

SecFlow-4

Modular Ruggedized SCADA-Aware Ethernet Switch/Router



- High-density, modular, ruggedized Ethernet switch, deployed in harsh industrial environments with up to 28 GbE ports and optional PoE
- Advanced security package, including Layer 2/3 VPN with IPsec, Layer 2/3/4 ACL for incoming traffic
- Integrated RS-232 serial interfaces with protocol gateway and tunneling functionality for easy migration of legacy services to IP
- Ethernet switching, IP routing and Ethernet Ring protection per ITU-T G.8032

SecFlow[®]-4 industrial Ethernet switch/router combines ruggedized Ethernet platform with unique SCADA-aware processing engine to fit the mission-critical industrial applications.

SecFlow-4 is a modular device with 7 interface slots. Each interface slot can house either an Ethernet module or a serial RS-232 module, enabling a flexible network configuration.

The system overall capacity can scale up to 28xGbE full-duplex throughput, with wire-speed switching for both Ethernet and IP.

SecFlow-4 is designed for installation under harsh environmental conditions. It features DIN-rail mount, IP30 protection level, wide temperature operating range (-40°C to +65°C) without fans.

MULTI-SERVICE GATEWAY

SecFlow-4 is equipped with the serial interfaces for connectivity of legacy RTUs with new IP based IEDs. SecFlow-4 gateway converts legacy IEC-101 protocol to IP-based IEC-104, enabling seamless communication from the IP SCADA to both the old and new RTUs. This provides a single box solution for multi-service applications and smooth migration to all-IP networks.

MARKET SEGMENTS AND APPLICATIONS

SecFlow-4 addresses the following markets:

- Utility installations (electricity, water, gas and oil)
- Intelligent transportation (highway, railway)
- Manufacturing facilities (chemical, food industry)
- Military and defense applications (HLS, safe city)

QUALITY OF SERVICE

Flexible QoS techniques ensure differentiated service delivery end-to-end.

SecFlow-4 utilizes the following traffic management methods: strict priority, Weighted Round Robin (WRR), MDRR, and egress traffic shaping.

SecFlow-4 IP address might be private behind NAT, or public.

SecFlow

OAM

SecFlow-4 provides these types of Ethernet OAM:

- Single-segment (link) OAM according to IEEE 802.3-2005 (formerly 802.3ah) for remote management and fault indication
- End-to-end connectivity OAM based on IEEE 802.1ag to monitor Ethernet services proactively and guarantee that customers receive the contracted SLA
- End-to-end service and performance monitoring based on ITU-T Y.1731. Fault monitoring and end-to-end performance measurement



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RESILIENCY

SecFlow-4 supports Ethernet protection ring according to G.8032, enabling fast failure detection and switchover.

Traditional resiliency protocols such as RSTP (Rapid Spanning Tree Protocol) and MSTP (Multiple Spanning Tree Protocol) per IEEE 802.1D are also supported.

Link aggregation is performed according to IEEE 802.3ad with LACP allowing aggregation of point-to-point links operating at the same data rate. This enables the switches to take advantage of increased bandwidth.

INTEROPERABILITY

SecFlow-4 is compatible with SecFlow-2.

MANAGEMENT

The device can be managed via RADview, RAD's carrier-class NMS for Windows and Linux.

SecFlow-4 also supports a variety of access protocols, including CLI, Telnet, SNMPv2, SNMPv3, and TFTP.

