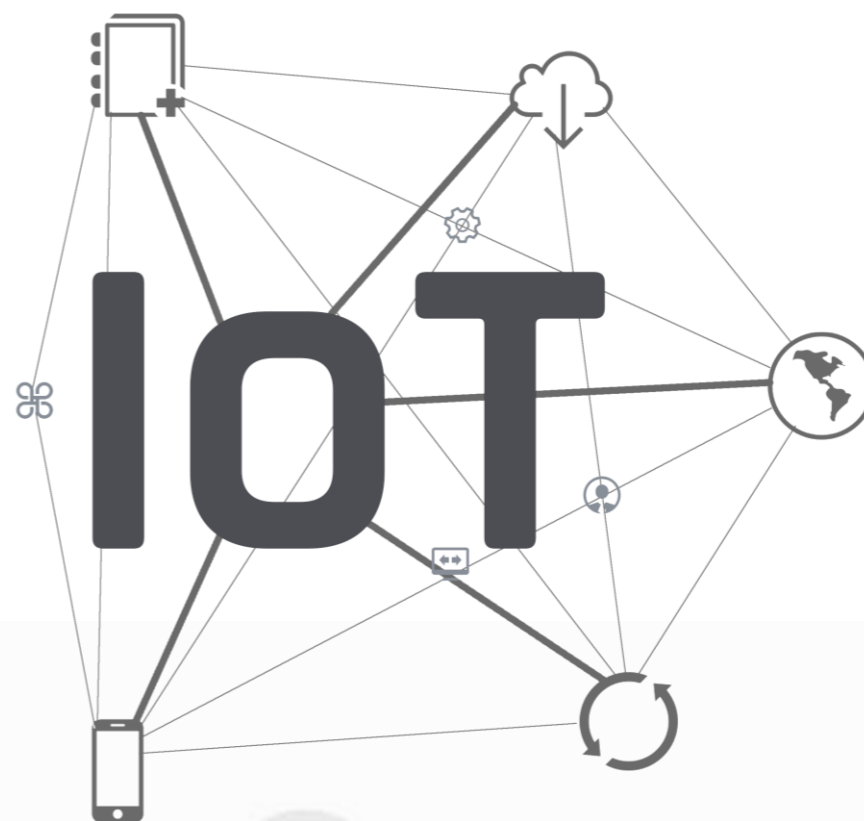




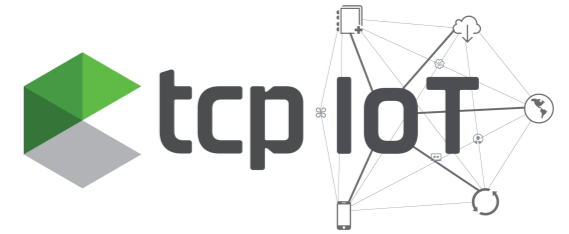
tcp



# IoT Platform for Smart Cities

Jan Pokorný & Jiří Hýbek

# IoT Platform



- TCP IoT team

Building smart city platform

Based on open-source technologies

Unique solution from data collection to cloud services.



