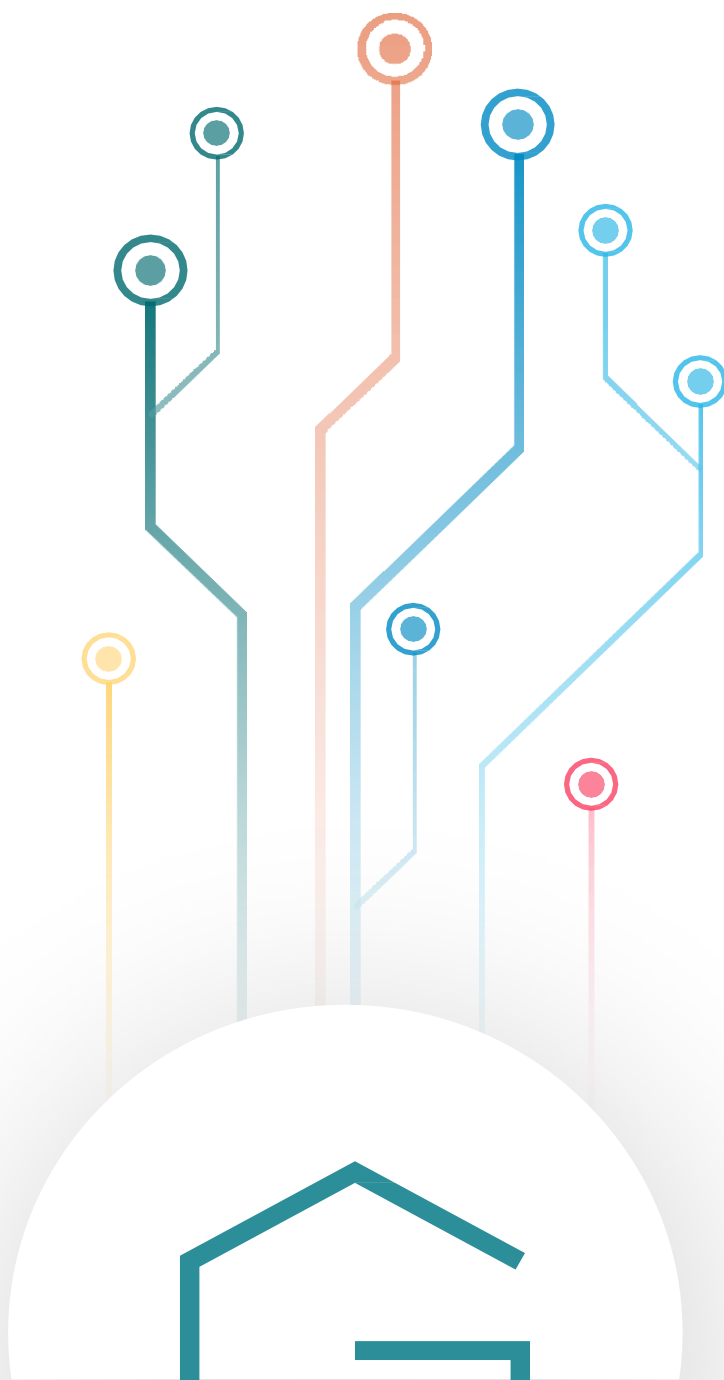
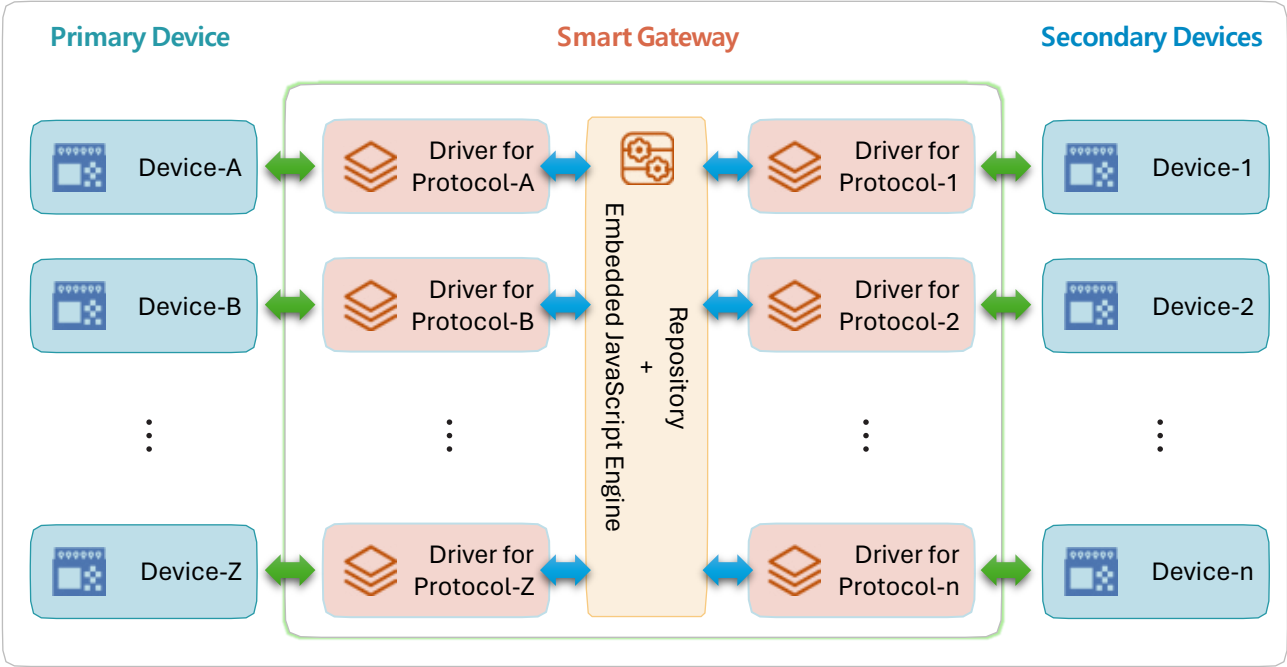


