Unified Computing Platform

Product Selection Guide

Serial Device Servers
Modbus Gateways
Protocol Gateways

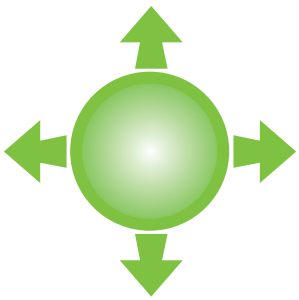
2017/2018

atop Technologies

Features

- Wide range to fully equip various verticals market
- Software-independent platform
- Advanced feature-sets for flexible configurations
- Redundancy through RSTP
- DC/AC or PoE power inputs (802.3af)
- Legacy protocol support
- Multiple Environments: from factory floor to harsh environments
- Industry-standard certifications
- Advanced features
- Platforms with SDK available

Introduction



Discover how Atop devices can enable your business to be more effective, with better efficiency and reliable uptime.

Page 3

Serial Device Servers

Convert from Serial (RS-232/422/485) to Ethernet seamlessly using our wide range of devices: from entry-level to harsh environments.

Page 4~6

Modbus Gateways

Convert Modbus TCP to Modbus RTU/ASCII, with advanced and standard features available like data concentrator and redundancy.

Page 7~11

Protocol Gateways

Modbus

dnp Distributed Network Protocol

IEC 61850

IEC 60870

Integrate new and legacy devices into new and expanding networks. Perfect for applications like substations and smart grids.

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Application Platform Map

How we map solutions to develop for Your business.

No matter what industry or environment you operate in, Atop's applications provide an efficient and secure backbone for your business. From entry-level to advanced hardware bases, Atop is able to incorporate your devices seamlessly to provide total connectivity – both wired and wirelessly.

1) **SDK version:** for a freely programmable embedded edge computer with proven cloud connectivity

   a. Atop's customized **Linux OS**

   b. Atop's **custom APIs and utilities** to control hardware with a wide variety of programming examples

   c .An integrated **Building Block programming environment,** in addition to C programming. The embedded **NodeRED** environment includes a wide range of customized APIs, allowing you to access hardware through a visual programming environment

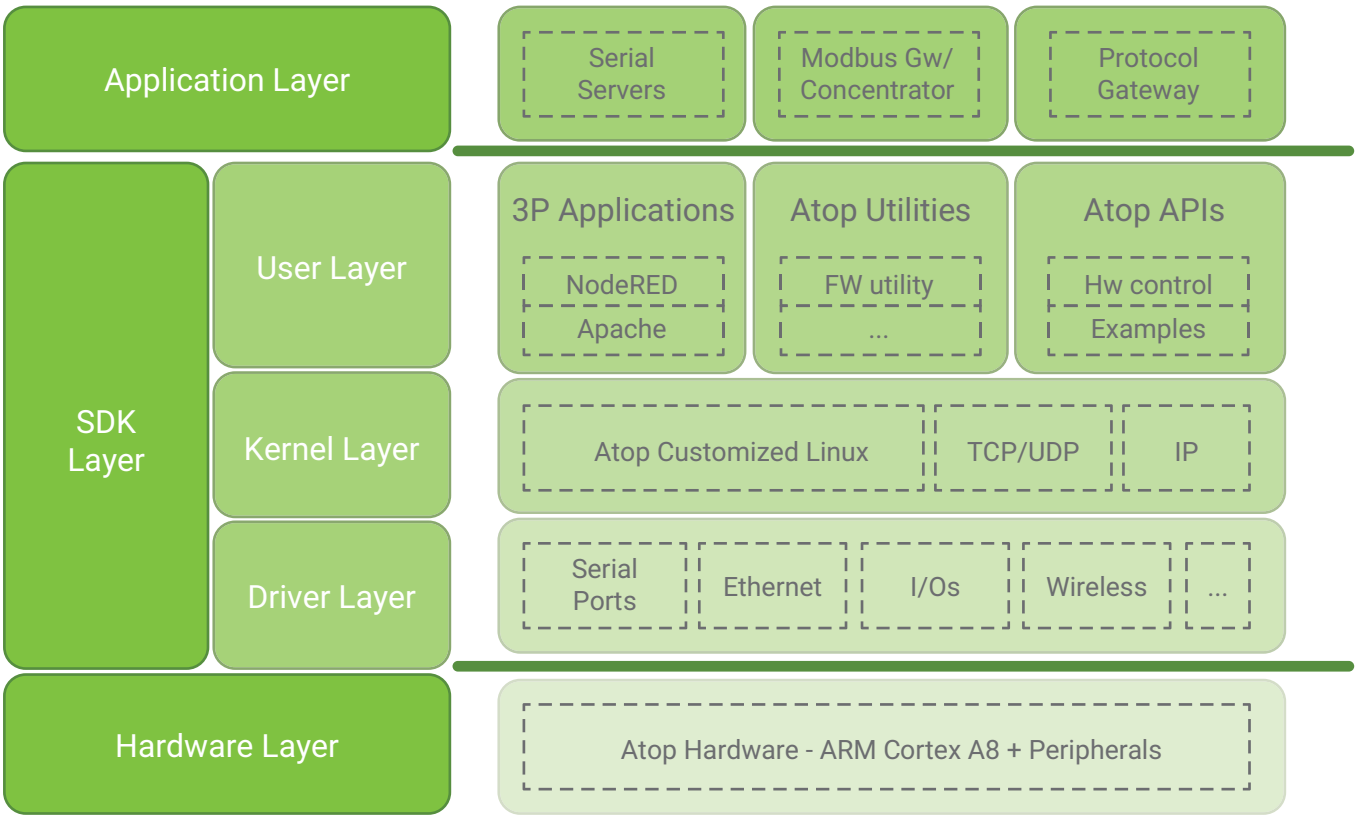
   To learn more about our edge computing, check out our Embedded Computing Brochure.

2) **Serial Server Application:** for transparent conversion between Serial and Ethernet

3) **Modbus Gateway Application:** to convert from Modbus TCP to RTU/ASCII, and vice-versa

4) **Modbus Concentrator:** for faster Modbus polling responsiveness, redundancy, and register remapping

5) **Protocol Gateway:** for an advanced protocol conversion applications, such as Substation and Industrial scenarios



Atop Serial Servers

At Atop we understood that it can be difficult to integrate various application needs. So we develop solutions that bring interoperability between various hardware and software platforms. In addition, we develop with a product strategy in mind, so that flexibility and network scalability are factored in to provide solutions that are fit for the future.

Entry Level

A low-cost, hardened hardware device for serial server applications in standard operating environments in normal temperature ranges.

Wireless

Designed to equip serial server functionality with wireless connectivity, our wireless devices support IEEE 802.11abgn and IEEE 802.11bgn.

Advanced

Featuring a high-powered industrial CPU and high EMC protection at Levels 3 to 5 or IEC61850-3, these advanced serial servers provide performance and scalability for Modbus Gateways, Modbus Concentrators, Protocol Gateways, and programmable environment support (SDK), in which you can write your own software in C or build your own IIoT application with a visual building-block tool.

