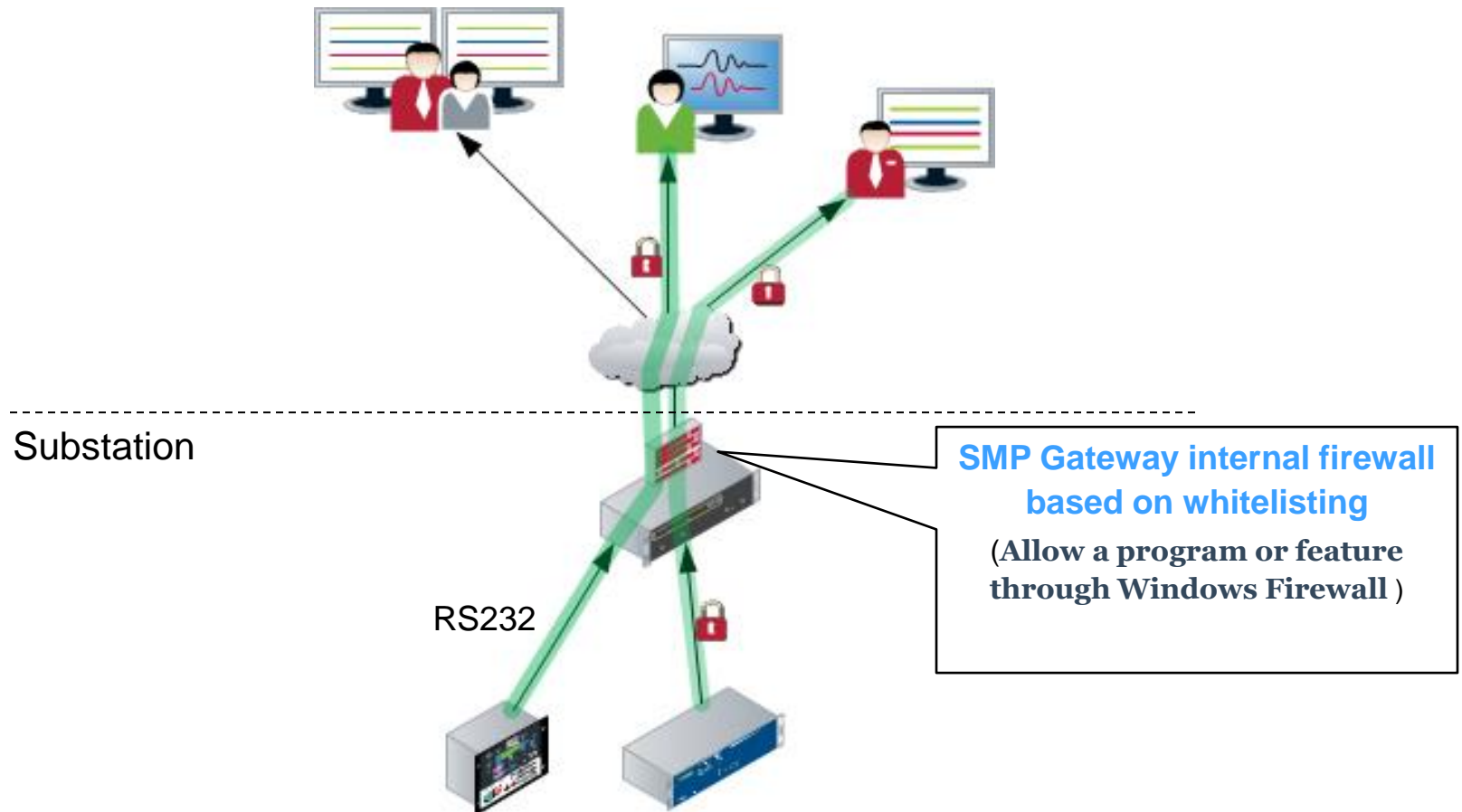
SMP Gateway As Automation Processor



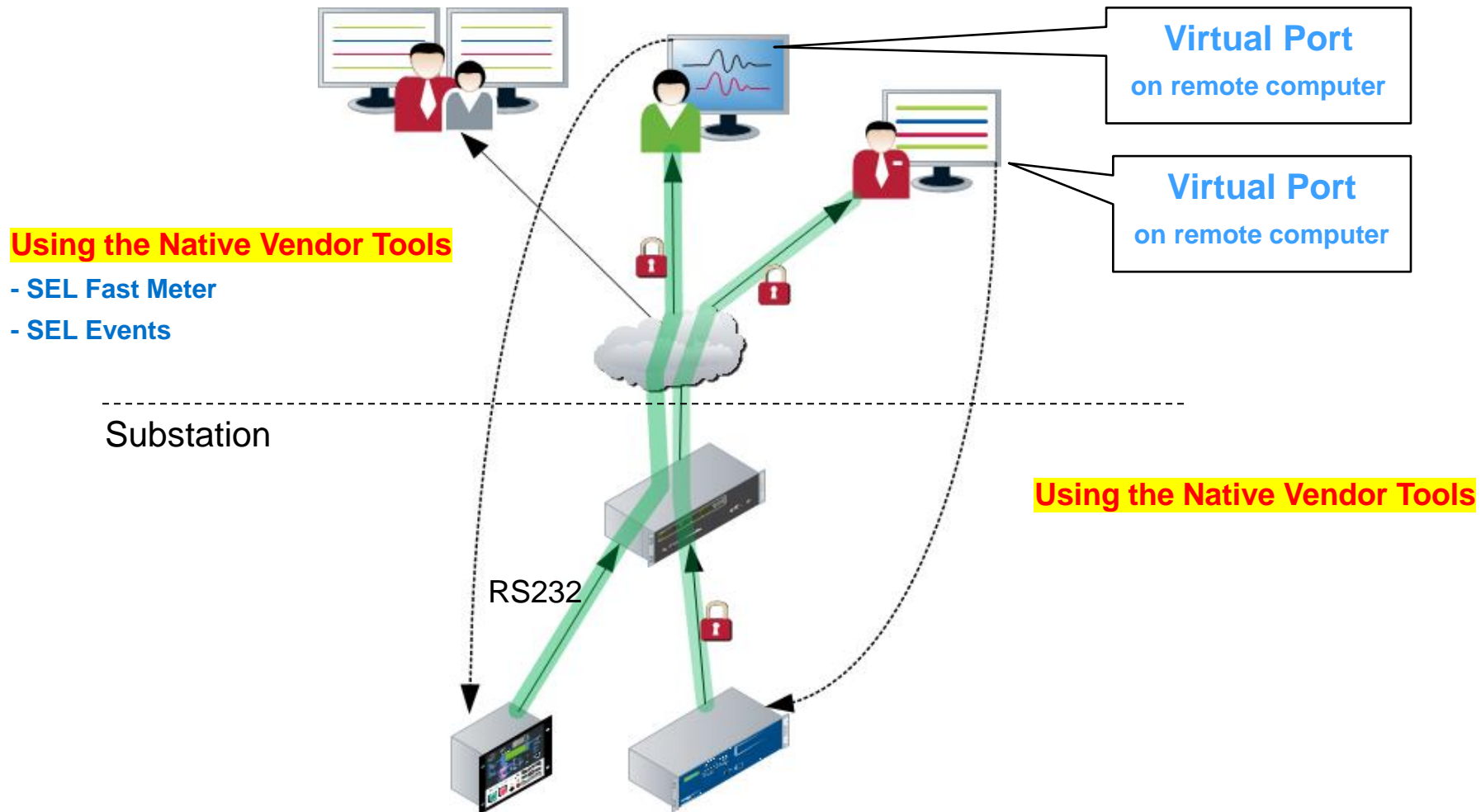
SMP Gateway As Port Switch



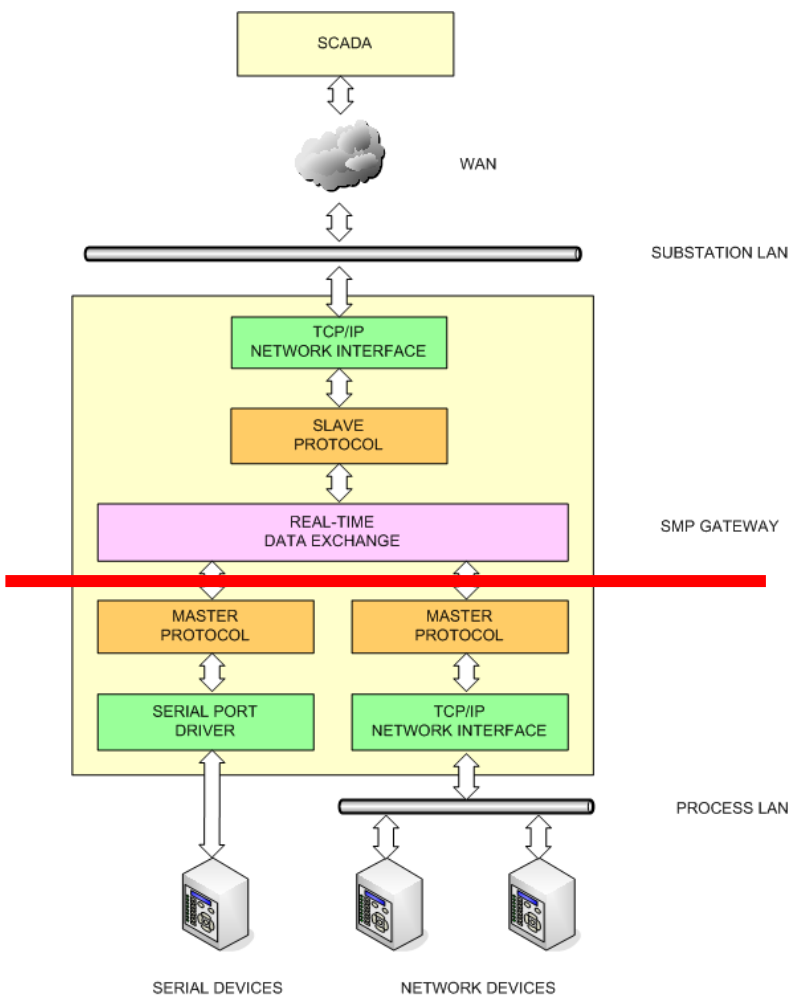
SMP Gateway as Cybersecurity Appliance



SMP Gateway as Passthrough device



SMP Gateway Software Architecture



- SMP Gateway procesa todos los datos intercambiados entre dispositivos y SCADA, y aísla las redes.
- Los múltiples adaptadores de red proporcionan segmentación de red.
- No se enrutan paquetes TCP/IP entre redes.