Smart Gateway



What is SmartGateway?

The foundation of IoT (Internet of Things), the core technology of the 4th Industrial Revolution, begins with connecting various internet-enabled objects, needs an understanding and implementation of various protocols supported by these objects. SmartGateway serves as the most cost-effective and efficient solution for relaying desired values from devices or transmitting required values to devices without needing to comprehend the protocol applied to the device being connected.



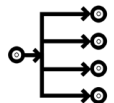
Features of SmartGateway



It is easy to install with adapting tiny hardware, and it supplies the web-based UI for simple setting-up configuration.



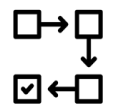
It is well-worked on embedded Linux, and it ensures excellent robust with adapting plug-in architecture.



It enables connection between things, supporting not only one-to-one connections but also one-to-many connections



It ensures reliability with the independent structure that enables to be well-worked even though another module in running is a malfunction.



It can be applied on the various environment which has to connect with PLC, OPC UA, Modbus and so on.

JavaScript-based

Unlike another gateway that supports data exchange between devices with fixed protocols, the Smart Gateway provides variety of functions to enable connection or exchanging data between devices with different protocols and converts data value between collected items. All of these tasks can be implemented using the low-coding techniques using JavaScript.



```
Lib.load("mbtcpriu");
MBtcpriu.openTcp(502);
MBtcpriu.openRtu("/dev/ttyUSB0", "baud=9600 databit=8 parity=none");
```

With just 3 lines of JavaScript code, it's possible to connect and collect data form Modbus/RTU devices using Modbus

In addition to the various features provided by JavaScript, the SmartGateway provides differentiated features such as engineering unit conversion and normalization between values, making it easy to configure data integration with other systems.