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Serial Device Servers

	Entry-level				Advanced				
									
General Information						NEW!			NEW!
Model Number	SE5001	SE5001A	SE5002	SE5002D	SE5901	SE5901B	SW5501/2	SW5501/2C	SE5904D
Network Interfaces									
Total number of ports	1	1	1	1	2	1	1	1	2
Total Fast Ethernet	1	1	1	1	2	-	-	1	(2)
10/100 BaseT(X)	1	1	1	(1)	2	-	-	1	(2)
100 Base-X (SFP)	-	-	-	(1) or MM/SM	-	-	-	-	-
Total Gigabit	-	-	-	-	-	1	1	-	(2)
10/100/1000 BaseT(X)	-	-	-	-	-	1	1	-	-
100/1000 Base-X SFP	-	-	-	-	-	-	-	-	(2)
1000Base-X SFP	-	-	-	-	-	-	-	-	-
Wireless LAN	-	-	-	-	-	-	802.11abgn	802.11bgn	-
3G/4G interfaces	-	-	-	-	-	3G or 4G	-	-	-
Network Redundancy									
RSTP redundant ports	-	-	-	-	2	-	-	-	2
HSR/PRP redundant ports	-	-	-	-	-	-	-	-	-
Serial Ports									
Number of ports	1	1	2	2	1	2	1/2	1/2	4
RS-232 RS-422 RS-485 full func.	1	1	2	2	1	1 (RS-232/485)	1/2	1/2	4
RS-232 only	-	-	-	-	-	1 (only IO vers.)	-	-	-
Serial port Isolation	-	15kV	15kV Optional	-	-	-	2kV Optional	-	3kV Optional
Terminal Block (TB) ports	(1)	(1)	(2)	(2)	(1)	(1)	1/(2)	1/(2)	(4)
D-Sub 9 (DB9) ports	(1)	(1)	(2)	(2)	(1)	(1)	1/(2)	1/(2)	(4)
RJ45 Serial ports	-	-	-	-	-	-	-	-	-
Other interfaces									
Digital Inputs	-	-	-	-	-	2 (Optional)	-	-	-
Digital Outputs	-	-	-	-	-	2 (Optional)	-	-	-
Power Supply input									
Low Voltage DC power Input	9~30 VDC	9~48 VDC	9~30 VDC	9~48 VDC	9~48 VDC	9~48 VDC	9~48 VDC	9~48 VDC	12~48 VDC
Power through PoE 802.3af	-	-	-	-	Optional	-	-	-	Optional
AC power input	-	-	-	-	-	-	-	-	-
High Voltage DC power input	-	-	-	-	-	-	-	-	-
Power Inputs	1	1	1	1	1	1	1	1	2
Relay Output	-	-	-	-	-	-	-	-	1
Installation Options									
DIN-Rail Mount	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes
19" Rack Mount	-	-	-	-	-	-	-	-	-
Field Mount	Yes	Yes	Yes	(optional)	(optional)	(optional)	(optional)	(optional)	(optional)
Ingress Protection	IP30	IP30	IP30	IP30	IP30	IP30	IP30	IP30	IP30
Environment									
Operational Temperature	0/60° C	0/60° C	0/60° C	0/60° C	-40/85° C	-40/75° C	-10/60° C	-10/60° C	-40/85° C
Serial Server									
TCP Client:	Single/VCOM	Single/VCOM	Single/VCOM	Dual/VCOM	Dual/VCOM	Dual/VCOM	Dual/VCOM	Dual/VCOM	Dual/VCOM
TCP Server connections (Max):	Single/VCOM	4/VCOM	Single/VCOM	4/VCOM	4/VCOM	4/VCOM	4/VCOM	4/VCOM	4/VCOM
UDP (IP Ranges):	4 ranges	4 ranges	4 ranges	4 ranges	4 ranges	4 ranges	4 ranges	4 ranges	4 ranges
Reverse Telnet	-	TCP Server	-	TCP Server	TCP Server	TCP Server	TCP Server	TCP Server	TCP Server
VirtualCOM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSL Security (Web)	-	-	-	-	Yes	Yes	Yes	Yes	Yes
SSL Security (Traffic)	-	-	-	-	-	-	-	-	-
Compliance									
Industrial EMC Protection	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
UL60950-1	-	-	-	-	-	-	Yes	Yes	-
UL61010-2-201	-	-	-	-	-	-	-	-	Yes
EN60950-1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-
CE (EN61000-6-2 and EN61000-6-4)	-	Yes	-	Yes	Yes	Yes	-	-	Yes
RED (Radio Directive 2014/53/EU	n/a	n/a	n/a	n/a	n/a	Yes	Yes	Yes	n/a
FCC Part 15 Subpart B Class A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EN50155 - EN50121-4 Railway	-	-	-	-	-	-	-	-	-
IEC61850-3 / IEEE1613	-	-	-	-	-	-	-	-	-

Serial Device Servers

	Advanced				IP68
					
General Information			NEW!	NEW!	
Model Number	SE5908	SE5916	SE5908A	SE5916A	SE8502
Network Interfaces					
Total number of ports	2	2	6	6	1
Total Fast Ethernet	2	2	6	6	1
10/100 BaseT(X)	2	2	(6)	(6)	1 (M12)
100 Base-X (SFP)	-	-	(6)	(6)	-
Total Gigabit	-	-	-	-	-
10/100/1000 BaseT(X)	-	-	-	-	-
100/1000 Base-X SFP	-	-	-	-	-
1000Base-X SFP	-	-	-	-	-
Wireless LAN	-	-	-	-	-
3G/4G interfaces	-	-	-	-	-
Network Redundancy					
RSTP redundant ports	2	2	2	2	-
HSR/PRP redundant ports	-	-	-	-	-
Serial Ports					
Number of ports	8	16	8	16	2 (M12)
RS-232 RS-422 RS-485 full func.	8	16	8	16	2 (M12)
RS-232 only	-	-	-	-	-
Serial port Isolation	2.5kV Optional	2.5 kV Optional	3kV Optional	3kV Optional	2kV Optional
Terminal Block (TB) ports	-	-	(8)	(16)	-
D-Sub 9 (DB9) ports	-	-	(8)	(16)	-
RJ45 Serial ports	8	16	-	-	-
Other interfaces					
Digital Inputs	-	-	-	-	-
Digital Outputs	-	-	-	-	-
Power Supply input					
Low Voltage DC power Input	24~48 VDC	24~48 VDC	24~48 VDC	24~48 VDC	9~48 VDC
Power through PoE 802.3af	-	-	-	-	-
AC power input	100~240VAC	100~240VAC	100~240VAC	100~240VAC	-
High Voltage DC power input	-	-	100~370VDC	100~370VDC	-
Power Inputs	1	1	2	2	1
Relay Output	-	-	2	2	-
Installation Options					
DIN-Rail Mount	-	-	-	-	Optional
19" Rack Mount	Yes	Yes	Yes	Yes	-
Field Mount	-	-	-	-	Yes
Ingress Protection	IP30	IP30	IP30	IP30	IP68
Environment					
Operational Temperature	-20/70° C	-20/70° C	-40/85° C	-40/85° C	-40/75° C
Serial Server					
TCP Client:	Dual/VCOM	Dual/VCOM	Single/VCOM	Single/VCOM	Dual/VCOM
TCP Server connections (Max):	4/VCOM	4/VCOM	4/VCOM	4/VCOM	4/VCOM
UDP (IP Ranges):	4 ranges	4 ranges	4 ranges	4 ranges	8 ranges
Reverse Telnet	TCP Server	TCP Server	TCP Server	TCP Server	-
VirtualCOM	Yes	Yes	Yes	Yes	Yes
SSL Security (Web)	Yes	Yes	Yes	Yes	-
SSL Security (Traffic)	-	-	-	-	-
Compliance					
Industrial EMC Protection	Yes	Yes	Yes	Yes	Yes
UL60950-1	-	-	-	-	-
UL61010-2-201	-	-	EN/CB	EN/CB	-
EN60950-1	Yes	Yes	-	-	-
CE (EN61000-6-2 and EN61000-6-4)	Yes	Yes	Yes	Yes	Yes
RED (Radio Directive 2014/53/EU	n/a	n/a	n/a	n/a	n/a
FCC Part 15 Subpart B Class A	Yes	Yes	Yes	Yes	Yes
EN50155 - EN50121-4 Railway	-	-	-	-	Yes
IEC61850-3 / IEEE1613	-	-	Yes	Yes	-