- Se ha agregando soporte VLAN para proporcionar capacidades de segmentación adicionales.

Additional Features

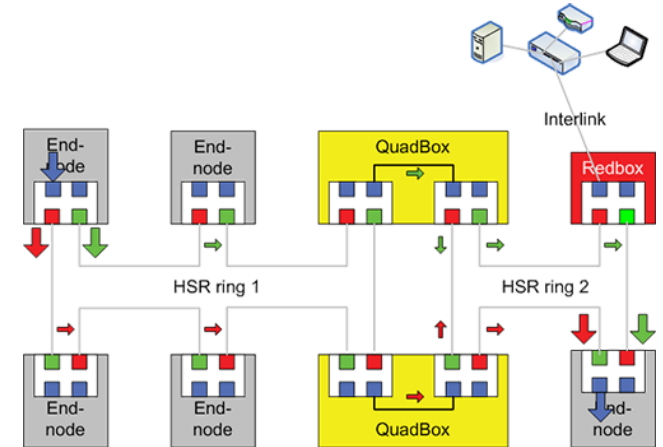
- Security Features
- Advanced HMI functionalities (SLD, alarms, etc)
- Redundancy (Support for maximum reliability)
- Accurate Time Synchronization
- IED Management Capabilities
- Syslog
- Complete Software Suite (for management, configuration and commissioning)
- PRP / HSR

Architecture

SMP SG-4260: PRP / HSR

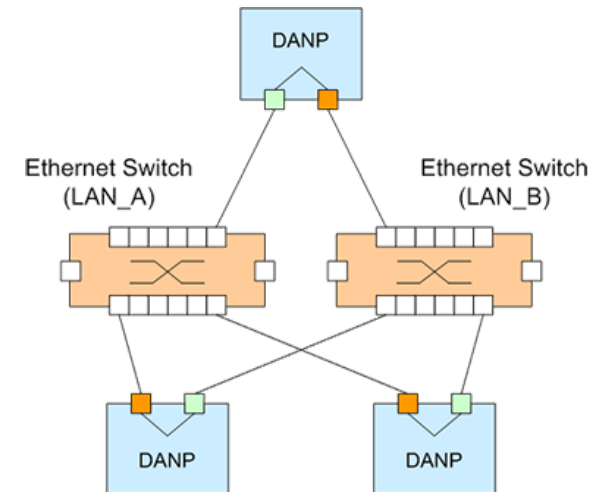
✓ HSR PROS

- ✓ Lower cost, since network doesn't need to be doubled as in PRP
- ✓ <http://www.flexibilis.com/technology/>



✓ PRP PROS

- ✓ Non-PRP devices can be part of the network



The SMP Gateway Platforms

Provide flexible, evolutive, scalable and performing platforms for all ***Electrical Utility Substation Automation and Integration*** projects

SMP SG-4260



- ✓ Up to 128 IEDs (CFE Mexico 250 DEIs)
- ✓ Up to 64 Control Centers
- ✓ 20,000 tags
- ✓ Local and Remote HMI
- ✓ Up to 33 Serial ports
- ✓ Up to 10 Ethernet ports

SMP 4/DP



- ✓ Up to 32 IEDs
- ✓ Up to 8 Control Centers
- ✓ 10,000 tags
- ✓ Remote HMI
- ✓ 4 Serial ports
- ✓ 2 Ethernet ports

