

DOCUMENT DS-SF-2026 · REV 2.1

SignalForge Protocol Simulator & Gateway – Technical Specifications

Bridges 40+ industrial protocols with full IEC 61850 Edition 2.1 support in both server and client modes, including dedicated substation IED simulation for pre-commissioning validation and multi-vendor interoperability testing.

SECTION 01 · PROTOCOL SPECIFICATIONS

Supported protocols and modes of operation

PROTOCOL	MODE(S) SUPPORTED	INTERFACE / TRANSPORT	NOTES
IEC 61850 ED 2.1 · MMS	Server + Client LIVE	Ethernet / TCP	Full MMS report / control model
IEC 61850 ED 2.1 · GOOSE	Publisher + Subscriber LIVE	Ethernet (multicast)	Sub-4 ms typical publisher-to-subscriber latency
IEC 60870-5-104	Server + Client LIVE	TCP / IP	SCADA / control-centre uplink
IEC 60870-5-103	Server + Client LIVE	Serial / Ethernet	Protection / IED interoperability
IEC 60870-5-101	Server + Client LIVE	Serial	Legacy SCADA / RTU telecontrol link
DNP3	Master + Outstation LIVE	TCP / Serial	Utility RTU and control-centre workloads
Modbus	Master/Client + Slave/Server LIVE	RTU + TCP	Full function-code coverage
OPC UA	Client LIVE	Ethernet / TCP	Secure northbound integration
OPC DA	Client LIVE	Ethernet / TCP	Legacy DCOM-based OPC servers
PROFINET	Under development IN DEVELOPMENT	RT (real-time Ethernet)	Targeted for next release · mid-November 2026

† 40+ additional industrial protocols supported – full list available on request.

SECTION 02 · IEC 61850 SIMULATOR

FLAGSHIP CAPABILITY

Dedicated substation IED & communication simulator

Simulates IEDs and full substation communication for FAT/SAT and pre-commissioning validation. Reproduces vendor device behaviour and real traffic patterns to de-risk site cut-over before energisation. Supports GOOSE publisher/subscriber and MMS server/client simulation simultaneously, and is used for interoperability testing across multi-vendor IED environments.

CAPABILITIES

- Multi-IED simulation
- GOOSE / MMS traffic generation
- Pre-commissioning validation
- Multi-vendor interoperability testing

SECTION 03 · DIAGNOSTICS

Verification & inspection

Network sniffers

Port mirroring

Checksum verification

Validity / conformance checkers

Live traffic inspection

Malformed frame detection

SECTION 04 · ENGINEERING

Reliability features

Redundancy support

Multi-channel operation

Simultaneous multi-protocol operation

Per-channel mapping & transformation rules

SECTION 05 · DEPLOYMENT SCENARIOS

Where SignalForge is deployed

01 Substation automation & integration

Station-bus / process-bus, IEC 61850 native.

03 Protocol migration & legacy RTU

Serial legacy devices onto modern TCP fabrics.

02 Multi-vendor IED interoperability

Cross-vendor GOOSE / MMS validation.

04 Pre-commissioning testing & diagnostics

FAT / SAT rigs, cut-over rehearsal, live traffic inspection.

SECTION 06 · REFERENCE HARDWARE

Platform & delivery model

HARDWARE	OS PLATFORM	INTERFACES	DELIVERY MODEL
Industrial PC / gateway class (x86-64). Not embedded / FPGA.	Linux (Debian / RHEL) · Windows Server supported	1G / 10G Ethernet · RS-232 / RS-485 serial	Dedicated appliance or software-only install