...more information and datasheets available on Atop's website

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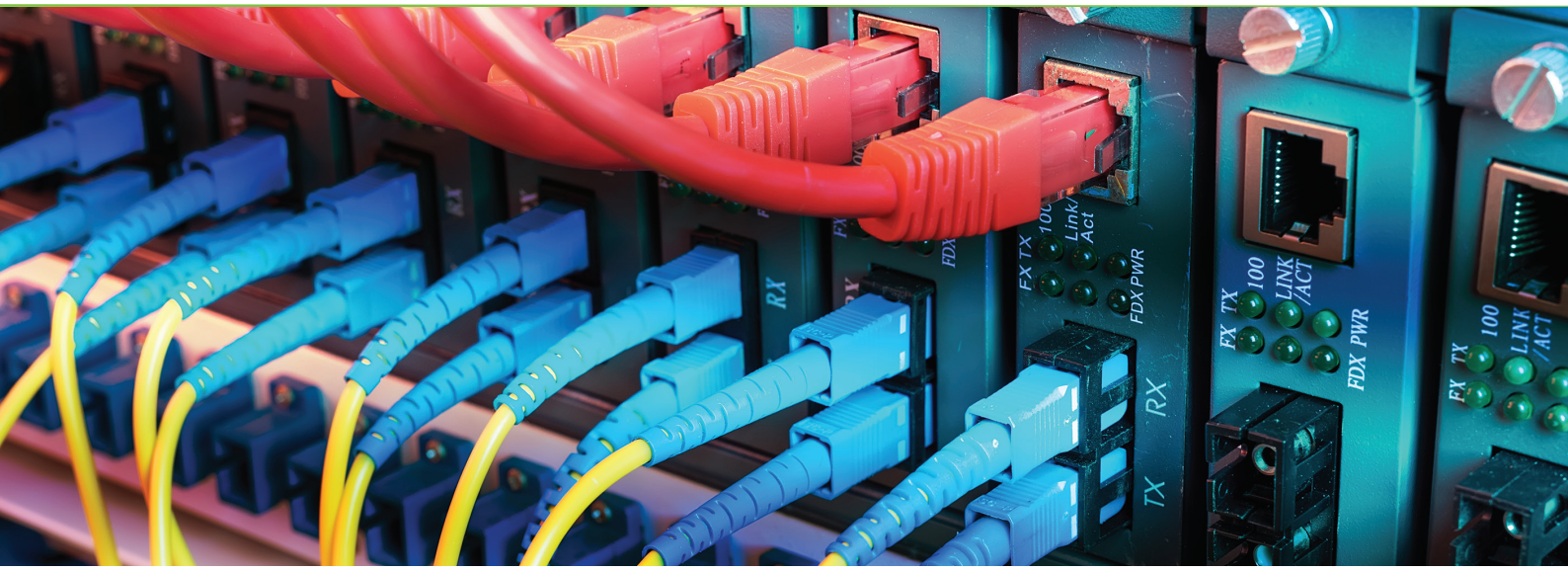


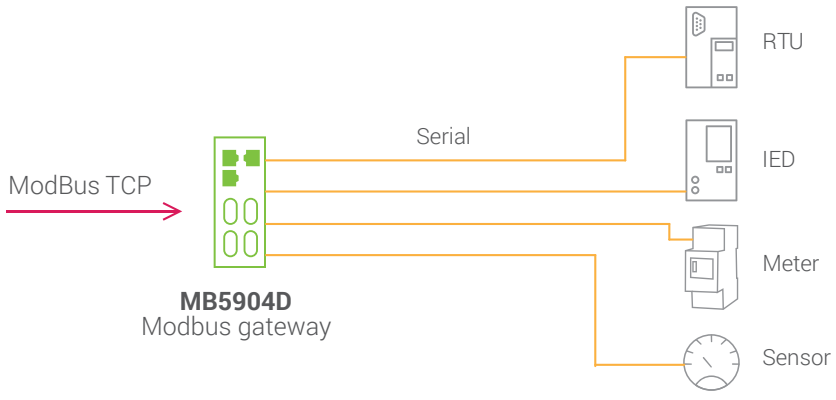
Modbus Gateways

Why Modbus?

Modbus is one of the most popular and trusted protocols, with Modbus RTU (for serial connection) and Modbus TCP/IP (for Ethernet Networks) normally used as the backbone preference in industrial automation, substation automation, and building automation solutions. To address the slow migration of communication standards from Serial- to Ethernet-based devices, ATOP has a complete range of Modbus Gateway devices to act converters to facilitate this migration, while extending the life of previous investment costs.

Product Line Overview

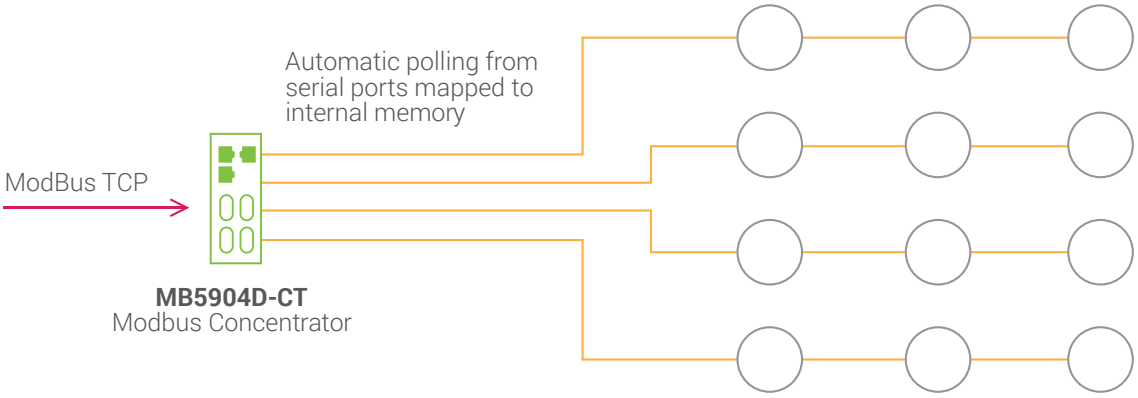
Entry level - Modbus Gateway



FEATURES

- Low-cost, easy to apply.
- Seamlessly provides conversion between ethernet-based Modbus TCP and serial-baed Modbus RTU/ASCII.
- Suitable for periodic data polling. Frequent pollings may cause long latencies and Modbus TCP Timeouts

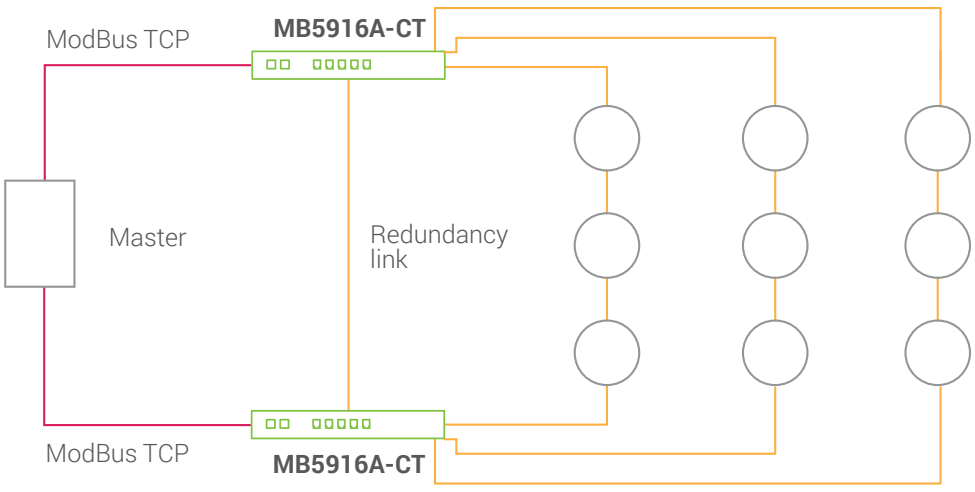
Advanced - Concentrator



FEATURES

- Suitable for frequent polling requests from multiple devices.
- Allows data to be polled automatically from slave devices. Data will be available for master polling at all times.
- Faster responsiveness, removing the risk of Modbus TCP timeouts.
- Customizable register mapping to optimize different masters needingto access different data structures.
- Supports link status and data timestamp access.

Top of the line - Redundant Concentrator



Automatic polling from serial ports with link failure recovery mechanism.

FEATURES

- All features of the Advanced Concentrator.
- Redundant architecture for the most mission critical applications.Automatic link recovery in case of Ethernet or Serial lirk failure.
- Supports link status and data timestamp access.
- High performance, reliability, and EMC protection.

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Modbus Redundant Concentrator Success Story

Modbus Redundant Concentrator

Challenge: to manage via Modbus TCP SCADA a large low-voltage substation infrastructure that is Modbus RTU-based. The infrastructure is very complex, with each switchboard involving around 190 slaves that need to be accessed simultaneously for data, diagnostics, and configuration.

Location: Malaysia, Petrochemical and Refinery Complex

Protocol used: Modbus TCP/Modbus RTU.

Requirements: Short failure recovery time; very efficient Modbus polling in an environment with a high density of devices.

Challenges

- Supporting system integrator define the topology.
- Customizing hardware with redundant Modbus concentrators with fiber uplink – 16 serial ports.
- Adjusting command priority to ensure each poll command can be executed within 600ms.
- Integration of customer's device management tool.
- On-site setup, config., test and troubleshooting.
- User-friendly configuration: develop a colored-block UI to identify memory area and enable easy set up of the memory mapping.