Architecture

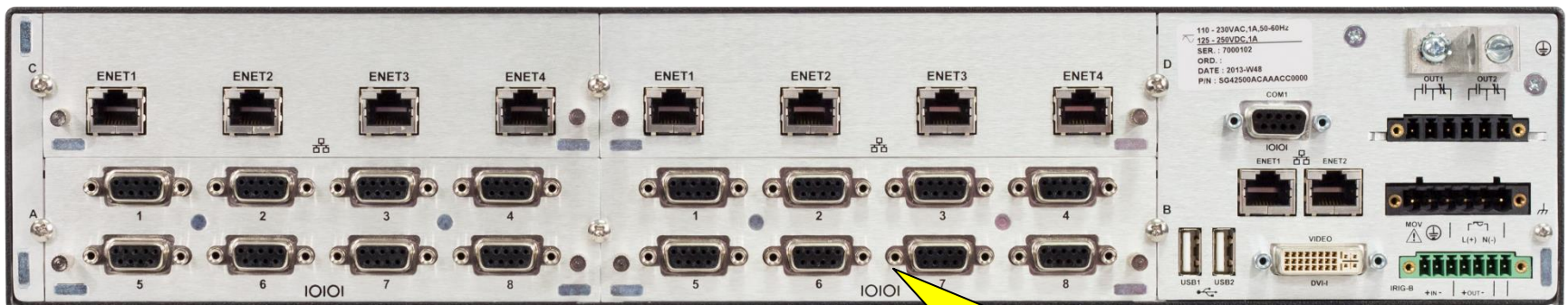
SMP SG-4250 Back Panel



- 1) Serial Port COM1
- 2) Build-In Ethernet port (Optical ST/LC also available)
- 3) USB connector (TouchScreen, Keyboard, Mouse)
- 4) DVI-I Connector
- 5) 2 NO/NC (normally open / normally closed) Form C relays
- 6) Power Supply
- 7) IRIG-B IN /OUT
- 8) Communication modules (Serial, Optical, Ethernet)

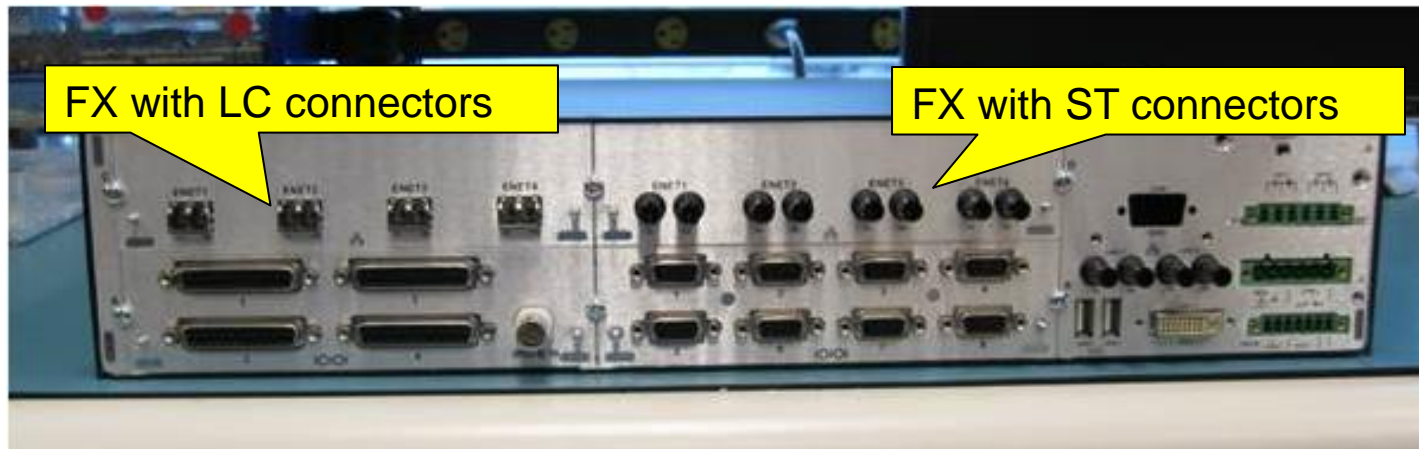
Serial Port Module

- 8 RS-232/485 ports (DB9 connectors)
- Software Configuration (no jumper)
- 115200 bps
- IRIG-B and 5V or 12V distribution



Ethernet Port Module

- **Metallic**
 - 10/100/1000 Base-T
 - 4 ports/module
- **Optical**
 - 100 FX, ST or LC connectors
 - 4 ports/module
 - 1300nm
 - Multimode



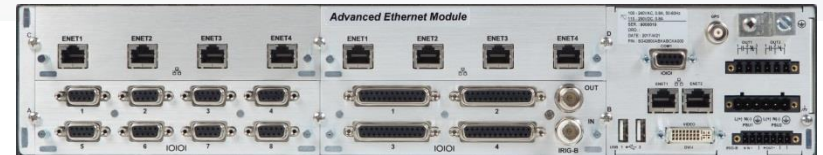
Universal Port Module

- 4 DB25
 - Synchronous communication
 - GE D20, Conitel, Courier (KITZ)
 - IRIG-B demodulated output
 - One PPS output (on each connector)
- Modulated IRIG-B input
 - High impedance



Introducing the SMP SG-4260

- Intel Bay Trail Quadcore CPU
 - Better capabilities, lower power consumption
- Advanced Ethernet Module (AEM)
 - PRP/HSR Network redundancy
 - PTP Accurate network-based time synchronization (IEEE 1588)
- GPS / GNSS Clock option
- New Dual Power-supply option
 - Hot swappable - high voltage only
 - Extended range (110 VDC rating instead of 125 VDC, can go down to 88 VDC to allow 20% variance)
- IEC 61850-3 ed2, IEEE 1613.1, IEC 60255



Architecture

SMP 4/DP

- ✓ 3 serial ports RS 232
- ✓ 1 serial port RS 232/422/485
- ✓ 2 ports Ethernet 10/100 Mbps
- ✓ Optional Modem (V.34, V.90, V.92)
- ✓ AC/DC Power Supply (5W)
- ✓ IRIG-B input
- ✓ USB console port

Front Panel



Rear Panel



SMP's : 16/CP-PM vs SG 4250 vs SG-4260.