Sensors



IoT Gateway

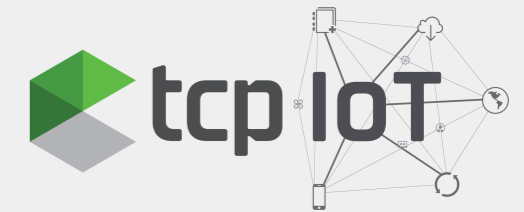


IoT Cloud

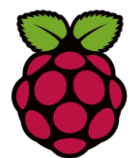
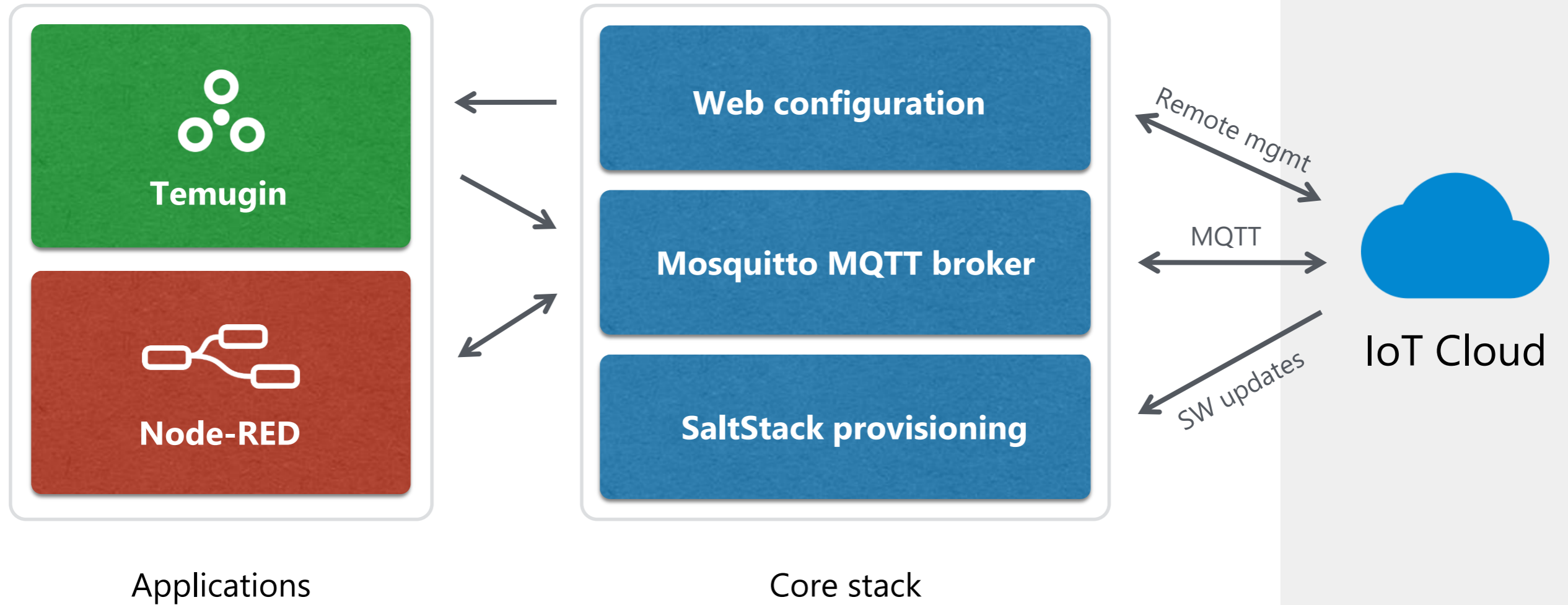
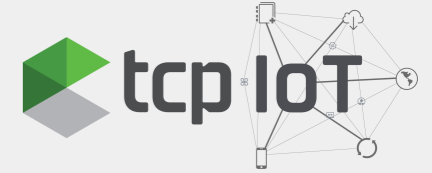
# Environmental sensor

Tesla Blatná s.r.o.

- IQRF communication
- Gases
- Light
- Air pressure
- Temperature
- Relative humidity
- Dust



# IoT Gateway



RaspberryPi



Windows IoT



Hardware & OS

# Hardware & OS

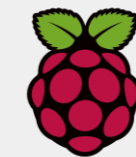
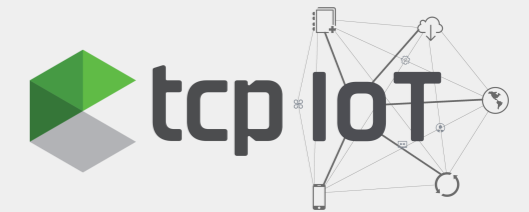
Multiplatform Gateway