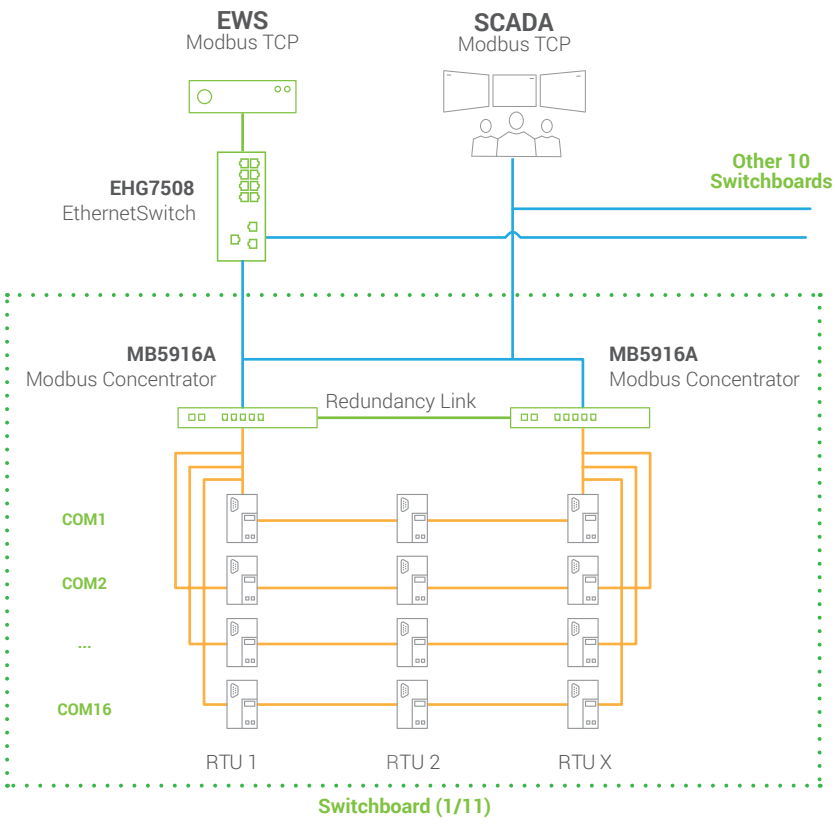
Solution provided

- Modbus redundant concentrators designed and set up in pairs, with redundancy fiber link between them and COM links that start from one device and end with the other one.
- Software customization and optimization.
- Managed Ethernet switches providing the backbone to the customer's EWS.

Results achieved

- 600 ms complete polling for more than 100 slaves, each with 20 registers (19200 bps).
- 500 ms secondary recovery to handle primary device downtime or device failure.
- Multi-write command to map different slaves simultaneously to improve efficiency.

Network Topology



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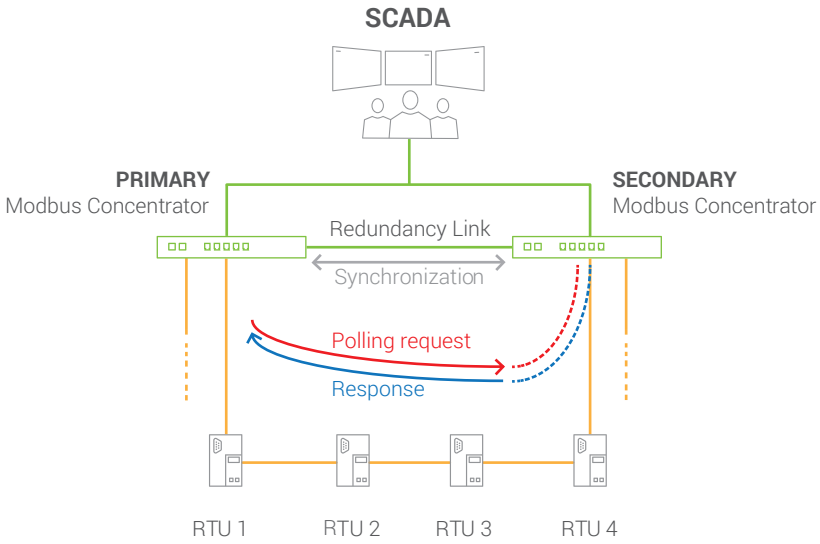
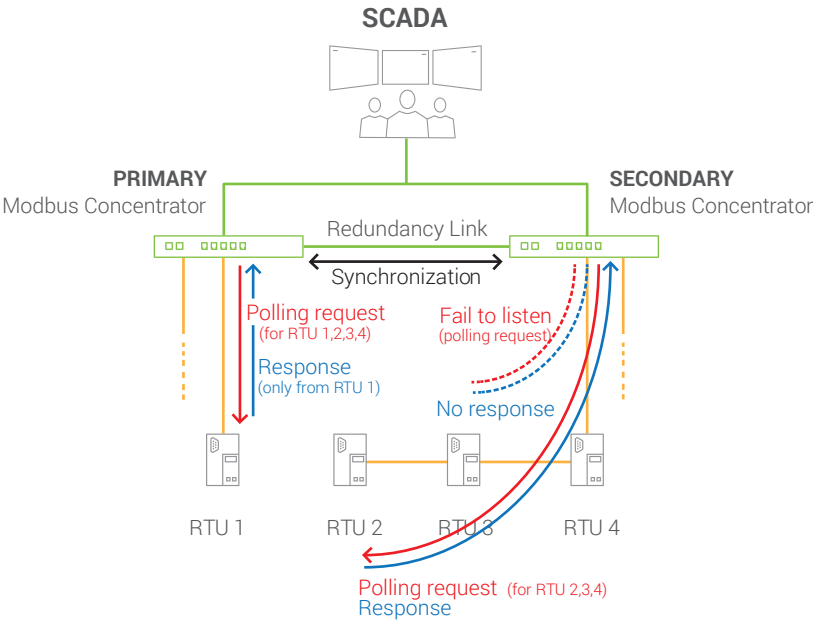
Ordinary operation

- During startup, one concentrator takes the role as primary and the other one takes the secondary role.
- The two devices share the same configuration and they are connected with a redundancy Ethernet link
- The serial port polling activity is carried out by the Primary device. Being the serial devices connected in a line from the primary to the secondary, the secondary device remains silent since it receives all data as per its configuration.
- The polled coils/registers are stored in the device's memory and rearranged, as it's more convenient for SCADA to access. Additional information on device status and time-stamping is made available.
- SCADA polls from one of the two concentrators, which sync their database in the background.



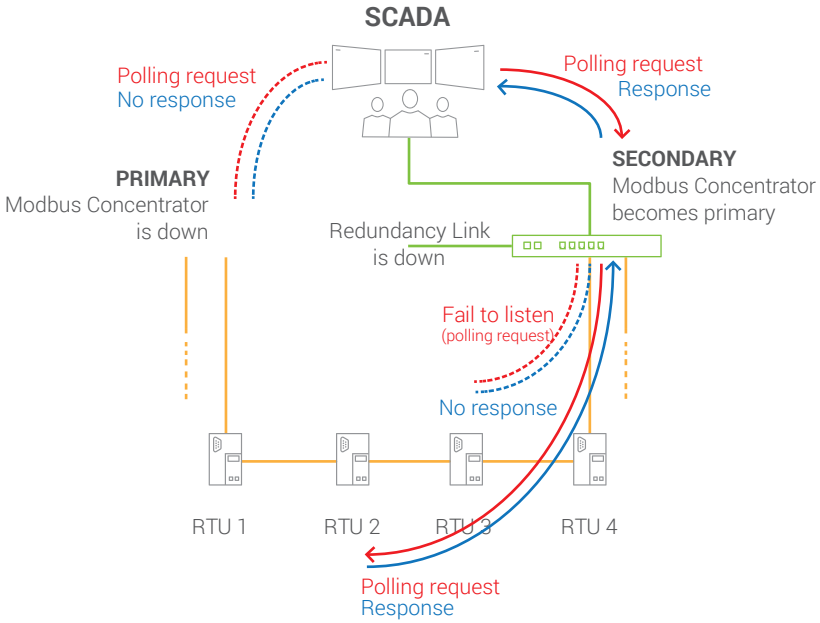
Serial line is broken

- In the example shown, the RS-485 line between IED 1 and IED 2 is broken. IED 2,3,4 can be accessed only from the Secondary concentrator side. IED 1 can be accessed only from the Primary Gateway.
- After Primary polls IED 1 and Syncing data with the secondary, the latter will notice IED 1 data wasn't received. This exception will be available as a dedicated register for diagnostics
- After not receiving any response from IED 2 and having a timeout, Primary will ask Secondary to poll the device, assuming the line is broken
- When successful, Secondary will Sync this with Primary. The data will anyway be available for the SCADA from primary device, seamlessly.
- Exception will be available as dedicated register



Device failure

- In case secondary device fails to receive any serial polling from primary and there is no response from the redundancy link, secondary will assume the the other device to be failure. Secondary will take over the primary role.
- SCADA will switch to poll secondary device
- The Primary failure status will be available through dedicated Modbus registers for diagnostics
- If the failed device returns back online, it will renegotiate its status and will act as a secondary concentrator with reference to poll and response to the SCADA host.