	SMP 16/CP-PM	SMP SG-4250	SMP SG-4260
Processor	Intel Pentium 1.4 GHz	Intel Atom Dual Core D525 (Dual Core 1.8GHz)	Intel® Atom™ E3845 Quad-core 1.91GHz
RAM Memory	1 GB	2 GB	2 GB
Storage	1 GB; Option 4 GB	1 GB; Option Flash up to 32 GB or SSD up to 128 GB	1 GB; SSD up to 128 GB
Operating Temperature	-40 to 65°C	-40 to 85°C	-40 to 85°C
Physical	3U	2U	2U
Serial ports	16	1 basic, up to 33	1 basic, up to 33
Ethernet ports	2	2 basic, up to 10	2 basic, up to 10
Power Supply	21-29 VDC; 42-56 VDC; 85-264 VAC/105-370 VDC	19 – 56 VDC; 88-264 VAC / 100-287.5 VDC	19 – 56 VDC; 88-264 VAC / 85-300 VDC Optional dual power-supply
Internal Modem	Yes	No	No
IEEE 1588 time Sync	No	No	Option
GPS Module	Option	No	Option
PRP/HSR	No	No	Option

SG-4260 : The *Most Robust Platform in the Market*

Wurldtech Achilles Level 1
Compliant

- **The Achilles** Test Platform is the only communications robustness test platform that can monitor both network and operational parameters, allowing vulnerabilities to be discovered, faults to be reproduced, isolated, identified and resolved before products are introduced to the market.

NESSUS Compliance

Nessus, by Tenable, is trusted by more than 30,000 organizations worldwide as one of the most widely deployed security technologies on the planet - and the gold standard for vulnerability assessment.

IEEE 1613 class 2

- **is the IEEE standard** detailing environmental and testing requirements for communications networking devices in electric power substations. The standard is sponsored by the IEEE Power & Energy Society.

IEC 61850-3

- **IEC 61850-3** is an electrical substation standard by IEC. It defines the communication between intelligent electronic devices in the substation.

IEC 60950:2005 - CB Scheme
Electrical Security Report

- **IEC 60950:2005** Applies to information technology equipment intended to be installed in an OUTDOOR LOCATION. The requirements for OUTDOOR EQUIPMENT also apply, where relevant, to empty OUTDOOR ENCLOSURES

CE Marking for Low Voltage Electrical
Equipment

- **CE Marked** Electrical equipment that is being sold in the UK and Europe is required to be CE Marked under the Low Voltage Directive (typically shortened to 'LVD').

New Datalight Reliance Nitro file
system :

- Robust transactional system designed to prevent memory corruption during power loss
- High level of performance regardless of the number of files

Rescue operating system to allow for
more reliable remote firmware update

- Is an open source secure bootloader for all microcontrollers, designed to support remote firmware updates in embedded systems