Hardware platforms

- RaspberryPi
- Intel GW
- AAEON GW
- PC

Operating systems

- Raspbian
- Windows IoT
- Ubuntu



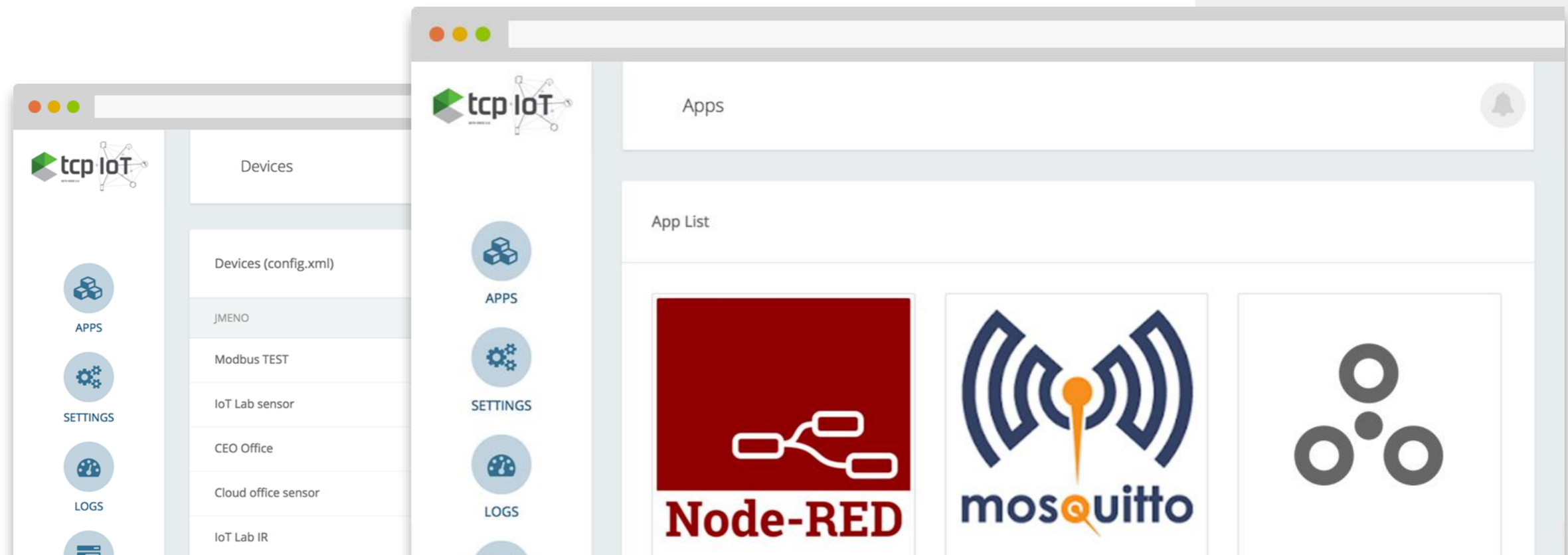
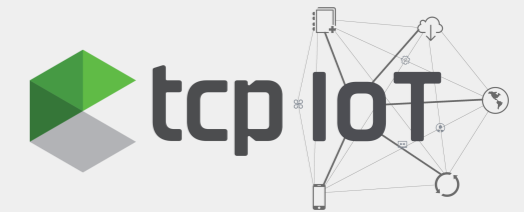
RaspberryPi



# Configuration

Local & Remote Management

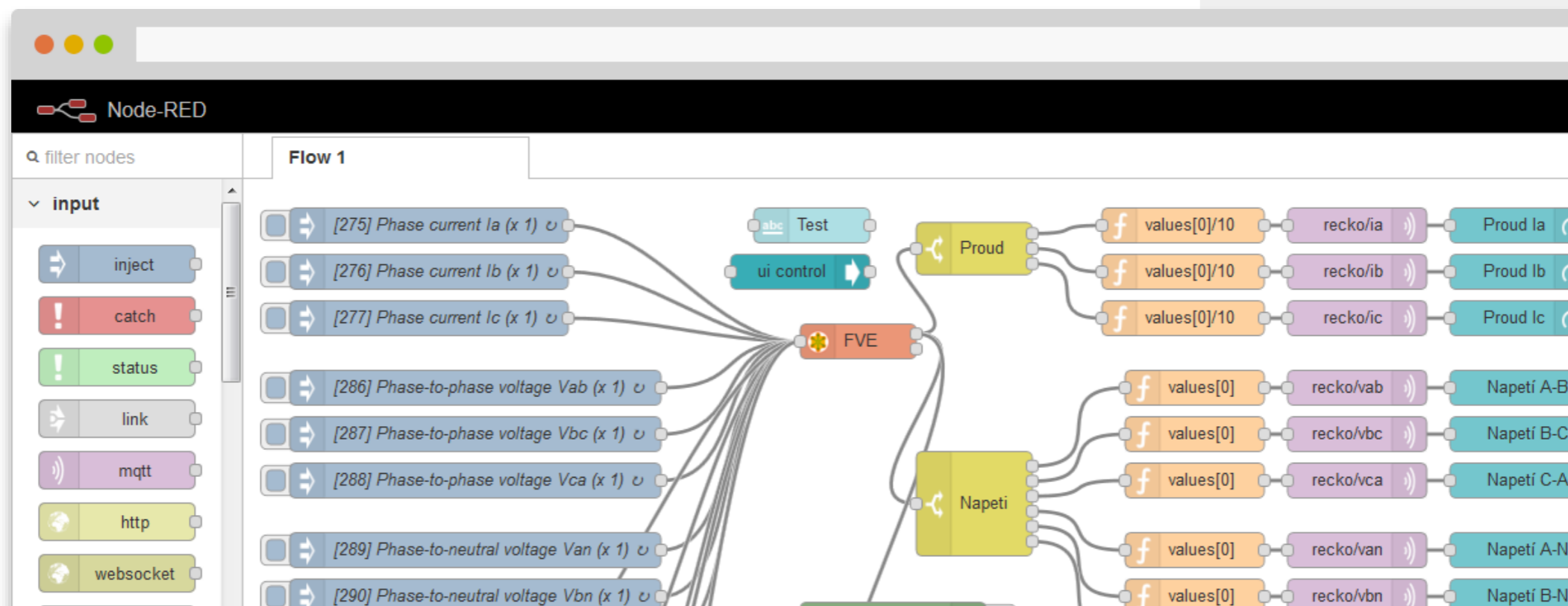
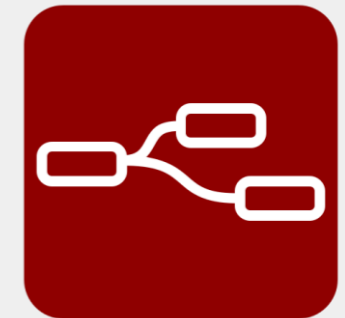
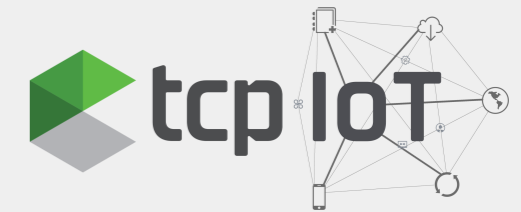
- Web configuration interface
- SaltStack software updates
- Remote management via cloud