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Modbus Gateways/ Modbus Concentrators

	Entry	Advanced							
									
General Information									
Model Number	MB5001C	MB5901	MB5901B	MW5501/2C	MB5904D	MB5908	MB5916	MB5908A	MB5916A
Network Interfaces									
Total number of ports	1	2	1	1	2	2	2	6	6
Total Fast Ethernet	1	2	-	1	(2)	2	2	6	6
10/100 BaseT(X)	1	2	-	1	(2)	2	2	(6)	(6)
100 Base-X (SFP)	-	-	-	-	-	-	-	(6)	(6)
Total Gigabit	-	-	1	-	(2)	-	-	-	-
10/100/1000 BaseT(X)	-	-	1	-	-	-	-	-	-
100/1000 Base-X SFP	-	-	-	-	(2)	-	-	-	-
1000Base-X SFP	-	-	-	-	-	-	-	-	-
Wireless LAN	-	-	-	802.11bgn	-	-	-	-	-
3G/4G interfaces	-	-	3G or 4G	-	-	-	-	-	-
Network Redundancy									
RSTP redundant ports	-	2	-	-	2	2	2	6	6
HSR/PRP redundant ports	-	-	-	-	-	-	-	-	-
Serial Ports									
Number of ports	1	1	2	1/2	4	8	16	8	16
RS-232 RS-422 RS-485 full func.	1	1	1 (RS-232/485)	1/2	4	8	16	8	16
RS-232 only	-	-	1 (only IO vers)	-	-	-	-	-	-
Serial port Isolation	15kV Optional	-	-	-	3kV Optional	2.5 kV Optional	2.5 kV Optional	3kV Optional	3kV Optional
Terminal Block (TB) ports	(1)	(1)	(1)	1/(2)	(4)	-	-	(8)	(16)
D-Sub 9 (DB9) ports	(1)	(1)	(1)	1/(2)	(4)	-	-	(8)	(16)
RJ45 Serial ports	-	-	-	-	-	8	16	-	-
Other interfaces									
Digital Inputs	-	-	2 (Optional)	-	-	-	-	-	-
Digital Outputs	-	-	2 (Optional)	-	-	-	-	-	-
Power Supply input									
Low Voltage DC power Input	9~30 VDC	9~48 VDC	9~48 VDC	9~48 VDC	12~48 VDC	24~48 VDC	24~48 VDC	24~48 VDC	24~48 VDC
Power through PoE 802.3af	-	Optional	-	-	Optional	-	-	-	-
AC power input	-	-	-	-	-	100~240VAC	100~240VAC	100~240VAC	100~240VAC
High Voltage DC power input	-	-	-	-	-	-	-	100~370VDC	100~370VDC
Power Inputs	1	1	1	1	2	1	1	2	2
Relay Output	-	-	-	-	2	-	-	2	2
Installation Options									
DIN-Rail Mount	-	Yes	Yes	Yes	Yes	-	-	-	-
19" Rack Mount	-	-	-	-	-	Yes	Yes	Yes	Yes
Field Mount	Yes	(optional)	(optional)	(optional)	optional	-	-	-	-
Ingress Protection	IP30	IP30	IP30	IP60	IP30	IP30	IP30	IP30	IP30
Environment									
Operational Temperature	0/60° C	-40/85° C	-40/75° C	-10/60° C	-40/85° C	-20/70° C	-20/70° C	-40/85° C	-40/85° C
Modbus Gateway									
Modbus TCP/RTU/ASCII Gateway	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Modbus TCP/RTU/ASCII Concentrator	-	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes
Modbus Redundant Concentrator	-	Yes	-	-	Yes	Yes	Yes	Yes	Yes
Conversion direction	TCP>Serial	Bi-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional	Bi-directional
Maximum number of slaves	247	247	247	247	247	247	247	247	247
Exception error handling	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Compliance									
Industrial EMC Protection	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UL60950-1	-	-	-	Yes	-	-	-	-	-
UL61010-2-201	-	-	-	-	Yes	-	-	EN	EN
EN60950-1	Yes	Yes	Yes	Yes	-	Yes	Yes	-	-
CE (EN61000-6-2 and EN61000-6-4)	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RED (Radio Directive 2014/53/EU	n/a	n/a	Yes	Yes	n/a	n/a	n/a	n/a	n/a
FCC Part 15 Subpart B Class A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IEC61850-3 / IEEE1613	-	-	-	-	-	-	-	Yes	Yes

Legacy Systems – Protocol Gateways

Integrating Different Protocols into one Network

The need for communication between different protocols

Serial Communication has been the standard in the manufacturing and utilities industries for decades, so most of the investment in devices like PLCs, IEDs follow either the Serial- or CAN-based standard. Upgrading these to newer standards is a costly, risky, and time-consuming process.

However, today's data requirements are much greater — both in data volume and in speed. But the standards of newer technologies have presented some problems when integrating with previous industry standards. Bridging this gap is vital, as fully replacing existing infrastructures and devices is inconceivable. So they must be brought up-to-date, especially for emerging industry technologies like Smart Grids and Industry 4.0. And this is where Atop's protocol gateways come in.

Atop's Protocol Gateways

Designed and developed in-house, our Protocol gateway bridges the communication gap between the latest IEC61850 standards and the legacy IEC60870-5-10X gird standard, enabling communication between OPC UA, Ethernet/IP, Profinet and Modbus industry protocols.

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Supported Protocols

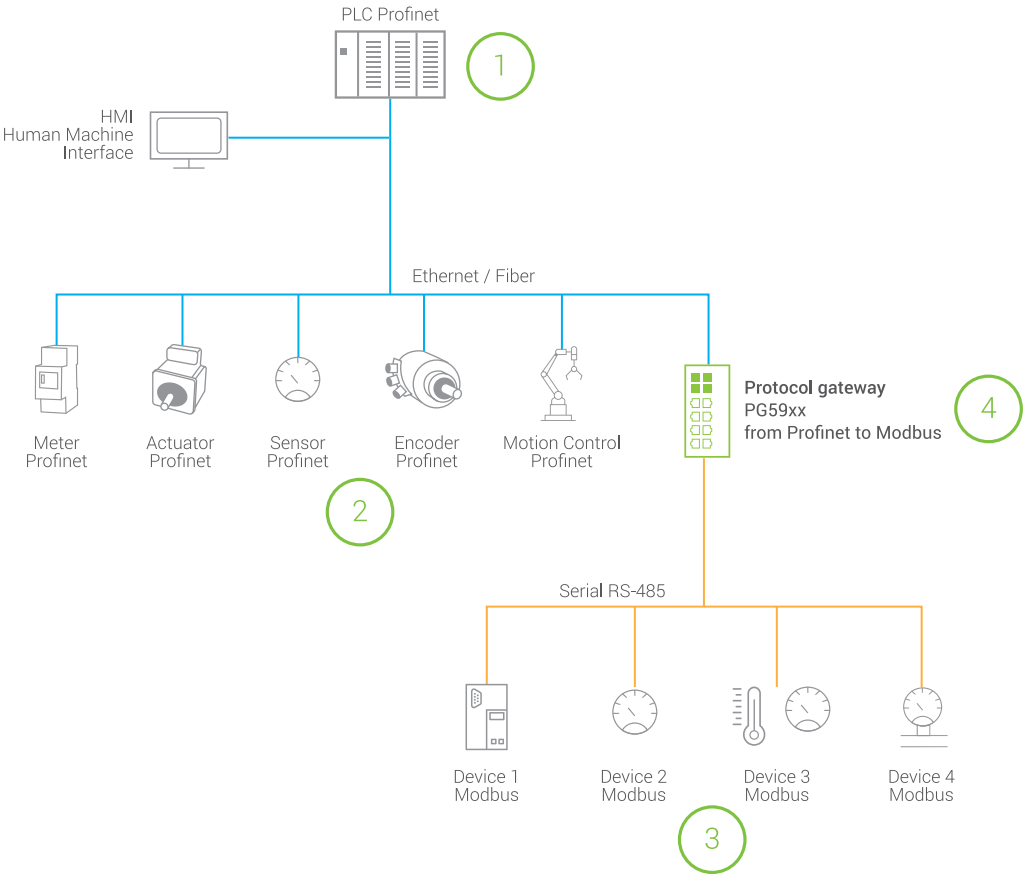
The ATOP Protocol Gateway Platform supports:

a. Modbus TCP/RTU/ASCII (Ethernet and Serial) - Client/Server and Master/Slave
b. DNP3.0 (Ethernet and Serial) - Client/Server and Master/Slave
c. EC 60870-5-101 (Serial) - Master/Slave
d. IEC 60870-5-103 (Serial) - Master/Slave
e. IEC 60870-5-104 (Ethernet) - Client/Server and Master/Slave
f. IEC 61850 (Ethernet) - Client/Server

Architecture Concept

Able to run Client/Server–Master/Slave modes at the same time, ATOP's family of Protocol Gateways are a suite of powerful industrial gateway platforms that are bundled with different protocol stacks.

The illustration shows a typical application.



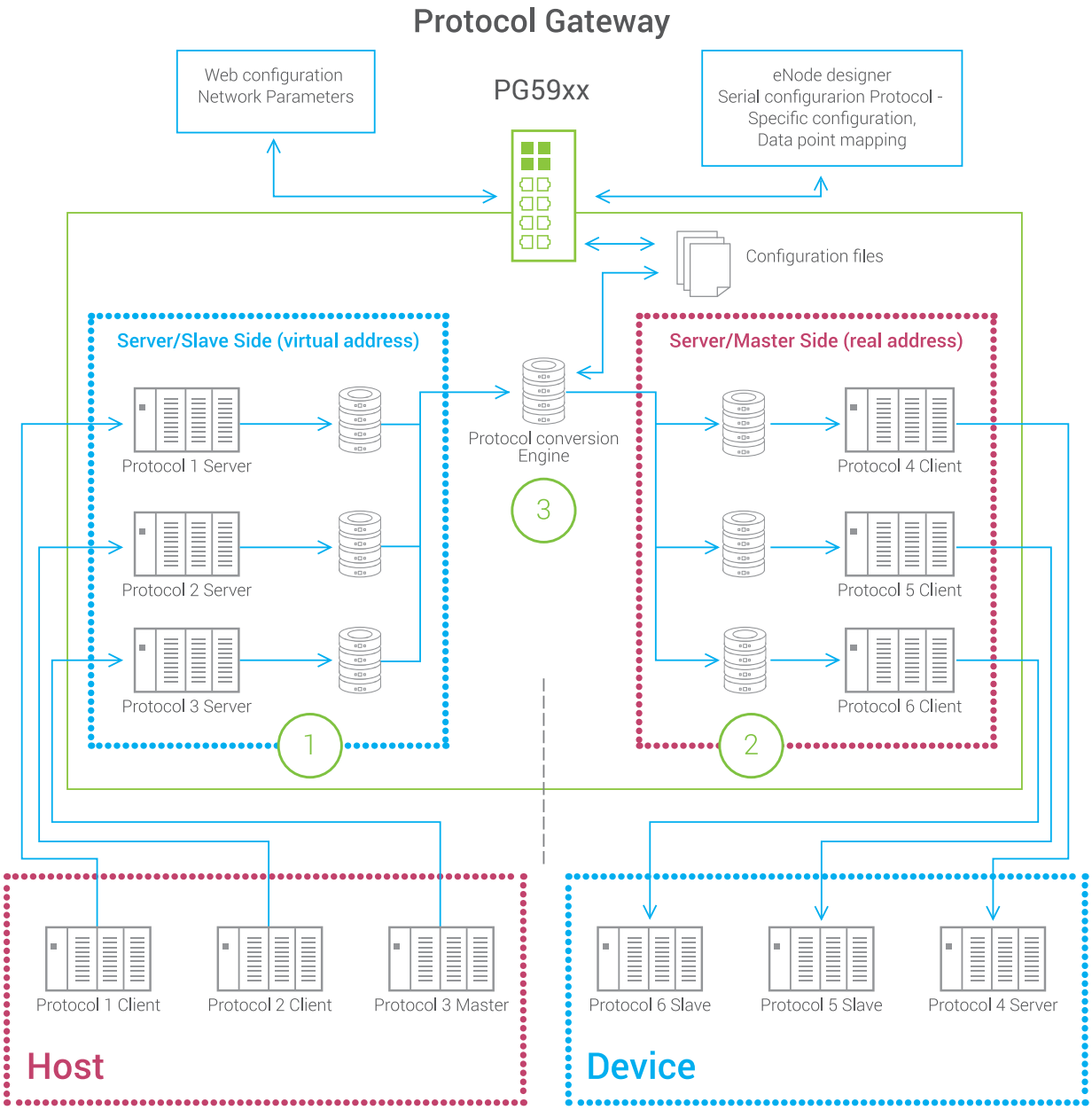
1 **HOST side**: in control of the application issuing read and write commands and managing events, being either a PLC, SCADA host, IPC, or HMI. In this example, the HOST side works with Profinet. This is the Client/Master side.

2 **Device side**: connected to the HOST side that receives read/write commands and replies to the HOST. In this example, these devices are connected directly to the host because they run Profinet protocol. This is the Server/Slave side.

3 **Device side**: In this example, these devices run Modbus RTU protocol on RS-485, and they will receive read and write commands from a Modbus RTU Host only. This is the Server/Slave side.

4 **Device side** for the HOST (PLC) and **HOST side** for Modbus RTU Devices. The Protocol Gateway's job is to translate information from Profinet to Modbus RTU and to let the PLC seamlessly connect to non-Profinet devices. This is the Server/Slave side for PLC and Client/Master side for the Devices.

The figure below shows the device as part of a general architecture



The architecture is made of 3 different parts:

1. **Device Server/Slave interface**: listening to a Master/Client that is outside a device, such as a PLC. This means that Atop's Protocol Gateway will behave towards an external master as a slave device and with the respective protocol.
2. **Device Client/Master interface:** actively polling or issuing commands to an external Slave/Server.
3. **ADH**: the core of the unit that moves, translates, and maps the data points, commands, and events between the client and server sides.

The Protocol Gateway allows mapping of any protocol to any Serial or Ethernet port from the protocol itself. eNode Designer allows the user to assign different protocols to different ports, define the serial port settings, and define the protocol-specific parameters. Using eNode designer, the user can define for the Master/Client the real IDs of the devices needing to obtain data or send commands from, and will set for the Slave/Server the virtual addresses to be used from the client for data-point or command mapping.

The core of the Gateway is the Protocol Engine, in which data, commands, and events are stored and mapped to other protocols.