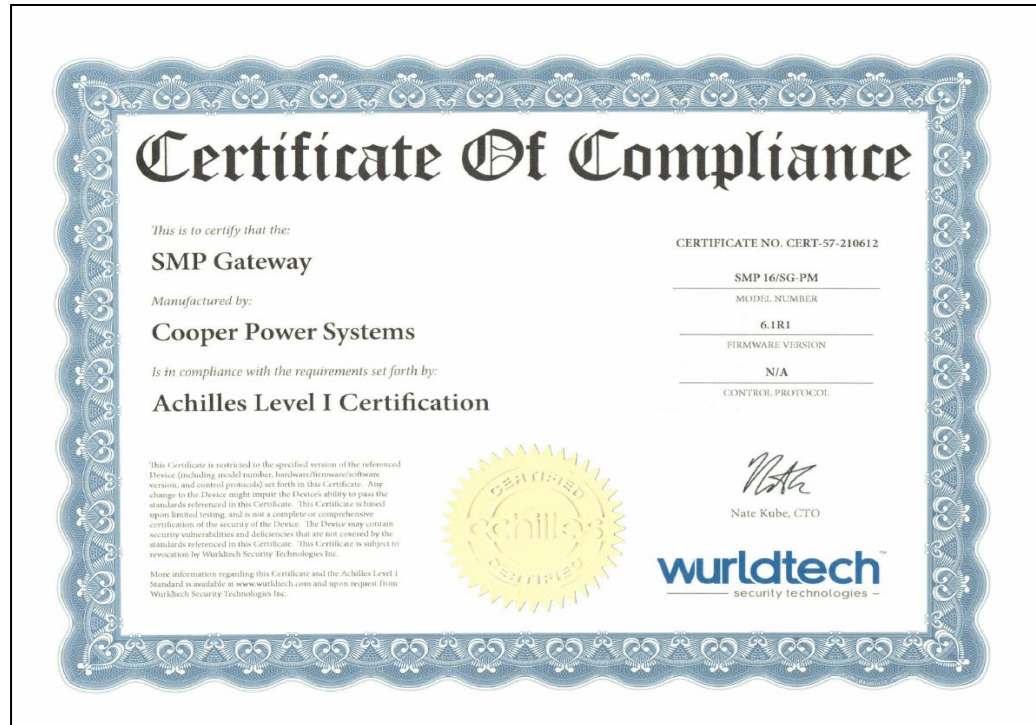
Fiabilidad y robustez de la red

- Todos los modelos de SMP Gateway han obtenido la certificación Wurldtech Achilles Communications como dispositivo de red.
- La certificación de Achilles confirma que SMP Gateway puede **mantener la disponibilidad incluso cuando se envía a un gran volumen de tráfico, o a un tráfico mal formado como resultado de problemas de red o intenciones maliciosas.**
- Esta certificación es un subconjunto de la certificación ISA Secure.

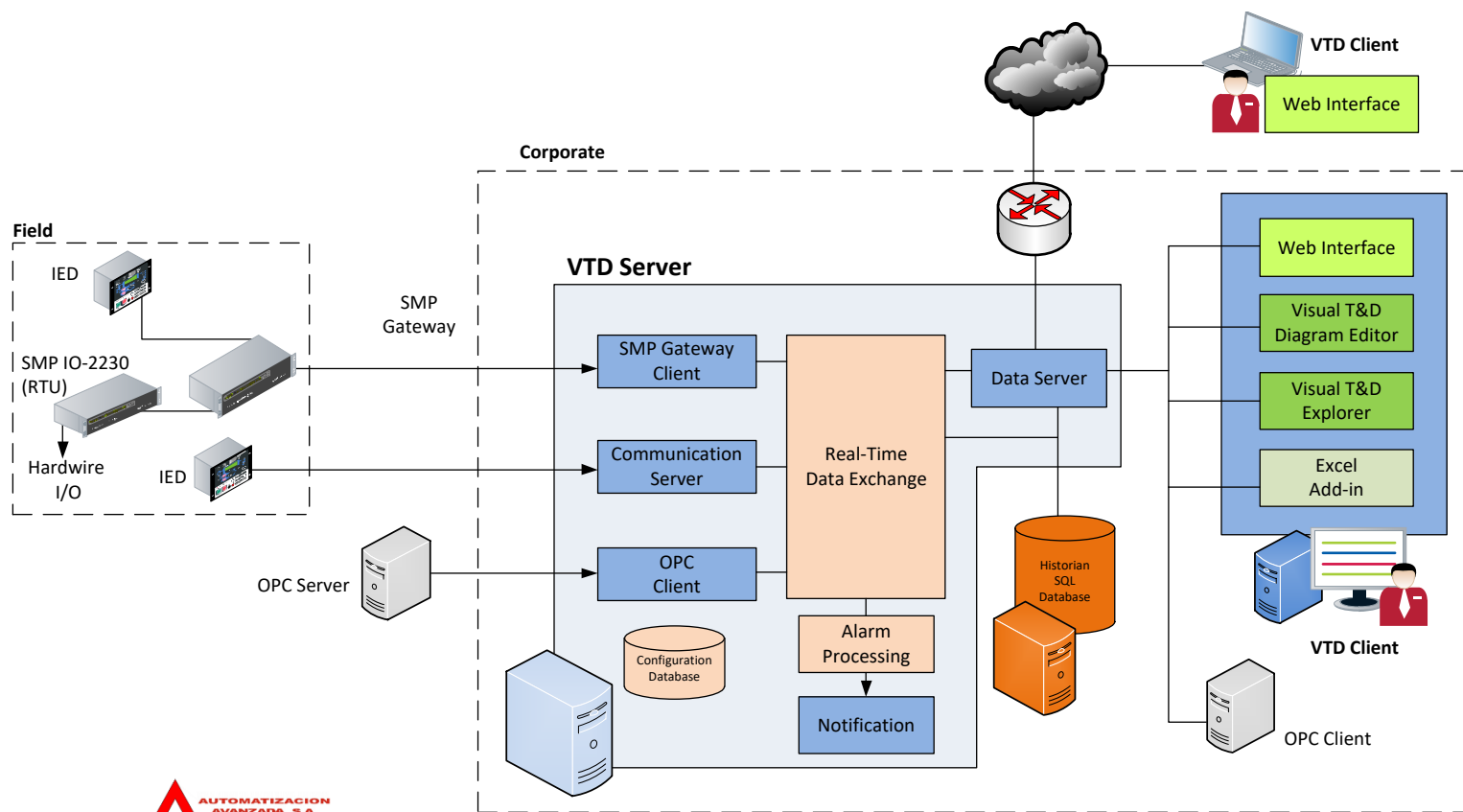
Metodología de prueba

- Las pruebas ejecutadas se dividen en dos categorías:
 - **Pruebas de agotamiento de recursos.** Pruebas que intentan agotar un recurso particular del DUT. Por ejemplo, tormentas que envían paquetes a velocidades rápidas en un intento de desbordar los recursos de memoria del DUT.
 - **Pruebas de paquetes no válidos.** Pruebas que envían paquetes formados ilegalmente al DUT. Las pruebas utilizan fuzzers y gramáticas para crear estos paquetes no válidos.