0~65535

➡

var realVal = Conv.Norm(0, 65525, 0, 100)

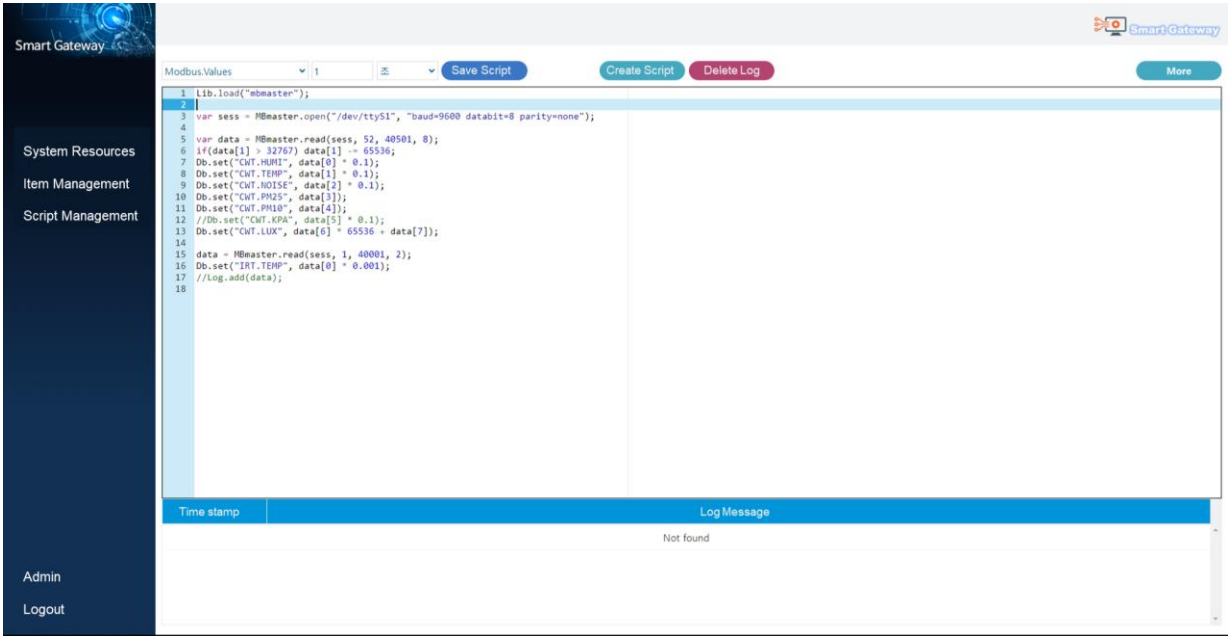
➡

0~100

For devices that transmit values between 0 and 100 degrees to a range of 0 to 65535, a normalization process is necessary, and the SmartGateway provides functions specifically for normalization and realization in such cases.

