

SecFlow-1p

Industrial IoT Gateway



- Ruggedized IOT gateway
- One or two embedded LTE modems
- Two SIM cards for maximum link resiliency
- GPS for location reporting
- Wi-Fi access point
- Zone-based stateful firewall
- Edge computing by hosting 3rd party container software for customized applications
- Zero Touch provisioning
- Support of RAD's SD-CloudAccess solution
- SCADA Protocol Gateway for IEC-101, IEC-104, Modbus-RTU/TCP, and DNP3 protocols*
- Terminal server*
- Dry contacts support*
- Serial Tunneling, IEC 101 to IEC 104*

SecFlow®-1p is an industrial IoT gateway, a member of RAD's SecFlow suite of ruggedized Ethernet products.

This is an open platform hosting third-party software, besides its communication capabilities.

In its maximum configuration, SecFlow-1p can support four GbE Copper ports and two GbE SFP ports, two serial ports (single RS-232 port or one RS-232 plus one RS-485/2W), built-in WiFi modem, GPS receiver for location indication and a cellular modem with two SIM cards or two modems for maximum link resiliency.

SecFlow-1p is equipped with serial interfaces for connectivity of legacy equipment. As a gateway it converts legacy serial protocols to modern IP-based protocols, 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.

SecFlow-1p features DIN-rail mounting, IP30 protection level, wide operating temperature range (-40°C to 65°C) without fans.

SECFlow

INTEROPERABILITY

SecFlow-1p operates with SecurityGateway, SecFlow-1v, Secflow-1 and SecFlow-2.

ROUTING

SecFlow-1p features static routing, OSPF, BGP and 10 VRFs.

VPN SERVICES

The device features a VPN gateway with two operation modes:

- Inter-site connectivity using IPsec tunnels
- Remote user access using SSH

Inter-site VPN based encrypted link ensures L3 transparent connection of the Ethernet networks sites.

For remote access, the router uses an SSH-encrypted tunnel, with user authentication and specific access authorization.

MARKET SEGMENTS AND APPLICATIONS

SecFlow-1p addresses the Industrial IoT, for example:

- Out-of-band management using cellular uplink
- Smart meter concentration
- Smart Retail
- Distributed automation in secondary substations
- Water Resources Management

SINGLE/DUAL LTE MODEMS AND GPS

With embedded LTE modems, connectivity is available from day 1 without waiting for a wire-based connection. SecFlow-1p features flexible configuration with option for one LTE modem with two SIM cards, or two embedded LTE modems, for maximum resiliency. Optional support of GPS for location reporting is also available. The SecFlow-1p HW is ready for future support of 5G modems.

* This feature will be released in a future version.



SecFlow-1p

Industrial IoT Gateway

DISAGGREGATED OPERATING SYSTEM

SecFlow-1p comes bundled with pCPE-OS, RAD's carrier-grade, 64-bit, Linux-based operating system, designed to run on several HW platforms, including ARM- and X86-based CPEs.

pCPE-OS is a security hardened operating system, optimized to provide maximum performance with small SW footprint.

CONTAINERS – NEXT LEVEL OF FLEXIBILITY

SecFlow-1p can host containerized edge applications, supporting any 3rd party containers, which extend its original functionality to a new level for Industrial IoT solutions.

Containers can easily be installed and managed via SecFlow-1p's Web interface, or RADview NMS.

SD-CloudAccess

SD-CloudAccess enables access-agnostic application-aware traffic distribution across multiple access links, featuring bonding, failover, application based steering, and top up. This technology allows traffic to burst into a second cellular connection when the primary link bandwidth is not sufficient to meet the SLA.

RAD's SD-CloudAccess solution can be purchased as an add-on service. For more information, refer to the SD-CloudAccess documentation.

MANAGEMENT AND SECURITY

Management

SecFlow-1p can be managed via Web, CLI, or by NETCONF.