Specifications

CAPACITY

Throughput

Line rate L2/L3 switching throughput

Switching

Switching latency below 10 µsec

Max. Number of MAC Addresses

32K

Max. Number of VLANs

4K

ETHERNET

4×100/1000BaseTx ports (optional PoE with max 15W per port/120W per chassis) on SF4-M-4GbE module

4×10/100/1000BaseFX SFP ports on SF4-M-4GbE module

Max Frame Size

12 kB

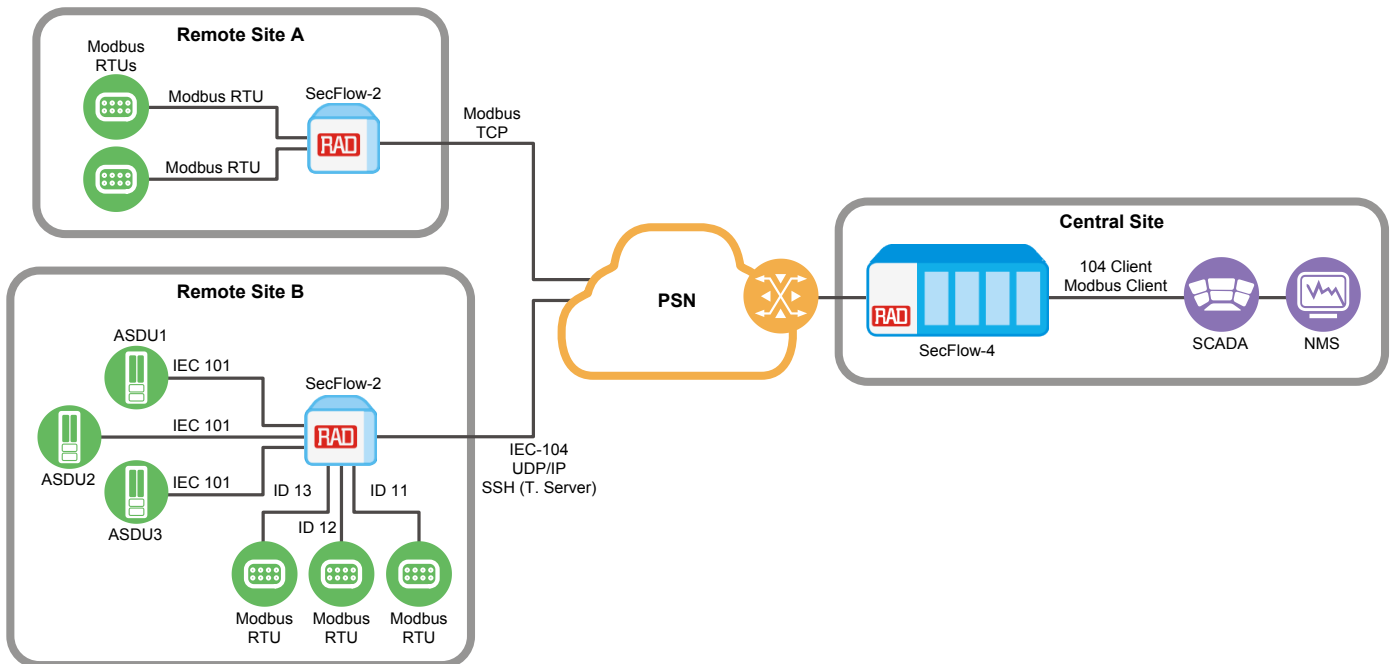


Figure 1. Aggregating Traffic from Remote Substations with Protocol Gateway Functionality

SERIAL INTERFACE

4×RS-232 ports
 Transparent tunneling serial streams
 Protocol gateway – serial to Ethernet,
 IEC 101/104
 Terminal server

QUALITY OF SERVICE (QOS)

VLAN segregation per IEEE 802.1q
 VLAN tagging according to L2–L3 headers
 L2 multicast with guaranteed QoS
 IGMP snooping for traffic optimization
 DSCP to 802.1p QoS mapping
 LLDP
 DHCP client
 DHCP relay, option 82

ROUTER

Static routing, OSPF, RIPv2 routing, NAT

MANAGEMENT**Control Port**

RS-232

USB Port

Local USB port for emergency boot

Management Options

Command-line interface with password
 protected access, authorization levels
 Telnet/SSH, SNMPv1, SNMPv2, SNMPv3,
 RADview-EMS, SFTP, RADIUS, TACACS+