Web-based Configuration

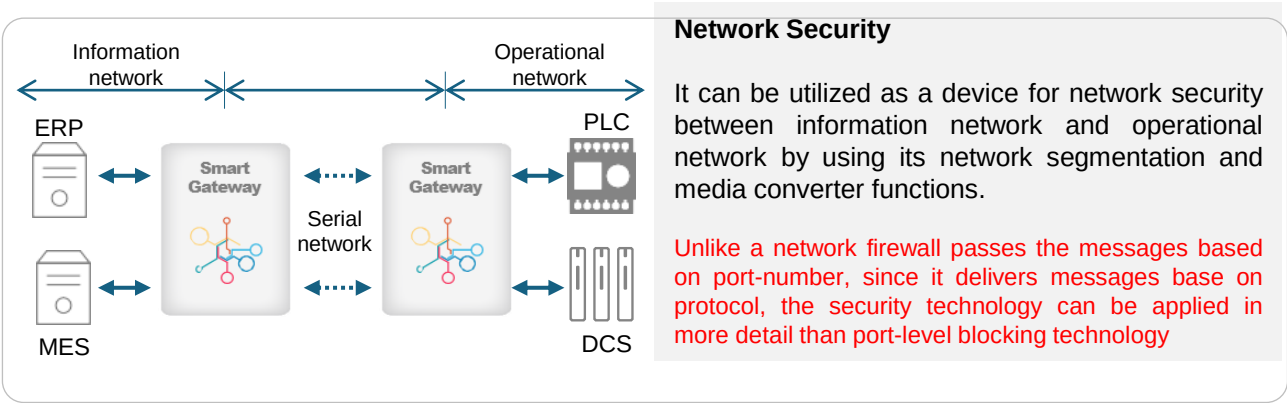
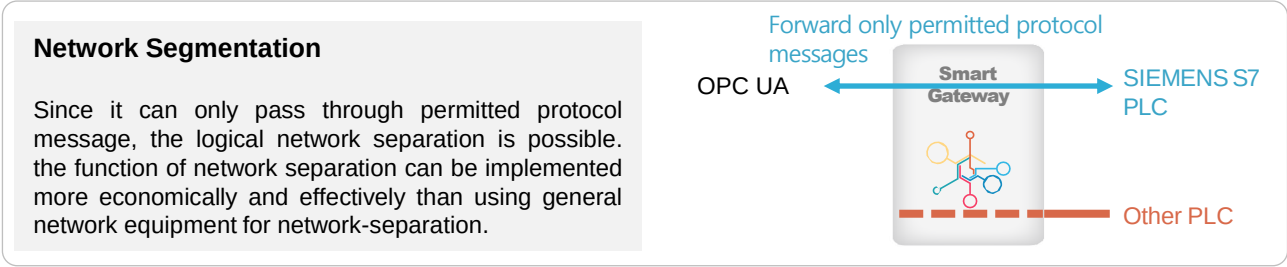
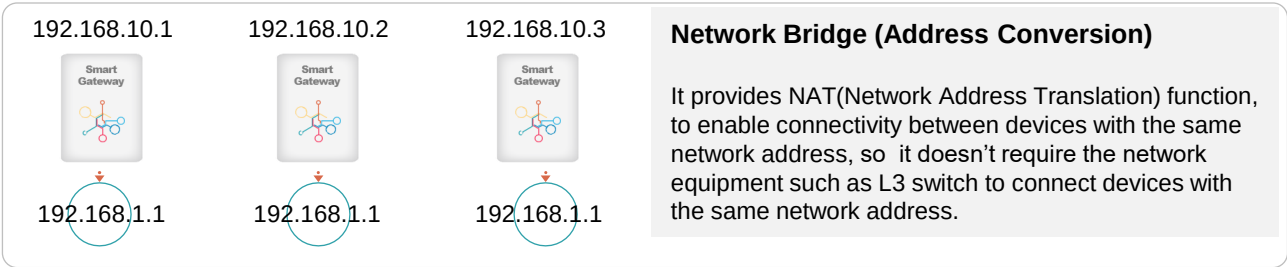
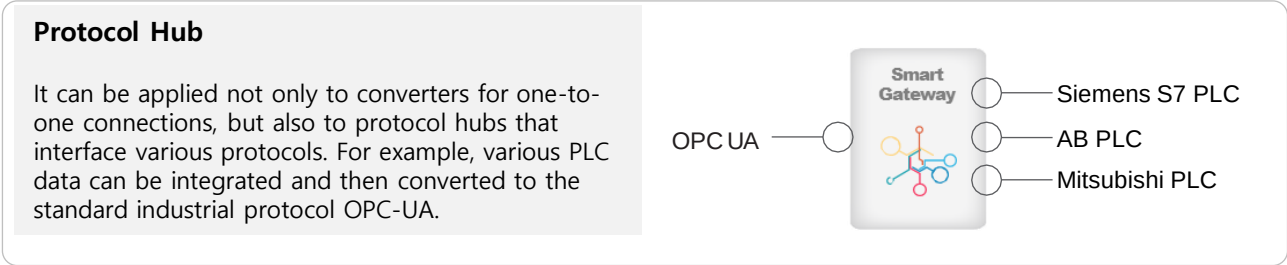
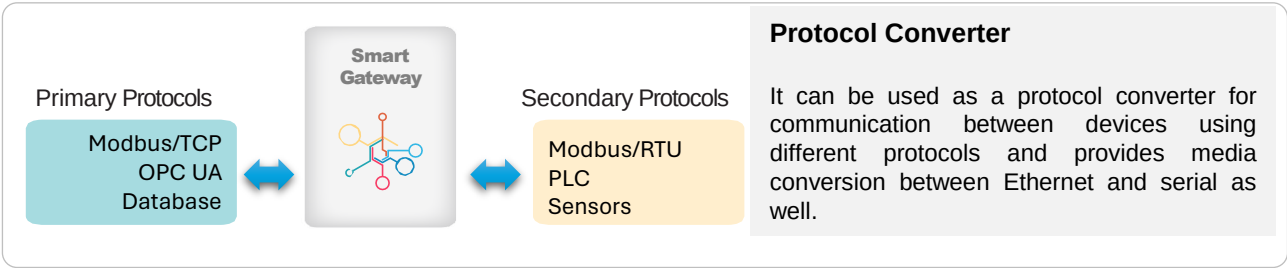
Smart Gateway has a built-in web server, so actions such as monitoring operation status and collected items, and editing JavaScript can be performed using a web browser without installing a specific program.



