

TRACe-LP1

for Ground Application



LoRaWAN™



IOT LPWAN GATEWAY WITH EDGE COMPUTING CAPABILITY

- ▶ Fanless rugged intelligent gateway for ground applications
- ▶ Concentrates and transforms LoRaWAN™ messages to Ethernet MQTT secured data streams
- ▶ On premise or cloud server connectivity to collect and distribute sensor data
- ▶ Optional virtual machine for edge analytics or general FOG computing
- ▶ 868 MHz Antenna for EU (Option 915 MHz for US)
- ▶ Operating -40°C to +70°C

POSSIBILITIES START HERE



kontron
S&T Group

PRODUCT OVERVIEW



YOUR PRIVATE LoRaWAN™ NETWORK READY TO USE

Thanks to its rapid adoption in the industry, LoRa™ offers one of the best low cost wireless data gathering technology.

This makes it a solution of choice for many new applications like in asset management, remote maintenance, transportation, infrastructure monitoring, ...

TRACe-LP1 is designed for severe environment (temperature, vibrations, ...) including EN50155 rolling stock conditions. A private network based on LoRaWAN™ can be instantaneously built without subscribing to a telecom operator network. When needed, the gateway can be installed on a moving platform (train, ship, vehicle, ...) creating a mobile LoRaWAN™ network.

The TRACe-LP1 embeds a LPWAN (Low Power Wide Area Network) radio concentrator based on Semtech's LoRa® wireless RF IC solution that can sustain eight communication channels simultaneously, and an Ethernet connectivity from one of the 2x GbE M12 X-Coded connectors.

LoRaWAN™ NETWORK OPERATION

After configuration and installation, TRACe-LP1 creates a private local LoRaWAN™ network. Installed LoRaWAN™ end-devices (typically the sensors), can communicate to the gateway.

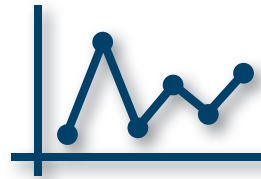
All LoRaWAN™ messages that belong to this private network are secured and concentrated in the gateway (Star network, one hop from sensor to Gateway).



Cloud or on premise connection is based on standard IP Ethernet. The gateway automatically transforms LoRaWAN™ messages to a secure MQTT stream that is "pushed" on a remote MQTT server.

The connection to the MQTT server is secured by TLS connection using private keys on both sides: the TRACe gateway and the MQTT Server.

Optionally, based on a yearly fee model, a Cloud server is accessible on a public URL to retrieve the data from the TRACe Gateways.



Data can be easily collected from the Cloud or on premise server, by MQTT subscriptions, using MQTT clients. Nowadays, MQTT clients are widely used for IoT applications and available for various environments (Linux,

Windows, Android, IOS). They can be installed on computers, tablets or smartphones.

Combined with data stream analytics (SQLStream or other analytics tools), collected data can be analyzed and reported on a graphical dashboard.

Based on an open Linux distribution, this powerful gateway features an Intel® Atom quad core CPU.

The Edge Computing (EC) option offers a local data processing engine feature. This takes the form of a fully integrated Virtual Machine which can be used to run customer OS and application software. The VM can receive the MQTT datastream and perform edge analytics or general FOG computing.

Thanks to the system openness and performance, beyond the LoRa/MQTT gateway communication services and security, various customers' applications like maintenance, remote control, remote diagnostic, entertainment, video recording, operator information and much more can be launched in parallel.



Optionally, the gateway can be populated with up to 2x 4 G/LTE modems and 1x Wi-Fi 802.11 ac/a/b/g/n. Thanks to the dual SIM card support, modem connections can be established, simultaneously, with different mobile network operators.

DEFAULT CONNECTIVITY

- ▶ 2x independent Gigabit Ethernet LAN through isolated and filtered industry standard M12 connectors.
- ▶ 1x LPWAN LoRa® concentrator. Based on SEMTECH chipsets, it can receive packets of different end-devices sent with different spreading factors on up to 8 radio' channels in parallel.

WIRELESS CONNECTIVITY OPTIONS

- ▶ 1x WLAN 802.11 a/b/g/n Wi-Fi network interface, supporting the high transmission data rate and reliable performance ideal for demanding bandwidth applications. It provides 3-stream MIMO configurations, which is a suitable choice for mobile to ground communication when under a Wi-Fi coverage (typically on station or with a dedicated Wi-Fi infrastructure).
- ▶ 1x WWAN network connection through a 2G/3G/4G cellular modem (dual SIM support) offering LTE/HSPA+/GSM/ GPRS/ EDGE/EV-DO Rev A/1x RTT interfaces and even GPS location solutions: A-GPS, gps XTRA and Glonass.