# Applications

Node-RED

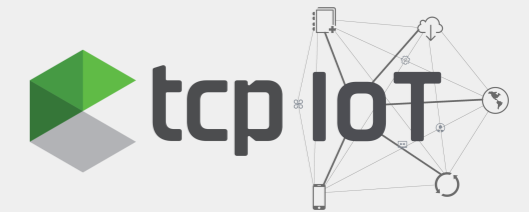
- Flow-based programming
- Web-based user interface
- Access to hardware



# Applications

Temugin

- Proprietary software
- Various device integration
- Protocol translation
- IQRF network management
- Configurable via web

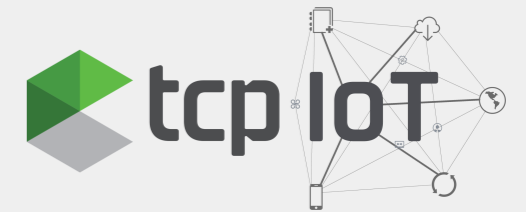
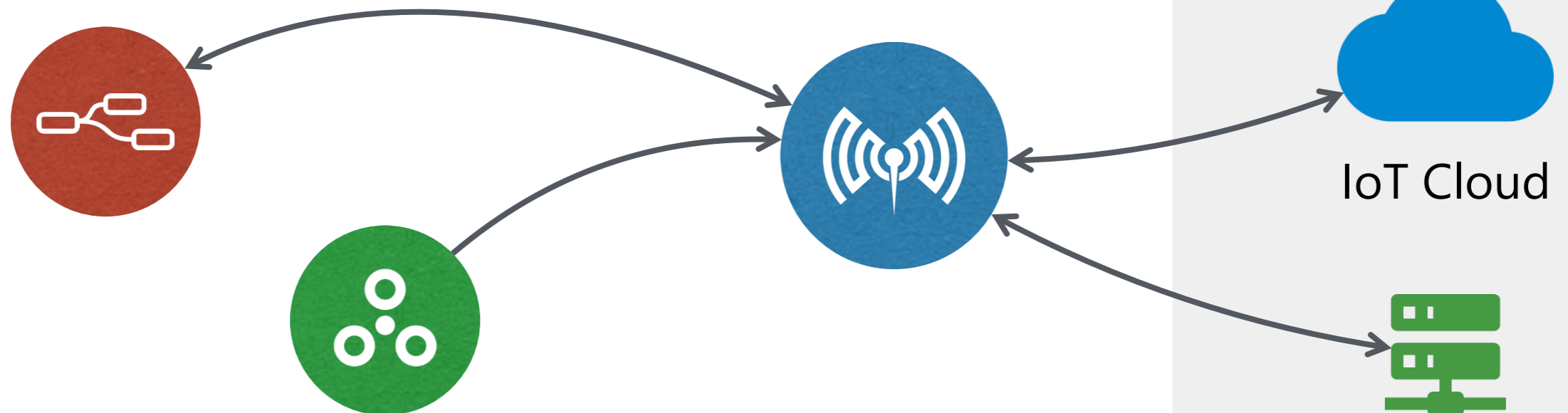