Using the web-based JavaScript editor, you can configure and load communication drivers, configure communication items, and convert data.

Features of Smartgateway

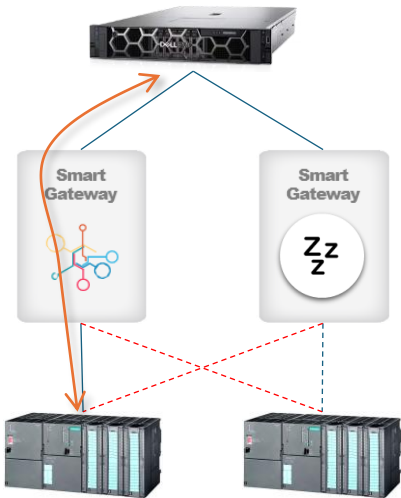
The SmartGateway serves as the optimal solution for data exchange between heterogeneous devices by performing protocol conversion, network segmentation, network security, and protocol hub role.



Smartgateway Redundancy Configuration

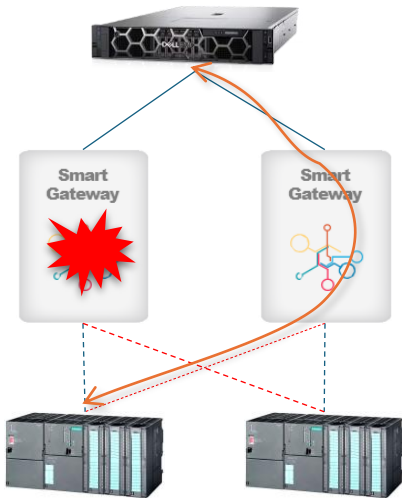
The SmartGateway supports an active-standby redundancy configuration to ensure reliable data connectivity. In this configuration, if a communications line, gateway, or network device fails, the SmartGateway automatically detects it and switches to a normal device, allowing for seamless data exchange.

System Redundancy – Initial State



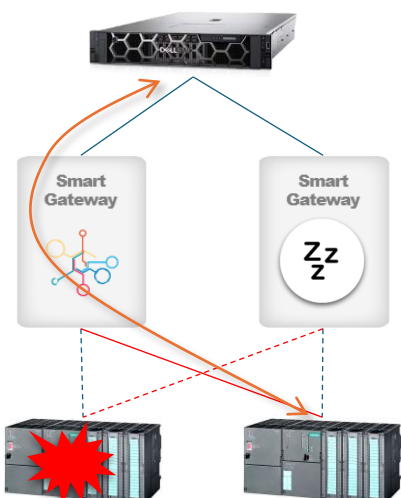
Only one SmartGateway connects to the PLCs and collects data from them.