Certificación Achilles

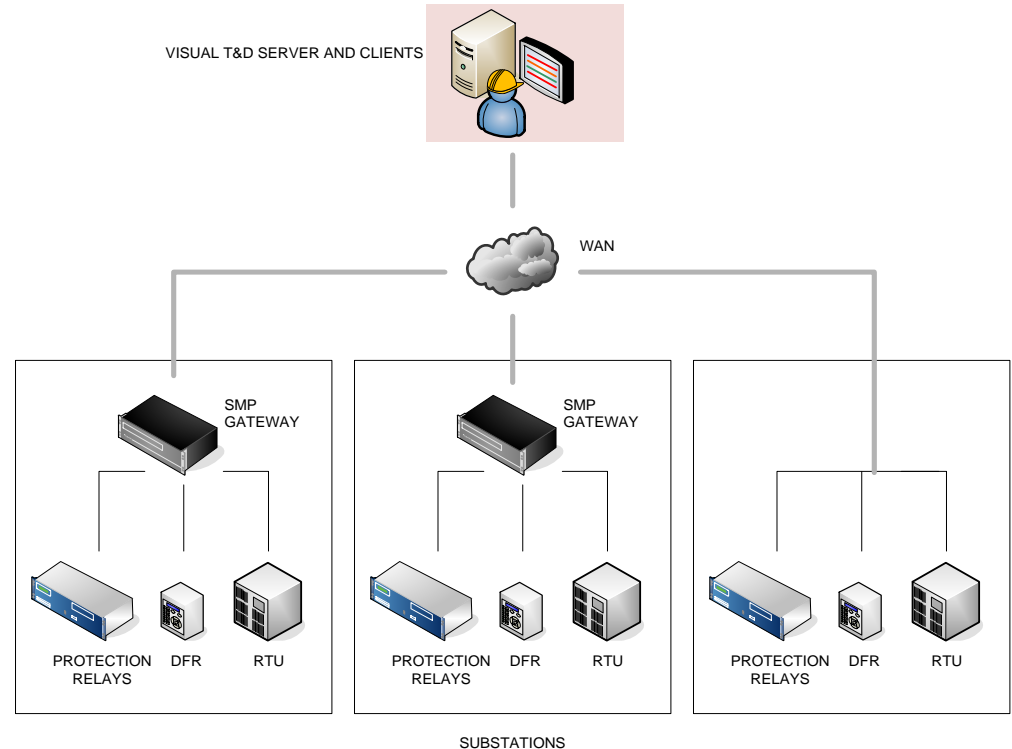


Arquitectura del Visual T&D



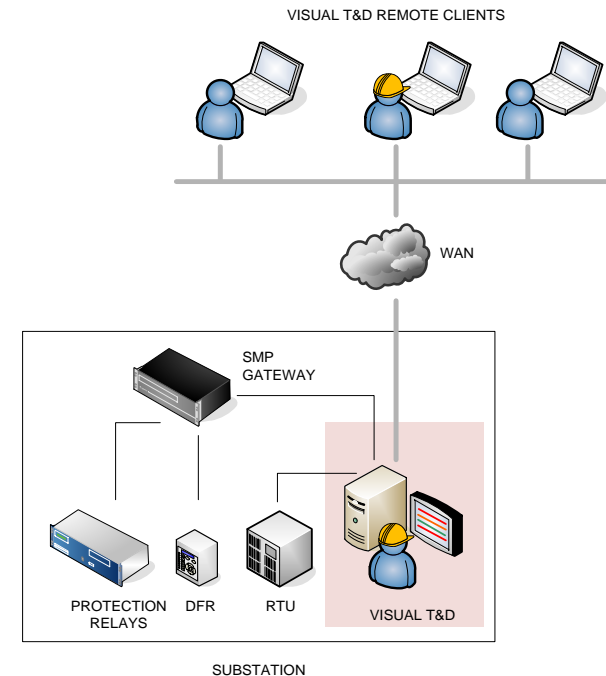
SCADA - YUKON VISUAL T&D

- Probado en campo con hasta 500.000 puntos de datos
- Probado en campo a hasta 10.000 transiciones por segundo
- Soporte de redundancia
- Admite múltiples fuentes de datos
- Enlaces de comunicación cifrados mediante TLS/SSL