Date/Time Synchronization

SNTP

SECURITY**Access Control**

Enable/disable port
 Port access filter per MAC/IP addresses
 Protection against DoS attacks

Service Validation

Egress filtering per VLAN

Industrial VPN Agent

Remote access using SSH tunnel
 Layer 2 GRE Transparent Ethernet Bridging
 Layer 3 mGRE DMVPN

Remote Access Agent

Remote access using reverse SSH tunnel

TIMING

NTP v.2

RESILIENCY**Ethernet Ring**

Per ITU-T G.8032v2

Link Aggregation

LAG with LACP per IEEE 802.3ad

Rapid Spanning Tree

MSTP per IEEE 802.1s, RSTP per 802.1w

GENERAL**Physical**

Height: 14.5 cm (5.70 in)
 Width: 38.0 cm (14.96 in)
 Depth: 13.9 cm (5.47 in)
 Weight: 2.4–4 kg (5.51–8.81 lb)
 DIN rail mounting, optional wall mount

Power

Dual DC power supply: 48 VDC (36–57 VDC)
 Dual AC power supply: 100–240 VAC

Power Consumption

Maximum power consumption for
 SecFlow-4:

65 W without PoE
 185 W with PoE

Maximum power consumption per module:

SF4-PS-48VDC – 8 W
 SF4-M-MNG – 18 W
 SF4-M-SERVICE – 10 W
 SF4-M-Serial – 4.5 W
 SF4-M-4GBE/U – 4 W
 SF4-M-4GBE/S – 6 W
 SF4-M-4FE – 4 W

Environment

Temperature:

Operating: -40 to 65°C (-40 to 149°F)

Storage: -40 to 85°C (-40 to 185°F)

Note: The operating temperature range can vary depending on the ordering option. For more information, refer to the SecFlow-4 installation and operation manual.

Humidity: 5 to 90%

Rugged enclosure – fanless, IP 30-rated

IEEE 1613 design for substation
 automation

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Ordering

RECOMMENDED CONFIGURATIONS

Chassis

Switch/Router Configuration

SF4/RP/48DCR

SecFlow-4 chassis, central processing and management module, Layer 2/3 switch/router platform, dual 48 VDC power supply

SF4/RP/ACR

SecFlow-4 chassis, central processing and management module, Layer 2/3 switch/router platform, redundant AC power supply

Power Supply Units

SF4-PS-48VDC

48 VDC power supply

SF4-PS-AC

AC power supply

Modules

SF4-M-4GBE-U

SecFlow-4 module with four 10/100/1000BaseT UTP Ethernet ports

SF4-M-4GBE-POE

SecFlow-4 module with four 10/100/1000BaseT UTP Ethernet ports and 15W PoE

SF4-M-4GBE-S

SecFlow-4 module with four 10/100/1000BaseFx SFP Ethernet ports

SF4-M-4FE

SecFlow-4 module with four 10/100BaseT UTP Ethernet ports

SF4-M-4FE-POE

SecFlow-4 module with four 10/100BaseT UTP Ethernet ports and 15W POE

SF4-M-4RS232

SecFlow-4 module with four RS-232 serial ports

SF4-M-SERVICE

Service module with serial tunneling, VPN functionalities and discrete input/output interfaces

SF4-M-MNG

Central processing and management module with local terminal and out-of-band management ports

SUPPLIED ACCESSORIES

CBL-SF-RJ45-CONSOLE

Console cable (delivered with SF4-M-MNG)

OPTIONAL ACCESSORIES

SF4/RM1

Kit for mounting SecFlow-4 into a 19-inch rack

SF-AC-48VDC-120W

External DIN rail AC to 48 VDC 120W power supply for SecFlow

CBL-RJ45-DB9/null

Serial cable, DCE wiring

CBL-SF-ALARM

SecFlow alarm port cable

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