Embedded Advanced Security

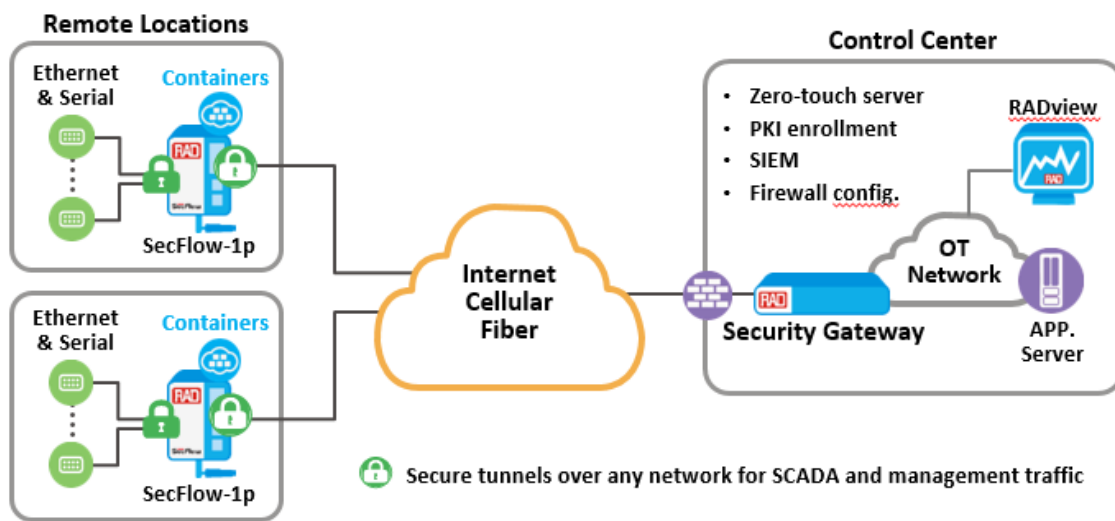
To optimize SecFlow-1p for meeting the evolving security needs of distributed environments, pCPE-OS includes embedded security features and options, such as stateful, zone-based firewall, threat protection and DPI.

The NGFW functionality, including zone-based stateful firewall, DPI for application recognition, IDS/IPS and DDOS prevention, do not require additional licenses. It is possible to specify URLs, Web content filtering, and much more.

ZERO TOUCH PROVISIONING

For easy and safe deployment, RAD offers Zero Touch provisioning thus reducing OPEX and providing a simple way to securely deploy thousands of elements in the network.

SecFlow-1p also supports a variety of access protocols including SFTP.



Secure Industrial IoT with Edge Computing

Hardware Specifications

INTERFACES

Ethernet	2 x 10/100/1000BASE-T ports 2 x 1000FX, 4 x 10/100/1000BASE-T ports
LTE	LTE modem with dual SIM
Wi-Fi	802.11b/g/n/ac dual band
Serial ports	1 RS-232 interface 2 RS-232 interfaces 1 RS-232, 1 RS-485 interfaces Connector: RJ-45
GNSS	GPS – American (default) Galileo – European

MODEMS

Dual SIM Cellular Modem	LTE bands – see Table 1 EVDO networks (technology backward compatible)
Firmware Upgrade	FOTA (Firmware upgrade Over the Air)
Configurable Cellular Authentication	PAP, CHAP
SIM Card	Mini SIM, 25 mm x 15 mm (0.98 in x 0.59 in) Form factor: 2FF
WiFi Module	IEEE 802.11ac/a/b/g/n Dual band 2.4 GHz or 5 GHz (software selectable) Up to 8 users

Table 1. Integrated LTE Modems

LTE Ordering Code	Modem Category and Frequency Bands
L1	CAT 4 EMEA/Korea/Thailand LTE FDD: B1/B3/B5/B7/B8/B20 LTE TDD: B38/B40/B41 WCDMA: B1/B5/B8 GSM: B3/B8
L3	CAT 4 Australia/New Zealand/Taiwan/Brazil LTE FDD: B1/B2/B3/B4/B5/B7/B8/B28 LTE TDD: B40 WCDMA: B1/B2/B5/B8 GSM: B2/B3/B5/B8
L4	CAT 4 North America, Verizon wireless + AT&T LTE LTE FDD: B2/B4/B5/B12/B13/B14/B66/B71 WCDMA: B2/B4/B5

MANAGEMENT AND DIAGNOSTICS

Console Port	Ethernet port with the highest number (4 or 6, according to the device ordered), RJ-45 connector <i>Note: Console cable is not included and must be ordered separately (see Optional Accessories)</i>
LEDs	Including alarm indication and cellular RSSI level
Dry Contacts	2 In, 2 Out (default) 3 In, 1 Out (special ordering option)

GENERAL

Compliance	Enhanced EMI and immunity according to EN 50121-4* EUCE FCC and TUV for North America EMC Class A
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Environment

Storage Temperature	-40 to 85°C (-40 to 185°F)
Operating Temperature	DIN rail: -40 to 65°C (-40 to 149°F)
Humidity	Up to 90%

Physical

Height mm (in)	138 (5.43)
Width	53.3 (2.1)
Depth	123.3 (4.85)
Weight	0.88 kg (1.94 lb)

Power

Wide Range Input Voltage	12/24V
EXT AC Power Supply	90–240VAC
Power Consumption	< 12W

* This feature will be released in a future version.

