EN50155 CERTIFIED LORA-MQTT GATEWAY, WITH EDGE COMPUTING CAPABILITY

- Fanless LoRa-MQTT gateway for vehicles applications
- Concentrates and transforms LoRa™ 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
- 1x LoRa™ 868 MHz Antenna for EU (Option 915 MHz for US)
- Operating -40°C to +70°C

Conformal coating of internal components is optional
YOUR PRIVATE LoRa™ 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 LoRa-MQTT is designed for severe environment (temperature, vibrations, ...) including EN50155 rolling stock conditions. A private LoRa™ network 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 LoRa™ network.

The TRACe LoRa-MQTT embeds a LPWAN (Low Power Wide Area Network) LoRa™ radio concentrator that can sustain eight communication channels simultaneously, and an Ethernet connectivity from one of the 2x GbE M12 X-Coded connectors.

LoRa™ NETWORK OPERATION

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

All LoRa™ 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 LoRa™ 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® 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 B02.11 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™ network 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 B02.11 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 (INCLUDED)

- LoRa™ end-device configuration tool for local sensors registration.
- Python script sample for local LoRa™ message handling (LoRa to MQTT optional semantic conversion or local diagnostic).
- Wi-Fi and 4G/LTE connection scripts samples.
TYPICAL APPLICATION

1. Sensors sent LoRa messages to TRACe LoRaMQTT Gateway.
2. TRACe LoRa-MQTT transforms LoRa messages into secured MQTT Ethernet messages and publishes.
3. MQTT messages are sent to the infrastructure using local wired Ethernet, Wi-Fi, or 4G/LTE.
4. MQTT messages are sent to an MQTT server on premise or hosted in a data center.
5. Computers, tablets, or smartphones can subscribe with an MQTT client (free) to MQTT streams for remote data monitoring and analysis.

TECHNICAL INFORMATION

<table>
<thead>
<tr>
<th>PROCESSOR</th>
<th>Quad Core Intel® Atom™ CPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEMORY</td>
<td>2 GB DDR3 with ECC</td>
</tr>
<tr>
<td>OPERATIONAL PLATE</td>
<td>2x Ethernet 10/100/1000Mb/s, M12 X-coded connectors, 1.5kV insulation</td>
</tr>
<tr>
<td>OPERATING TEMPERATURES</td>
<td>868 MHz for Europe, maximum transmitted power +20 dBm</td>
</tr>
<tr>
<td>POWER SUPPLY</td>
<td>Input Voltage wide range 24 VDC...110 VDC (Class S2, 10 ms interruption)</td>
</tr>
<tr>
<td>PROTECTION CLASS</td>
<td>4G modem LTE/HSPA+ /GSM/GPRS/EDGE/EV-DO Rev A /1xRTT with GPS</td>
</tr>
<tr>
<td>OPTIONS</td>
<td>Dedicated GPS module</td>
</tr>
<tr>
<td>LoRa™ 915 MHz</td>
<td>LoRa network variant for US</td>
</tr>
<tr>
<td></td>
<td>-40°C up to +70°C (with 10 min at +85°C) EN50155 Class Tx</td>
</tr>
</tbody>
</table>
**TECHNICAL INFORMATION**

<table>
<thead>
<tr>
<th>ENVIRONMENT/ CERTIFICATIONS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Operating</td>
<td>Damp heat (55°C, 95% Relative Humidity), cyclic EN 50155 / NF EN 60068-2-30 Railway</td>
</tr>
<tr>
<td>Random Vibration</td>
<td>R &amp; TTE (EN300328 V1.8.1)</td>
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<tr>
<td>Shock</td>
<td>R &amp; TTE (EN301511 V9.0.2)</td>
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<tr>
<td>EMC Emission</td>
<td>EN 50155 / NF EN50121-3-2 / EN 55011 (*)</td>
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<tr>
<td>EMC Immunity</td>
<td>EN 50155 / NF EN50121-3-2 / EN 61090-4-2 / -4-3 / -4-4 / -4-5 / -4-6</td>
</tr>
<tr>
<td>ECM and ERM</td>
<td>R &amp; TTE (EN300328 V1.8.1)</td>
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<tr>
<td>GSM and MS</td>
<td>R &amp; TTE (EN301511 V9.0.2)</td>
</tr>
<tr>
<td>Radiated Emissions</td>
<td>R &amp; TTE (EN301901-1-V5)</td>
</tr>
<tr>
<td>LoRa Radio</td>
<td>ETSI EN 301489-1 V2.11, ETSI EN 301489-3 V2.11</td>
</tr>
<tr>
<td>Others</td>
<td>CE, WEEE, RoHS</td>
</tr>
<tr>
<td>Environmental Protection</td>
<td>IP50 rating (NF EN 60529: 2000) (*)</td>
</tr>
</tbody>
</table>

**DIMENSIONS**

(W x D x H) 272 mm (300 mm with ears) x 190 mm x 78 mm

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>ARTICLE</th>
<th>ORDER CODE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
</table>
| TRACE-LORAMQTT | TRACE-LORAMQTT-EU-C | TRACE-LoRaMQTT Gateway, EU version, Bundled Package with Cloud Connectivity and Cloud Server, including:  
  1x TRACE-LoRaMQTT-EU Gateway  
  Documentation kit and tools (LoRa™ end-device configuration & scripts)  
  Connection certificates (TLS/SSL)  
  One year of Cloud Services (yearly fee, minimum 1 year subscription, automatic renewal), including:  
  1x 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 |

**TECHNICAL INFORMATION**

- **IEEE Safety Europe**
- **Railway Safety**
- **Thermal Operating**
- **Climatic Test**
- **Random Vibration**
- **Shock**
- **EMC Emission**
- **EMC Immunity**
- **ECM and ERM**
- **GSM and MS**
- **Radiated Emissions**
- **LoRa Radio**
- **Others**
- **Environmental Protection**

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  Documentation kit and tools (LoRa™ end-device configuration & scripts) |
| TRACE-LORAMQTT-EC | TRACE-LORAMQTT-EC | Option to enable an internal dedicated virtual machine capability to perform local processing on datastream: edge analytics or general FOG computing |
| TRACE-LORA-YEAR-CLOUD | TRACE-LORA-YEAR-CLOUD | 1x Year Cloud Services (Only with TRACE-LoRaMQTT), including:  
  1x 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 |
| TRACE-LORA-EVAL-CLOUD | TRACE-LORA-EVAL-CLOUD | 1x Month Cloud Services Evaluation (Only with TRACE-LoRaMQTT), including:  
  1x On-line Eval Cloud Server non-secured connection (availability 24h/24h) to collect and dispatch data  
  Public URL for data subscription (non-secured connection)  
  Best effort Incident Response time |
| TRACE-LORA-ADD-SUB | TRACE-LORA-ADD-SUB | One Additional Client Subscription to Cloud Server |
| TRACE-LORA-ACADAPTOR | TRACE-LORA-ACADAPTOR | 110/220V 60W AC Adaptor to power TRACE-LoRaMQTT -30°C to +60°C Operation |

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