System Redundancy – First SmartGateway Failure



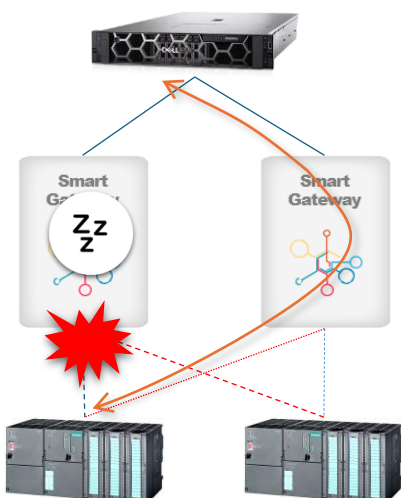
If one of the two smart gateways is failed, data is collected via the other smart gateway in standby. Afterwards, when the failed first smart gateway is restored, the first gateway is reactivated and communication resumes.

System Redundancy – First PLC Failure



If one of two PLCs has a trouble in communication the smartgateway switches to the other PLC in standby to collect data from PLC. After the failure is recovered, data is collected through like with the first PLC

System Redundancy – Network Device Failure



If the network equipment for the first gateway is malfunctioned, the second, standby gateway in becomes activated and begins communicating with the PLC to collect data.

Application of Smartgateway

Integration with Condition Monitoring System

- it collects data from Bentley Nevada Vibration System via protocol OPC UA , converts to Modbus/RTU and sends to iFix SCADA System
- SmartGateway and SCADA System are connected by a serial cable to separate network between the Vibration System and SCADA System.



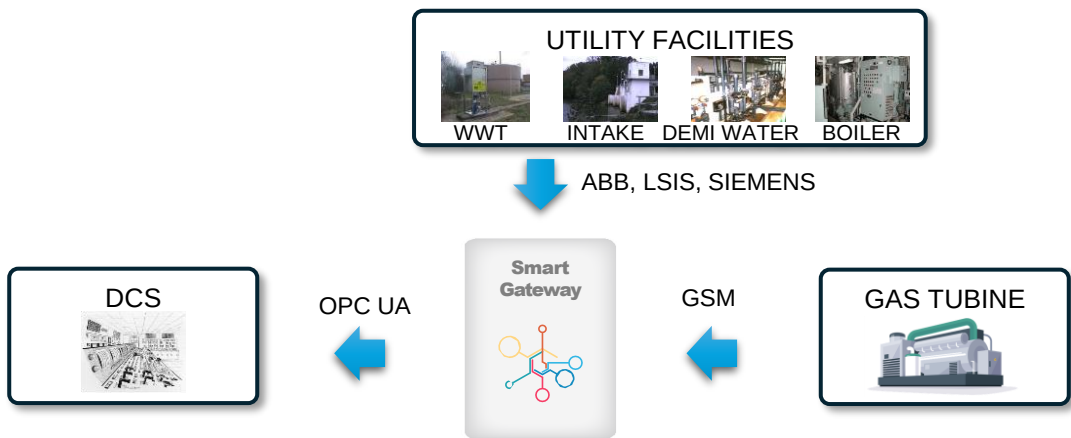
Integration with BEMS(Building Energy Management System

- BACnet/IP protocol is applied to connect with BEMS System.
- MQTTS is applied to connect with Microsoft's Azure cloud.



