TRACe-LP1

for Rail Application

GPS Wi Fi 4G LTE

EN50155 CERTIFIED(*) IoT LPWAN GATEWAY WITH EDGE COMPUTING CAPABILITY

- Fanless intelligent gateway for vehicles 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

(*) Conformal coating of internal components is optional

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 technology 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.

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 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 retreive 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® 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 anaylytics 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 CONNECTIVTY

- 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.

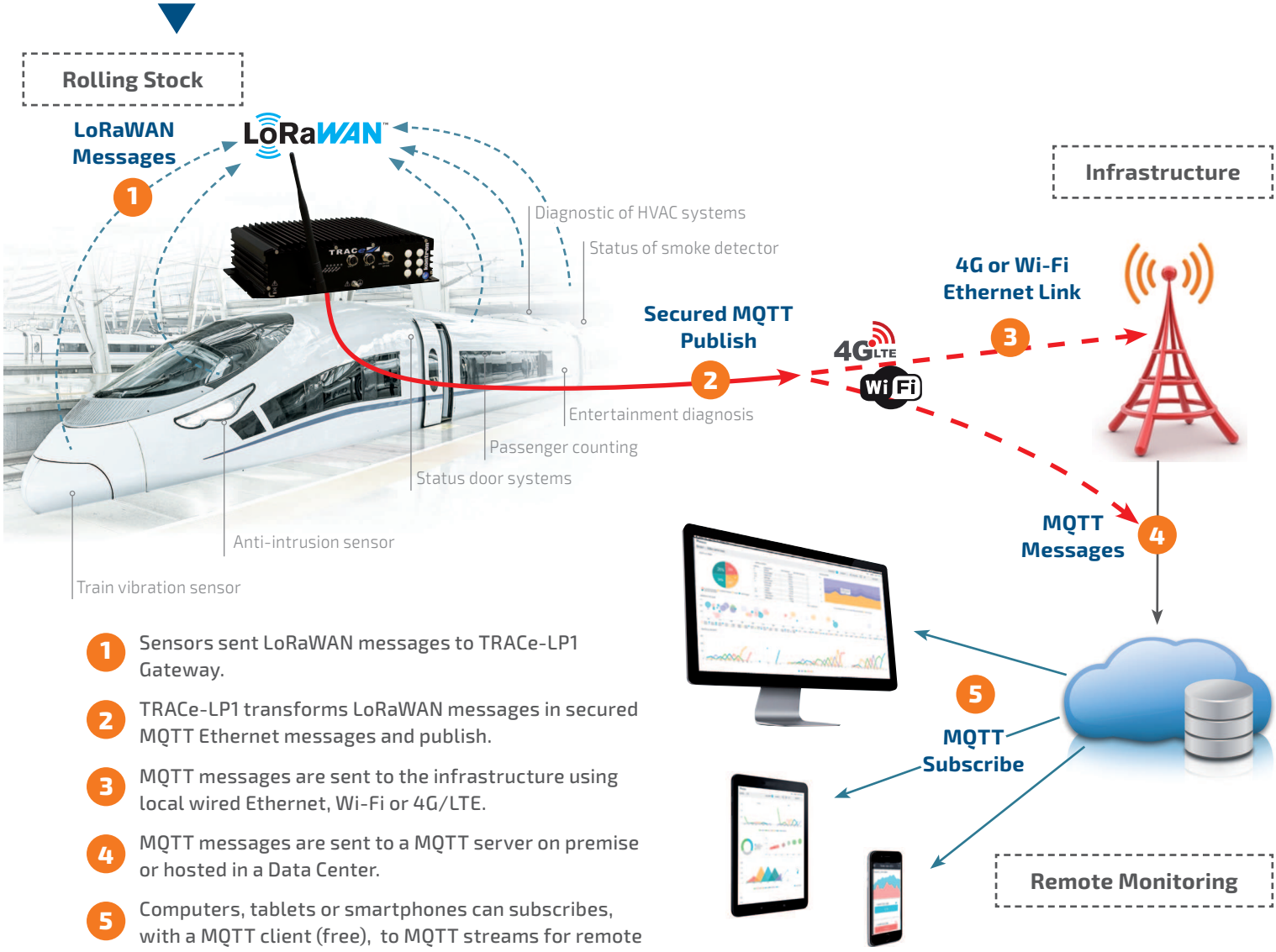
WIRELESS CONNECTIVTY OPTIONS

- 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



1. Sensors sent LoRaWAN messages to TRACe-LP1 Gateway.
2. TRACe-LP1 transforms LoRaWAN messages in secured MQTT Ethernet messages and publish.
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 (free), to MQTT streams for remote data monitoring and analysis.