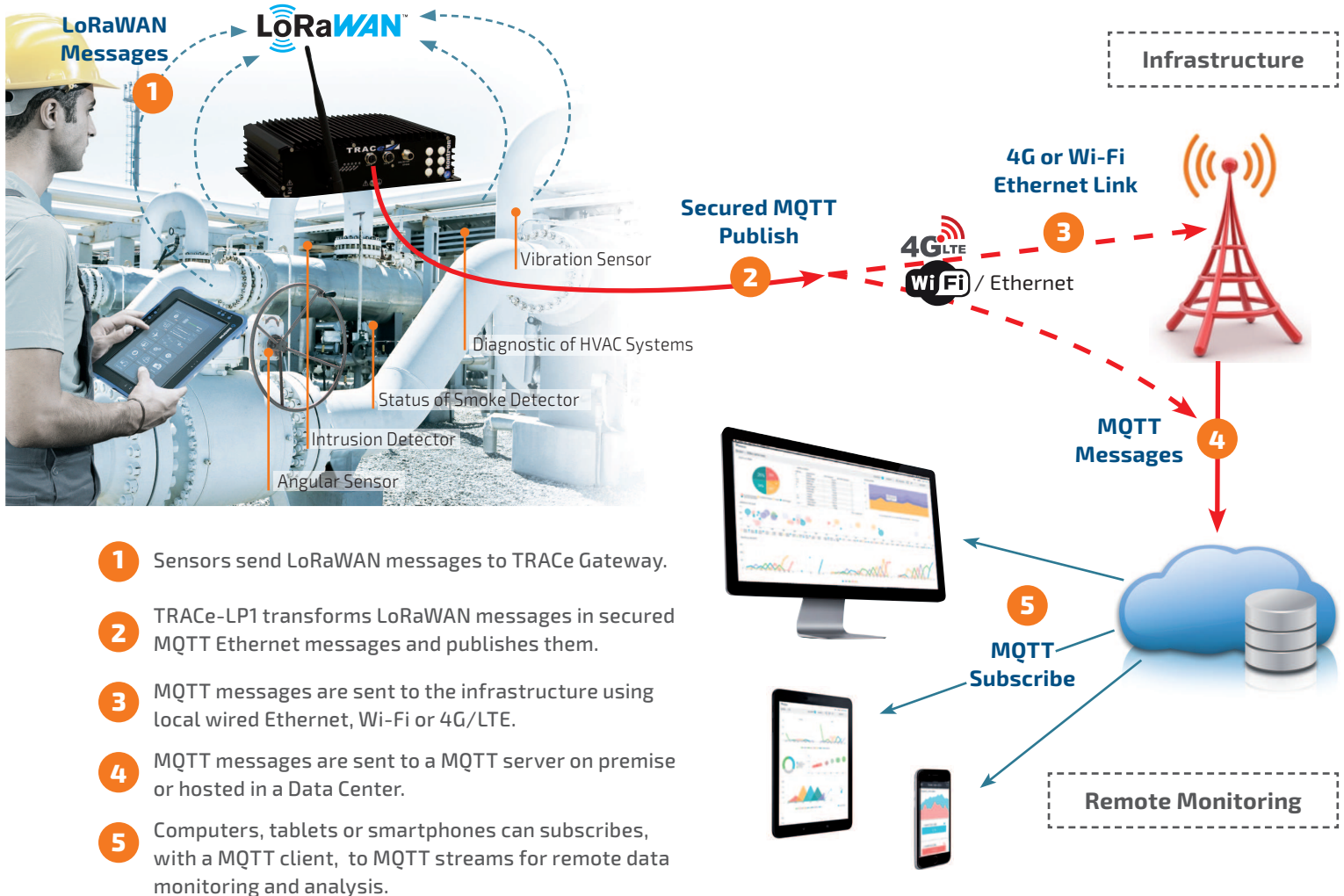
TOOLS

- ▶ LoRaWAN™ end-device configuration tool for local sensors registration.
- ▶ Python script sample for local LoRaWAN™ message handling (LoRa to MQTT optional semantic conversion or local diagnostic).
- ▶ Wi-Fi and 4G/LTE connection scripts samples.
- ▶ Optional: Monitoring framework for local or remote health monitoring.

TYPICAL APPLICATION



Maintenance Application



- 1 Sensors send LoRaWAN messages to TRACe Gateway.
- 2 TRACe-LP1 transforms LoRaWAN messages in secured MQTT Ethernet messages and publishes them.
- 3 MQTT messages are sent to the infrastructure using local wired Ethernet, Wi-Fi or 4G/LTE.
- 4 MQTT messages are sent to a MQTT server on premise or hosted in a Data Center.
- 5 Computers, tablets or smartphones can subscribes, with a MQTT client, to MQTT streams for remote data monitoring and analysis.

TECHNICAL INFORMATION

PROCESSOR		Quad core Intel® Atom™ CPU
MEMORY	System Memory	2 GB DDR3 with ECC
OPERATIONAL PLATE (FRONT)	Ethernet	2x Ethernet 10/100/1000Mb/s, M12 X-coded connectors, 1.5kV insulation
	Input Power	1x DC IN power , M12 A-coded (with Ignition Pin for Power Control), 1.5 kV insulation
	LoRa™ Radio	868 MHz for Europe, maximum transmitted power +20 dBm
POWER SUPPLY		24 VDC, optional 110/220 V AC/DC adaptor
PROTECTION CLASS		IP40 on all faces, IP54 or IP65 available on request
OPTIONS	WWAN	4G modem LTE/HSPA+/GSM/GPRS/EDGE/EV-DO Rev A/1xRTT with GNSS (Galileo, Glonass, GPS, Beidou)
	WLAN	Wi-Fi 802.11 ac/abgn 2T2R
	LoRa™ 915 MHz	LoRaWAN network variant for US
OPERATING TEMPERATURES		-40°C up to +70°C (with 10 min at +85°C)