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Industrial Protocol Gateways - Hardware

	Advanced							
								
General Information		NEW!	NEW!			NEW!	NEW!	NEW!
Model Number	PG5901	PG5901B	PG5904D	PG5908	PG5916	PG5900A	PG5908A	PG5916A
Interfaces								
Total number of ports	2	1	2	2	2	6	6	6
Total Fast Ethernet	2	-	(2)	2	2	6	6	6
10/100 BaseT(X)	2	-	(2)	2	2	(6)	(6)	(6)
100 Base-X (SFP)	-	-	-	-	-	(6)	(6)	(6)
Total Gigabit	-	1	(2)	-	-	-	-	-
10/100/1000 BaseT(X)	-	1	-	-	-	-	-	-
100/1000 Base-X SFP	-	-	(2)	-	-	-	-	-
1000Base-X SFP	-	-	-	-	-	-	-	-
Wireless LAN	-	-	-	-	-	-	-	-
3G/4G interfaces	-	3G/4G	-	-	-	-	-	-
Network Redundancy								
RSTP redundant ports	2	-	2	2	2	6	6	6
HSR/PRP redundant ports	-	-	-	-	-	-	-	-
Serial Ports								
Number of ports	1	1/2 (IO vers)	4	8	16	-	8	16
RS-232 RS-422 RS-485 full func.	1	1 (RS-232/485)	4	8	16	-	8	16
RS-232 only	-	1 (only IO vers)	-	-	-	-	-	-
Serial port Isolation	-	-	3kV Optional	2.5kV Optional	2.5kV Optional	-	3kV Optional	3kV Optional
Terminal Block (TB) ports	(1)	(1)	(4)	-	-	-	(8)	(16)
D-Sub 9 (DB9) ports	(1)	(1)	(4)	-	-	-	(8)	(16)
RJ45 Serial ports	-	-	-	8	16	-	-	-
Other Interfaces								
Digital Inputs	-	2 (Optional)	-	-	-	-	-	-
Digital Outputs	-	2 (Optional)	-	-	-	-	-	-
Power Supply input								
Low Voltage DC power Input	9~48 VDC	9~48 VDC	12~48 VDC	24~48 VDC	24~48 VDC	24~48 VDC	24~48 VDC	24~48 VDC
Power through PoE 802.3af	Optional	-	Optional	-	-	-	-	-
AC power input	-	-	-	100~240VAC	100~240VAC	100~240VAC	100~240VAC	100~240VAC
High Voltage DC power input	-	-	-	-	-	100~370VDC	100~370VDC	100~370VDC
Power Inputs	1	1	2	1	1	2	2	2
Relay Output	-	-	2	-	-	2	2	2
Installation								
Mount	DIN-Rail	DIN-Rail	DIN-Rail	Rack-Mount	Rack-Mount	Rack-Mount	Rack-Mount	Rack-Mount
Ingress Protection	IP30	IP30	IP30	IP30	IP30	IP30	IP30	IP30
Environment								
Operational Temperature	-40/85° C	-40/75° C	-40/85° C	-20/70° C	-20/70° C	-40/85° C	-40/85° C	-40/85° C
Compliance								
Industrial EMC Protection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UL60950-1	-	-	-	-	-	-	-	-
UL61010-2-201	-	-	Yes	-	-	EN	EN	EN
EN60950-1	Yes	Yes	-	Yes	Yes	-	-	-
CE (EN61000-6-2 and EN61000-6-4)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RED (Radio Directive 2014/53/EU	n/a	Yes	n/a	n/a	n/a	n/a	n/a	n/a
FCC Part 15 Subpart B Class A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IEC61850-3 / IEEE1613	-	-	-	-	-	Yes	Yes	Yes

...more information and datasheets available on Atop's website

Industrial Protocol Gateways - Software

	Advanced							
								
General Information		NEW!	NEW!			NEW!	NEW!	NEW!
Model Number	PG5901	PG5901B	PG5904D	PG5908	PG5916	PG5900A	PG5908A	PG5916A
Interfaces								
Ethernet ports	2	1	2	2	2	6	6	6
Wireless LAN	-	-	-	-	-	-	-	-
3G/4G interfaces	-	3G or 4G	-	-	-	-	-	-
Serial Ports	1	1/2 (IO vers)	4	8	16	-	8	16
Digital Inputs	-	2 (Optional)	-	-	-	-	-	-
Digital Outputs	-	2 (Optional)	-	-	-	-	-	-
Relay Outputs	-	-	2	-	-	2	2	2
Power Supply input								
Low Voltage DC power Input	9~48 VDC	9~48 VDC	12~48 VDC	24~48 VDC	24~48 VDC	24~48 VDC	24~48 VDC	24~48 VDC
Power through PoE 802.3af	Optional	-	Optional	-	-	-	-	-
AC power input	-	-	-	100~240VAC	100~240VAC	100~240VAC	100~240VAC	100~240VAC
High Voltage DC power input	-	-	-	-	-	100~370VDC	100~370VDC	100~370VDC
Power Inputs	1	1	2	1	1	2	2	2
Installation / Environment								
Mount	DIN-Rail	DIN-Rail	DIN-Rail	Rack-Mount	Rack-Mount	Rack-Mount	Rack-Mount	Rack-Mount
Ingress Protection	IP30	IP30	IP30	IP30	IP30	IP30	IP30	IP30
Operational Temperature	-40/85° C	-40/75° C	-40/85° C	-20/70° C	-20/70° C	-40/85° C	-40/85° C	-40/85° C
Protocol Gateway Software Model Number / Availability								
Front-End Protocol	**Back-End Protocol**							
Modbus RTU/ ASCII Slave	DNP3.0 Master	-	MBSS-DNSM*	MBSS-DNSM	MBSS-DNSM	MBSS-DNSM	-	MBSS-DNSM	MBSS-DNSM
	DNP3.0 Client	MBSS-DNEC	MBSS-DNEC	MBSS-DNEC	MBSS-DNEC	MBSS-DNEC	-	MBSS-DNEC	MBSS-DNEC
	IEC 101 Master	-	MBSS-01SM*	MBSS-01SM	MBSS-01SM	MBSS-01SM	-	MBSS-01SM	MBSS-01SM
	IEC 104 Client	MBSS-04EC	MBSS-04EC	MBSS-04EC	MBSS-04EC	MBSS-04EC	-	MBSS-04EC	MBSS-04EC
	IEC 61850 Client	MBSS-50EC	MBSS-50EC	MBSS-50EC	MBSS-50EC	MBSS-50EC	-	MBSS-50EC	MBSS-50EC
Modbus TCP Server	DNP3.0 Master	MBES-DNSM	MBES-DNSM	MBES-DNSM	MBES-DNSM	MBES-DNSM	-	MBES-DNSM	MBES-DNSM
	DNP3.0 Client	MBES-DNEC	MBES-DNEC	MBES-DNEC	MBES-DNEC	MBES-DNEC	MBES-DNEC	MBES-DNEC	MBES-DNEC
	IEC 101 Master	MBES-01SM	MBES-01Sm	MBES-01SM	MBES-01SM	MBES-01SM	-	MBES-01SM	MBES-01SM
	IEC 104 Client	MBES-04EC	MBES-04EC	MBES-04EC	MBES-04EC	MBES-04EC	MBES-04EC	MBES-04EC	MBES-04EC
	IEC 61850 Client	MBES-50EC	MBES-50EC	MBES-50EC	MBES-50EC	MBES-50EC	MBES-50EC	MBES-50EC	MBES-50EC
DNP3.0 Serial Slave	Modbus Master	-	DNSS-MBSM*	DNSS-MBSM	DNSS-MBSM	DNSS-MBSM	-	DNSS-MBSM	DNSS-MBSM
	Modbus Client	DNSS-MBEC	DNSS-MBEC	DNSS-MBEC	DNSS-MBEC	DNSS-MBEC	-	DNSS-MBEC	DNSS-MBEC
	IEC 101 Master	-	DNSS-MBSM*	DNSS-MBSM	DNSS-MBSM	DNSS-MBSM	-	DNSS-MBSM	DNSS-MBSM
	IEC 104 Client	DNSS-04EC	DNSS-04EC	DNSS-04EC	DNSS-04EC	DNSS-04EC	-	DNSS-04EC	DNSS-04EC
	IEC 61850 Client	DNSS-50EC	DNSS-50EC	DNSS-50EC	DNSS-50EC	DNSS-50EC	-	DNSS-50EC	DNSS-50EC
DNP3.0 TCP/IP Server	Modbus Master	DNES-MBSM	DNES-MBSM	DNES-MBSM	DNES-MBSM	DNES-MBSM	-	DNES-MBSM	DNES-MBSM
	Modbus Client	DNES-MBEC	DNES-MBEC	DNES-MBEC	DNES-MBEC	DNES-MBEC	DNES-MBEC	DNES-MBEC	DNES-MBEC
	IEC 101 Master	DNES-01SM	DNES-01SM	DNES-01SM	DNES-01SM	DNES-01SM	-	DNES-01SM	DNES-01SM
	IEC 104 Client	DNES-04EC	DNES-04EC	DNES-04EC	DNES-04EC	DNES-04EC	DNES-04EC	DNES-04EC	DNES-04EC
	IEC 61850 Client	DNES-50EC	DNES-50EC	DNES-50EC	DNES-50EC	DNES-50EC	DNES-50EC	DNES-50EC	DNES-50EC
IEC60870-5-101 Slave	Modbus Master	-	01SS-01SM*	01SS-01SM	01SS-01SM	01SS-01SM	-	01SS-01SM	01SS-01SM
	Modbus Client	01SS-MBEC	01SS-MBEC	01SS-MBEC	01SS-MBEC	01SS-MBEC	-	01SS-MBEC	01SS-MBEC
	DNP3.0 Master	-	01SS-DNSM*	01SS-DNSM	01SS-DNSM	01SS-DNSM	-	01SS-DNSM	01SS-DNSM
	DNP3.0 Client	01SS-DNEC	01SS-DNEC	01SS-DNEC	01SS-DNEC	01SS-DNEC	-	01SS-DNEC	01SS-DNEC
	IEC 104 Client	01SS-04EC	01SS-04EC	01SS-04EC	01SS-04EC	01SS-04EC	-	01SS-04EC	01SS-04EC
	IEC 61850 Client	01SS-50EC	01SS-50EC	01SS-50EC	01SS-50EC	01SS-50EC	-	01SS-50EC	01SS-50EC
IEC60870-5-104 Server	Modbus Master	04ES-MBSM	04ES-MBSM	04ES-MBSM	04ES-MBSM	04ES-MBSM	-	04ES-MBSM	04ES-MBSM
	Modbus Client	04ES-MBEC	04ES-MBEC	04ES-MBEC	04ES-MBEC	04ES-MBEC	04ES-MBEC	04ES-MBEC	04ES-MBEC
	DNP3.0 Master	04ES-DNSM	04ES-DNSM	04ES-DNSM	04ES-DNSM	04ES-DNSM	-	04ES-DNSM	04ES-DNSM
	DNP3.0 Client	04ES-DNEC	04ES-DNEC	04ES-DNEC	04ES-DNEC	04ES-DNEC	04ES-DNEC	04ES-DNEC	04ES-DNEC
	IEC 101 Master	04ES-01SM	04ES-01SM	04ES-01SM	04ES-01SM	04ES-01SM	-	04ES-01SM	04ES-01SM
	IEC 61850 Client	04ES-50EC	04ES-50EC	04ES-50EC	04ES-50EC	04ES-50EC	04ES-50EC	04ES-50EC	04ES-50EC
IEC61850 Server	Modbus Master	50ES-MBSM	50ES-MBSM	50ES-MBSM	50ES-MBSM	50ES-MBSM	-	50ES-MBSM	50ES-MBSM
	Modbus Client	50ES-MBEC	50ES-MBEC	50ES-MBEC	50ES-MBEC	50ES-MBEC	50ES-MBEC	50ES-MBEC	50ES-MBEC
	DNP3.0 Master	50ES-DNSM	50ES-DNSM	50ES-DNSM	50ES-DNSM	50ES-DNSM	-	50ES-DNSM	50ES-DNSM
	DNP3.0 Client	50ES-DNEC	50ES-DNEC	50ES-DNEC	50ES-DNEC	50ES-DNEC	50ES-DNEC	50ES-DNEC	50ES-DNEC
	IEC 101 Master	50ES-01SM	50ES-01SM	50ES-01SM	50ES-01SM	50ES-01SM	-	50ES-01SM	50ES-01SM
	IEC 104 Client	50ES-04EC	50ES-04EC	50ES-04EC	50ES-04EC	50ES-04EC	50ES-04EC	50ES-04EC	50ES-04EC