▶ TECHNICAL INFORMATION

PROCESSOR		Multi-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), 1.5kV insulation
	LoRa™ Radio	868 MHz for Europe, maximum transmitted power +20 dBm
POWER SUPPLY		Input Voltage wide range 24 VDC...110 VDC (Class S2, 10 ms interruption)
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) EN50155 Class Tx

▶ TECHNICAL INFORMATION

ENVIRONMENT/ CERTIFICATIONS	ITE Safety Europe	EN 60950-1: 2006 +A1: 2010 +A2: 2013 + A11: 2009 +A12: 2011. Safety Europe Directive
	Railway Safety	Supply Voltage: EN 50155: 2007. Railway
	Thermal Operating	Class Tx EN 50155 / NF EN 60068-2-1: 2007 / NF EN 60068-2-2: 2007 . Railway
	Climatic Test	Damp heat (55°C , 95% Relative Humidity), cyclic EN 50155 / NF EN 60068-2-30 Railway
	Random Vibration	Operating, Long life testing EN 50155 / NF EN 61373: 2011-04 / NF EN 60068-2-64: 2008
	Shock	EN 50155 / NF EN 61373: 2011-04 / NF EN 60068-2-27: 2009. Railway Class 1B
	EMC Emission	EN 50155 / NF EN50121-3-2 / EN 55011
	EMC Immunity	EN 50155 / NF EN50121-3-2 / EN 61000-4-2 / -4-3 / -4-4 / -4-5 / -4-6
	ECM and ERM	R & TTE (EN300328 V1.8.1)
	GSM and MS	R & TTE (EN301 511 V9.0.2)
	Radiated Emissions	R & TTE (EN301 901-1 V5)
	LoRa Radio	ETSI EN 301489-1 V2.1.1, ETSI EN 301489-3 V2.1.1
	Others	CE. WEEE, RoHS
	Environmental Protection	IP40 rating (NF EN 60529: 2000)
DIMENSIONS	(W x D x H)	272 mm (300 mm with ears) x 190 mm x 78 mm

▶ ORDERING INFORMATION

ARTICLE	ORDER CODE	DESCRIPTION
TRACE- LP1-EU-C	1061-3566	TRACe-LP1 Gateway, EU version, Bundled Package with Cloud Connectivity and Cloud Server, including: ▶ 1x TRACE-LP1-EU Gateway, 2 years HW warranty ▶ Documentation kit and tools (LoRaWAN™ end-device configuration & scripts) ▶ Connection certificates (TLS/SSL) AND One year of Cloud Services (yearly fee, minimum 1 year subscription, automatic renewal), including: ▶ 1 x On-line Cloud Server per project (availability 24h/24h) to collect and dispatch data ▶ Public URL for data subscription (two parallel subscriptions per Cloud Server) ▶ Connection certificates (TLS/SSL) ▶ Cloud Server Incident Response within one working day ▶ Software support and maintenance
TRACE-LP1-EU	1061-7876	TRACe-LP1 Gateway, EU version, WITHOUT Cloud services, including: ▶ TRACE-LP1-EU Gateway, 2 years HW warranty ▶ Documentation kit and tools (LoRaWAN™ end-device configuration & scripts) ▶ Cloud Services free trial of 3 months, including 1x On-line Cloud Server non-secured connection (24h/24h) and public URL for data subscription»
TRACE-LP1-EU-2-0	1062-6729	TRACE-LP1-EU Gateway with integrated LTE cat 6 and GNSS, WITHOUT Cloud services
TRACE-LP1-EU-2-0-C	TRACE-LP1-EU-2-0-C	TRACE-LP1-EU Gateway with integrated LTE cat 6 and GNSS, WITH Cloud Connectivity and Cloud Server
TRACE-LP1-US	1061-6190	TRACe-LP1 Gateway, US version, WITHOUT Cloud services, including: ▶ TRACE-LP1-US Gateway, 2 years HW warranty ▶ Documentation kit and tools (LoRaWAN™ end-device configuration & scripts) ▶ Cloud Services free trial of 3 months, including 1x On-line Cloud Server non-secured connection (24h/24h) and public URL for data subscription
TRACE-LORAMQTT-YEAR-CLOUD	1061-3954	1x Year Cloud Services (Only with TRACe-LP1), including: ▶ 1 x On-line Cloud Server per project (availability 24h/24h) to collect and dispatch data ▶ Public URL for data subscription (two parallel subscriptions per Cloud Server) ▶ Cloud Server Incident Response within one working day ▶ Software support and maintenance
TRACE-LORA-ADD-SUB	1061-3956	One Additional Client Subscription to Cloud Server
TRACE-LORA-ACADAPTOR	1058-7259	110/220V 60W AC Adaptor to power TRACe-LP1 -30°C to +60°C Operation
TRACE-ETHCAB-EVAL	1058-7220	Gigabit Ethernet cable TRACE Eval - M12 X-coded to RJ45 IP65 5m length
CMON-MONIT-RT-V	1061-4384	Monitoring run time framework for local or remote health monitoring
Warranty Extension	1058-4564 1058-4565 1058-4566	Extended Warranty for 1 additional year Extended Warranty for 2 additional years Extended Warranty for 3 additional years

▶ CORPORATE OFFICES

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