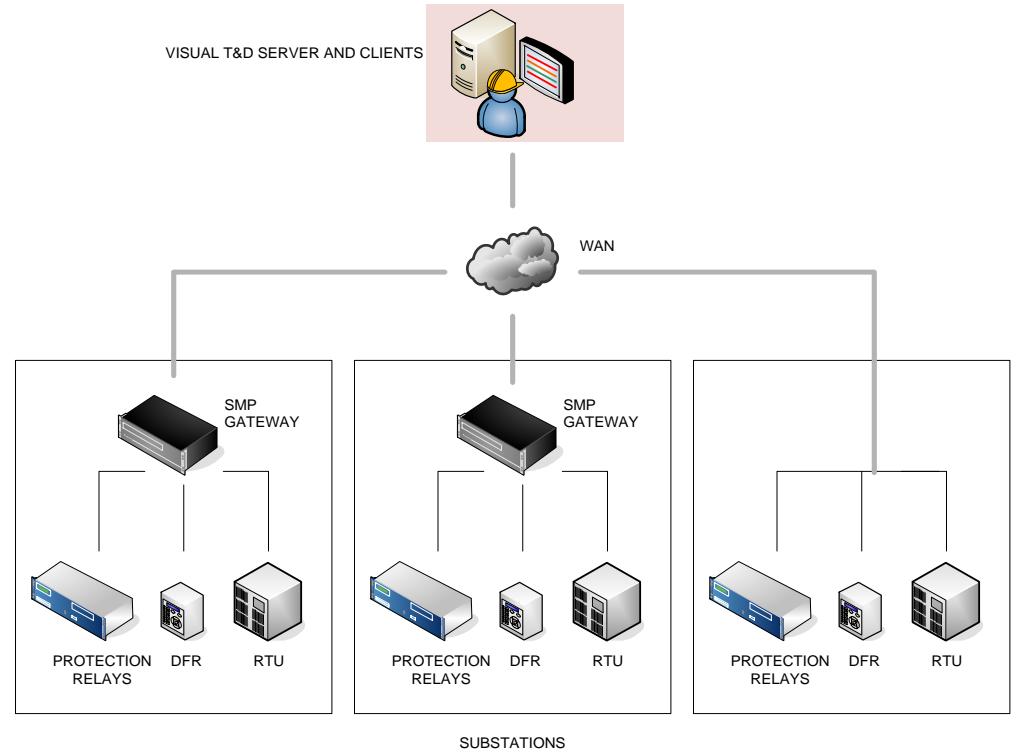
HMI de Subestación – YUKON VISUAL T&D

- Las aplicaciones cliente y servidor se pueden instalar en el mismo equipo
- Interfaz web para usuarios locales/remotos
- Modo consola



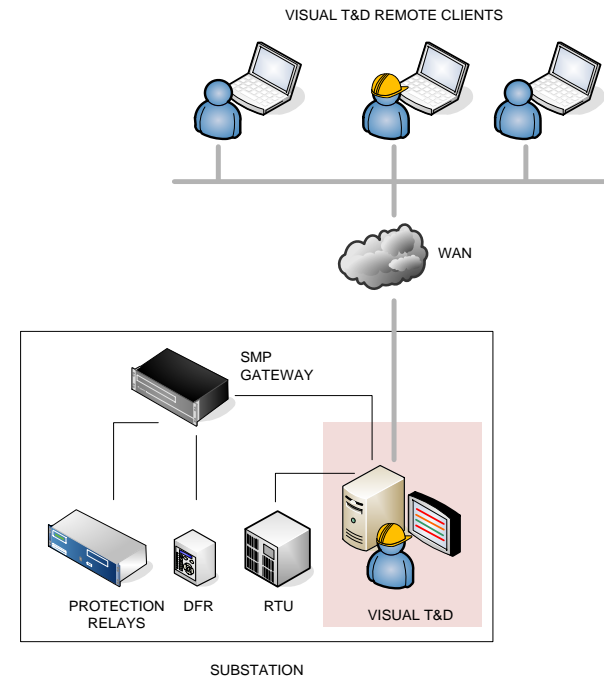
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GridAdvisor™ Series II smart sensor

Eaton ayuda a las empresas de servicios públicos a mejorar en la eficiencia con los que operan sus sistemas de distribución.

El sensor inteligente **GridAdvisor™ Serie II** colabora al mejorar la gestión de cortes, mantenimiento del banco de condensadores, proporcionando ahora información del sistema no disponible previamente.

Este producto simple pero sofisticado puede anunciar

- - Detección de fallas direccionales.
- Detección de un banco de condensadores.
- Falla del fusible.
- Y convierte una línea en un dispositivo de monitoreo DNP3 en casi cualquier ubicación.



GridAdvisor™ Series II smart sensor

- Detección de carga de 0,5 a 600 amperios con una precisión del 1 % o superior.
- Batería y tarjeta SIM reemplazable.
- -30 °C a 80 °C.
- Resistente a los rayos UV y al agua (IEEE 495).
- Detección de tensión (5 %) hasta 69 kV.
- Localización de fallas direccionales.
- Informes de demanda.
- Memoria para almacenar 96 valores actuales de demanda Di/dt.
- Seleccionable (25, 100 o 350 amperios).
- Magnitud de corriente de falla hasta 20kA.
- Puntos de alarma configurables.
- Coordenadas GPS (fase II).
- Configuración de Bluetooth a través del software ProView™ NXG
- Y más...