Integration with Combined cycle power plant

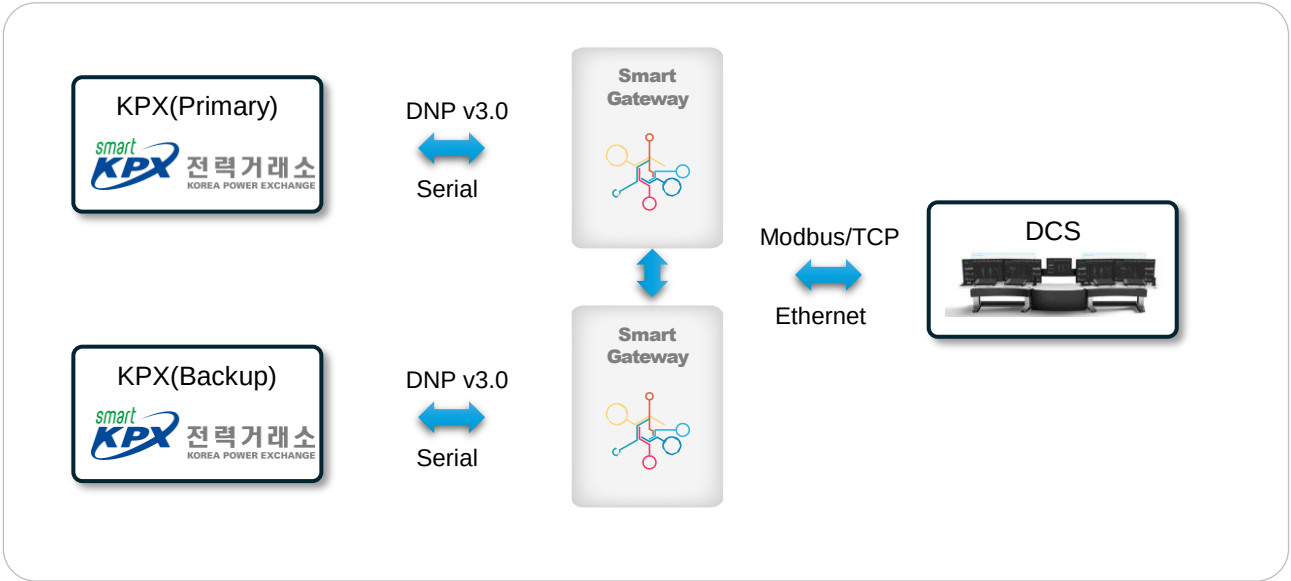
- Application of GE's GSM protocol to connect with GE turbine power generation facilities.
- To connect with utility facilities, the SmartGateway connects and collects data using the PLC protocol provided by each facility.



Application of Smargateway

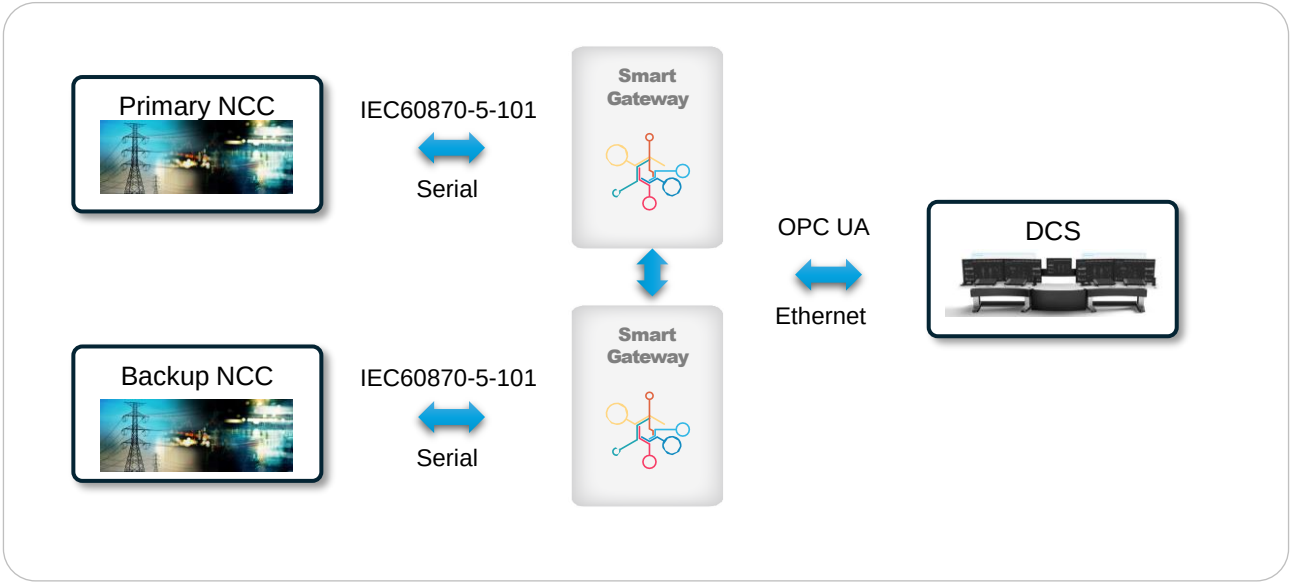
Integration with Power Exchange (In case of Korea)