* : IO version only

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Appendix : Protocol Specifications

IEC61850 Server/ Client	
Supported Functions (Read, Write)	• Generic access to the data (Read, Write) • Clock Synchronization • 8 Logical Devices per Port
Supported Control Type of commands	• Direct-with-Normal-Security • Select Before Operate (SBO)-with-Normal-Security • Direct-with-Enhanced Security Select Before Operate (SBO)-with-Enhanced-Security
Implemented Protocol Subsets	• IEC 61850-6 (Substation Configuration Language Description: SCL) • IEC 61850-7-1 (Principles and Models) • IEC 61850-7-2 (Abstract Communication Service Interface: ACSI) • IEC 61850-7-3 (Common Data Classes: CDC) • IEC 61850-7-4 (Logical Nodes and data Object Classes) • IEC 61850-8-1 (Mapping to Manufacturing Message Specification: MMS) • Edition 1 & Edition 2 are both Supported
DNP3 Server/ Client/ Master/ Slave	
Support Level	Level 2 and subset of Level 3
General Specifications	• Serial Mode or Ethernet with TCP or UDP Mode • Server side supports serving up to 5 client in TCP Mode • Client side in a single RS-485 port, supports connecting up to 16 IEDs • Client side supports connecting up to 16 IEDs • Maximum Fragment size 2048 octets • Protocol implementation with configurable parameters conforms to IEEE Std 1815-2012 level 2
Supported Functions	• Time Synchronization generic access to the data(Read, Write) • Commands with or without preselection (Select, Operate, Direct Operate) • Transmission of time-tagged events • Counter management (Immediate Freeze, Freeze and Clear) • Self-address
Supported DNP3 Object Library	• Binary Inputs up to 8000 pts • Binary Outputs up to 2000 pts • Double Inputs up to 4000 pts • Analog Inputs up to 250 pts • Analog Outputs up to 250 pts • Counters up to 250 pts
Modbus Server/ Client/ Master/ Slave	
General Specifications	• Support Modbus RTU and ASCII in Serial mode • Support Modbus in TCP mode • For Modbus devices, support connecting up to 64 Modbus slaves/servers - client/masters • Support maximum number of data points in read direction: 8000 pts • Support maximum number of commands in write direction: 4000 pts
Supported Function Codes	1: Read Coils 2: Read Discrete Inputs 3: Read Holding Registers 4: Read Input Registers 5: Write Single Coil 6: Write Single Register 15: Write Multiple Coils 16: Write Multiple Registers 43: Read Device Identification (server side only)
Supported Exception Codes	1: illegal function 2: illegal data address 3: illegal data value 4: server device failure 6: server device busy

IEC 60870-5-101 Master/ Slave	
General Specifications	• Protocol implementation with configurable parameters conforms to the IEC 60870-5-101 edition 2 specification • Process Information in Monitor and Control Direction • Balanced and Unbalanced Modes • CP24Time2a or CP56Time2a timestamp for monitor direction report
Supported Functions	• Station Initialization • Interrogation • Read Procedure • Cyclic Data and Spontaneous Transmission (Slave Side only) • Clock Synchronization • Transmission of Integrated Totals • Direct and SBO command
Supported Data Types	• Monitors Points: Each supports up to 1000 pts: Single Point, Double Point, Step Position, Bit String, Measured with Normalized Value, Measured with Scaled Value, Measured Short Floating Point Value, Integrated Totals • Control Points: Each supports up to 500 pts: Single Command, Double Command, Regulating Step Command, Set Point Command with Normalized Value, Set Point Command with Scaled Value, Set Point Command Short Floating Point, Bit string
IEC 60870-5-104 Server/ Client	
General Specifications	• Server side supports serving up to 5 client • Client side supports connecting up to 10 IEDs • Protocol implementation with configurable parameters conforms to the IEC 60870-5-104 specification edition 2 • Process Information in Monitor and Control Direction • CP56Time2a timestamp for Control Commands
Supported Functions	• Station Initialization • Interrogation • Read Procedure • Cyclic Data and Spontaneous Transmission (Slave Side only) • Clock Synchronization • Transmission of Integrated Totals • Direct and SBO command
Supported Data Types	• Monitors Points: Each supports maximum 1000 pts: Single Point, Double Point, Step Position, Bit String, Measured with Normalized Value, Measured with Scaled Value, Measured Short Floating Points Value, Integrated Totals. • Control Points: Each supports maximum 500 pts: Single Command, Double Command, Regulating Step Command, Set Point Command with Normalized Value, Set Point Command with Scaled Value, Set Point Command Short Floating Point, Bitstring. • Event Logging (Server Side only) Universal Event Buffer up to 20,000 Events

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