Software Specifications

MANAGEMENT

Configuration	Web-based interface using HTTPS or HTTP CLI with password-protected access Configure parameters via SMS*
Protocols	NETCONF server (v1.0/v1.1)/ YANG SNMP v2/v3 Telnet, SSH v2, HTTPS server, TFTP/SFTP
Users	User roles and privileges
Monitoring and Diagnostics	Syslog Traceroute, ping Alarm and event logs
DHCP Server	IPv4, IP subnet pools support 256 addresses

IP ADDRESSING AND ROUTING

Addressing	IPv4 and IPv6
Routing Protocols	OSPF v2, BGP v4 VRRP* IP-BFD for fast route propagation*
Routing Technologies	Static Policy-based* VRF (10), RIF (32)
NAT	Static/dynamic NAPT/NAT
DHCP	Client, server, relay IP helper addresses
DNS	Server Dynamic DNS*

TIMING

Date and Time	Local time setting
Protocol	SNTPv4

IP QUALITY OF SERVICE

Classification and Priority	IP-based (DiffServ) Marking, remarking
Queuing	Class-based, SPQ, WFQ
Traffic Processing	Shaping
Egress Queues	4 queues per port
Classification	Port-based, 802.1p, DSCP
Scheduling	Strict Priority / WRR

IOT FEATURES

Management and Security	Terminal server* SCADA Protocol Gateway* Serial Tunneling, IEC 101 to IEC 104*
Monitoring	Setting dry contacts based on pre-defined events, generate syslog and device log event* SNMP traps on events*

SECURITY

Access Lists	Standard and extended* ACL with MAC white list*
Firewall	Zone-based, stateful
Session	Monitoring and limiting
Authentication	Locally, RADIUS, TACACS+ (also for authorization and accounting), LDAP Port-based: 802.1X* on Ethernet and Wi-Fi*
Public Keys	Public Key Infrastructure with X.509 certification for Zero Touch Certificates with SCEP CA server*
Features	Login lockout

IP VPNS

Protocols	Policy- and route-based IPsec, GRE GREoIPsec IKEv1 (main and aggressive mode), IKEv2, SHA2 L3 mGRE DMVPN* L3 IPsec VPN PPPoE supporting Broadband or LTE access
IKE Algorithms	AES CBC 128 and 256, SHA-1, SHA-2 256 and 512
IKE Hashing Algorithms	SHA1-96-HMAC, SHA2-256-128-HMAC, SHA2-512-256-HMAC
ESP Algorithms	AES CBC 128 and 256, AES GCM 128 and 256, AES GMAC 128 and 256, null encryption, SHA-1, SHA-2 256 and 512
DH Groups	1 (768-bit modulus) 2 (1024-bit modulus) 5 (1536-bit modulus) 14 (2048-bit modulus) 19 (256-bit elliptic curve) 20 (384-bit elliptic curve)
Technologies	NAT traversal Interoperability with SCEP server 2012 and higher

* This feature will be released in a future version.

ADVANCED TECHNOLOGIES

SD-CloudAccess	Embedded agent in pCPE-OS, enabled by CLI (requires CGW servers)
Containers	LXC/LXD

ZONE-BASED FIREWALL

Type	Stateless (ACL-like) Stateful (monitor connection state; e.g. only allow to start a connection from inside the organization)
IPv4 and IPv6 NAT	SNAT, DNAT REDIRECT Masquerading (PAT)
Security Measures	DDOS protection: SYN and RST flood prevention
Configuration	via Web GUI
Rules	Interfaces are assigned to zones, for which a set of rules is configured IPv4 and IPv6 Can be limited to specific days, dates and times Number of connections per rule can be limited Rule hits reported to local LINUX Syslog Geo IP: Block or allow traffic based on source or destination country (requires Internet connection) DPI: Layer 7 rules (e.g. block Skype)
Web content filtering (requires internet connection, for periodic list updates)	Blacklisting of URL or IP, based on categories (e.g. ads, gambling) Blacklisting of phrases, based on categories Limiting downloadable files by extension DNS Proxy: black list filtering, downloadable periodically from the Internet