- Integrated with the Power Exchange for sending control commands or getting real-time status information.
- Configured to route through dedicated line modems and utilize the DNP v3.0 protocol for integration.



Integration with Power Exchange (Middle East, Southeast Asia)

- Integrated with the Power Exchange for processing control commands or transmitting real-time status information.
- Connected via dedicated line networks and utilizing the IEC-60870-5-101 protocol for integration.



Smartgateway Specification

General		
Configuration tool	Supported web-based configuration tool	
Supported Script	ECMAScript E5/E5.1(JavaScript)	
Operating System	Linux	
Maximum tags	Lite	up to 1,000 tags
	Standard	up to 5,000 tags
	Premium	up to 10,000 tags
Protocol Support		
OPC UA		Client/Server
Modbus/RTU		Master/Slave
Modbus/TCP		Client/Server
Modbus/RTU<->Modbus/TCP		
Modbus/TCP<->Modbus/RTU		
DNP v3.0		Client
IEC60870-5-1-101		Master/Slave
IEC60870-5-1-104		Client/Server
BACnet/IP		Client
Ethernet/IP		Client
GSM(GE Industrial Systems Standard Messages)		Client
SCPI(Standard Commands for Programmable Instruments)		Client
ICMP(Internet Control Message Protocol)		Client
SNMP(Simple Network Management Protocol) v2		Client
PLC Support		
Siemens		S700/S400/S300
LSIS		MASTER-K Series XGT Series (XGK, XGI, XGR) GLOFA-GM Series
Melsec		Q series FX series
OMRON		
Allen-Bradley		

Smartgateway Hardware Specification

	Lite	Standard	Premium
CPU	Armv7 Cortex-A8 600 MHz	Armv7 Cortex-A8 1 GHz	Intel Atom® x6211E
RAM	256 MB	512 MB	8 GB
Operating System	Debian 9, kernel 4.4		Debian 11 (kernel 5.10)
Storage Pre-installed	8 GB eMMC		64 GB SSD
Ethernet Ports	1 x 10/100 Mbps	2 x 10/100 Mbps	4 x 10/100 Mbps
Serial Ports	1 x RS232/422/485	2 x RS232/422/485	6 x RS232/422/485
Console port	RS-232 (TxD, RxD, GND), 4-pin header output (115200, n, 8, 1)		-
USB 3.0	-	-	USB 3.0 hosts x 3, type-A connectors
Digital Input	-	-	DIs x 8
Digital Output	-	-	DOs x 8
Video Output	-	-	HDMI 2.0b x 1 VGA x 1, 15-pin D-sub
LED Indicators	-	-	Power x 1 Storage x 1 2 per port (10/100/1000 Mbps)
Serial Baud rate	50 bps to 115.2 kbps		
Buttons	Reset button DIP switch for serial port configuration		Power button x1 Reset button x 1
[Ethernet] Magnetic Isolation Protection	1.5 kV (built-in)		
IP Rating	IP20		
Housing	Metal		
Installation	Wall mounting		Rack mounting(1U)
Operating Temperature	-10 to 60°C		-30 to 60°C
Storage Temperature	-20 to 70°C		-40 to 75°C
Input Voltage	9 to 48 VDC		12/24 VDC
Power Consumption	4 W		50 W
Dimensions	73 x 80 x 28 mm	99 x 111 x 25.5 mm	440 x 230 x 43.6 mm
Weight	190 g	290 g	3,330 ~ 3,520 g
			



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