INTEGRATED ROUTING AND BRIDGING (IRB)*

Operation Mode	VLAN aware VLAN un-aware Static or Dynamic MAC addresses
QoS	VLAN tagging and un-tagging 802.1p priority tagging ToS/CoS and CoS/ToS mapping
Max number of bridges	4
Max number of bridge ports	32
Max MAC addresses per bridge	512

WI-FI

Radio mode	802.11a/b/g/n/ac
Security	WPA2-AES MAC filter*
Users	8 concurrent
SSID	6
Bands	2.5Ghz and 5Ghz

CELLULAR AND GPS

LTE	Single SIM Dual SIM* Dual LTE modems*
Operation Modes	PPP, Eth/DHCP
GPS	Location reporting*

OAM

SLA Monitoring	TWAMP Light over IPv4 and IPv6* ICMP echo, UDP echo and RADM*
ZTP	On-net Off-net (over unsecured network) performs secure "call home" using Public Key Infrastructure (X.509)

* This feature will be released in a future version.

Ordering

SF-1P/@/#/\$/Lx1/Lx2/&/H1

@	Power Supply	
	ACEX	external AC power adaptor
	DC	Wide Range 12/24V input voltage (11-30 VDC)
#	Ethernet Ports	
	2U	2 x UTP ports
	4U2S	4 x 10/100/1000BASE-T and 2 x SFP ports
\$	Serial Ports	
	1RS	1 RS-232 interface
	2RS	2 RS-232 interfaces
	2RSM	1 RS-232, 1 RS-485 interfaces
Lx	Cellular Ports	
	L1	LTE modem for Europe
	L3	LTE modem for Oceania and Latin America
	L4	LTE modem for North America, Verizon wireless + AT&T
%	GNSS*	
	G	Integrated GPS
&	WiFi Interface	
	WF	Wireless LAN
H1	Dry Contacts	(Default: 2 input + 2 output)
	3DI	3 input + 1 output

RECOMMENDED CONFIGURATIONS

SF-1P/E1/ACEX/4U2S/2RS
 SF-1P/E1/ACEX/4U2S/2RS/L1/G
 SF-1P/E1/ACEX/4U2S/2RS/L1/G/WF
 SF-1P/E1/ACEX/4U2S/2RS/L3/G/WF
 SF-1P/E1/ACEX/4U2S/2RS/L4/G/WF
 SF-1P/E1/ACEX/4U2S/2RSM/L1/G
 SF-1P/E1/ACEX/4U2S/2RSM/L1/G/WF
 SF-1P/E1/ACEX/4U2S/2RSM/L3/G/WF
 SF-1P/E1/ACEX/4U2S/2RSM/L4/G/WF
 SF-1P/E1/DC/4U2S/2RS
 SF-1P/E1/DC/4U2S/2RS/L1/G
 SF-1P/E1/DC/4U2S/2RS/L1/G/WF
 SF-1P/E1/DC/4U2S/2RS/L3/G/WF

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SF-1P/E1/DC/4U2S/2RS/L4/G/WF
 SF-1P/E1/DC/4U2S/2RSM/L1/G/WF
 SF-1P/E1/DC/4U2S/2RSM/L3/G/WF
 SF-1P/E1/DC/4U2S/2RSM/L4/G/WF

SUPPLIED ACCESSORIES

SF-1p/ACEX

External desktop AC power supply (if /ACEX option is ordered)

Note: If /DC option is ordered, the power supply must be provided by the customer.

OPTIONAL ACCESSORIES

SF-AC-12VDC-20W

External DIN Rail AC to 12VDC 20W power supply

Note: if you want DIN Rail power supply, order DC option + SF-AC-12VDC-20W power supply

CBL-ETH/STP/STR/1M STP

Console port cable

CBL-RJ45/D9/F/6FT

Serial RS-232 data port cable

CBL-SF-RJ45-RS485

Serial RS-485 data port cable

SF-ANT-LTE700-7DBI-MGNT

LTE magnet antenna, 3 m (9.8 ft) cable, LTE frequencies 700-960 MHz; 1710-2170 MHz; 2500-2700 MHz

SF-ANT4G-2M

LTE screw antenna, 2 m (6.5 ft) cable, 3 dBi, 699-960 MHz/1710-2170 MHz/2500-2690 MHz

SF-ANT4G-5M

LTE screw antenna, 5 m(16.4 ft) cable, 3 dBi, 699-960 MHz/1710-2170 MHz/2500-2690 MHz

SF-ANT-GPS-PAS-3DBI-MAG/3M

GPS passive antenna, 3m

** This ordering option is part of RAD's roadmap. Regarding availability, follow updates of official rollout and release announcements.*

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