# Centralized Messaging

Mosquitto MQTT Broker

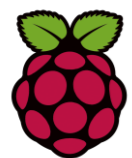
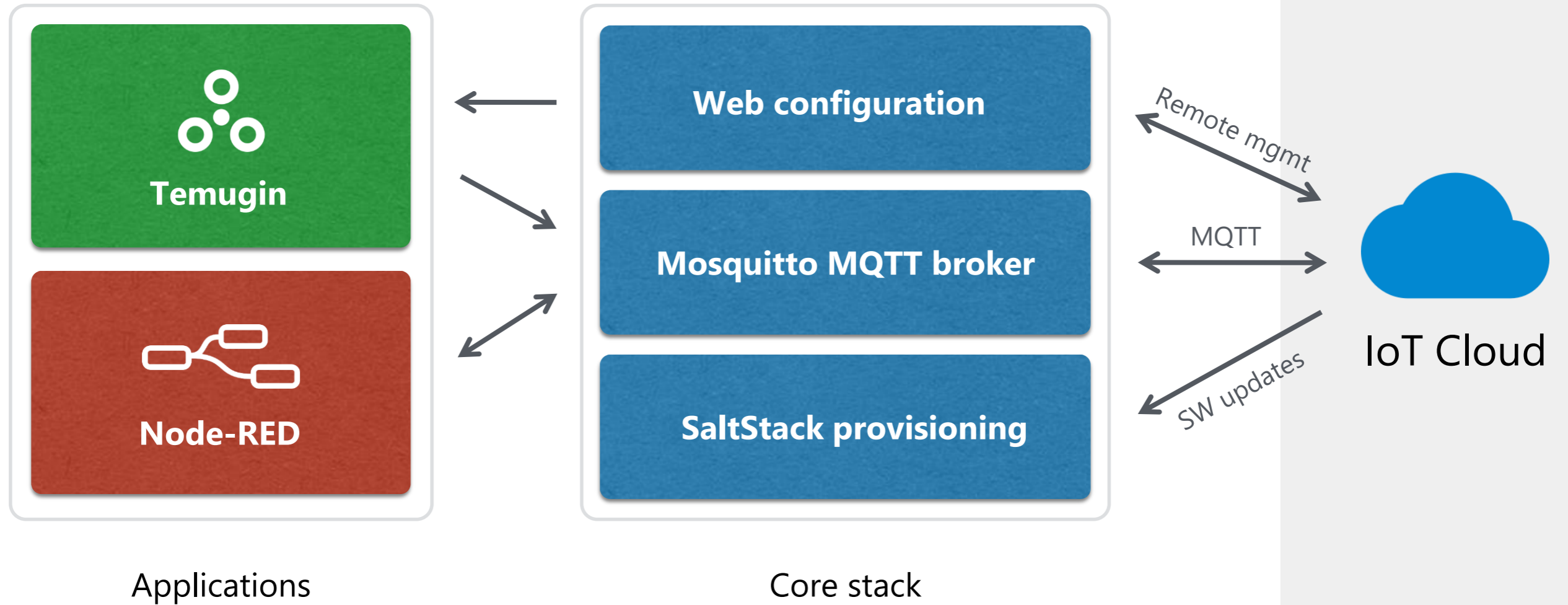
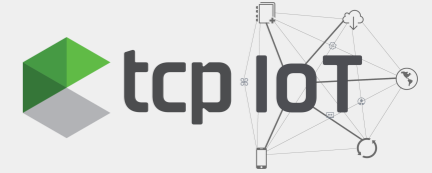
- Communication hub
- Message buffering
- MQTT to IoT Cloud



IoT Cloud



# IoT Gateway



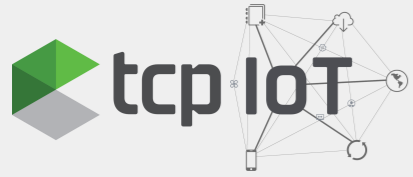
RaspberryPi



Windows IoT

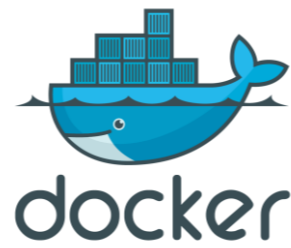
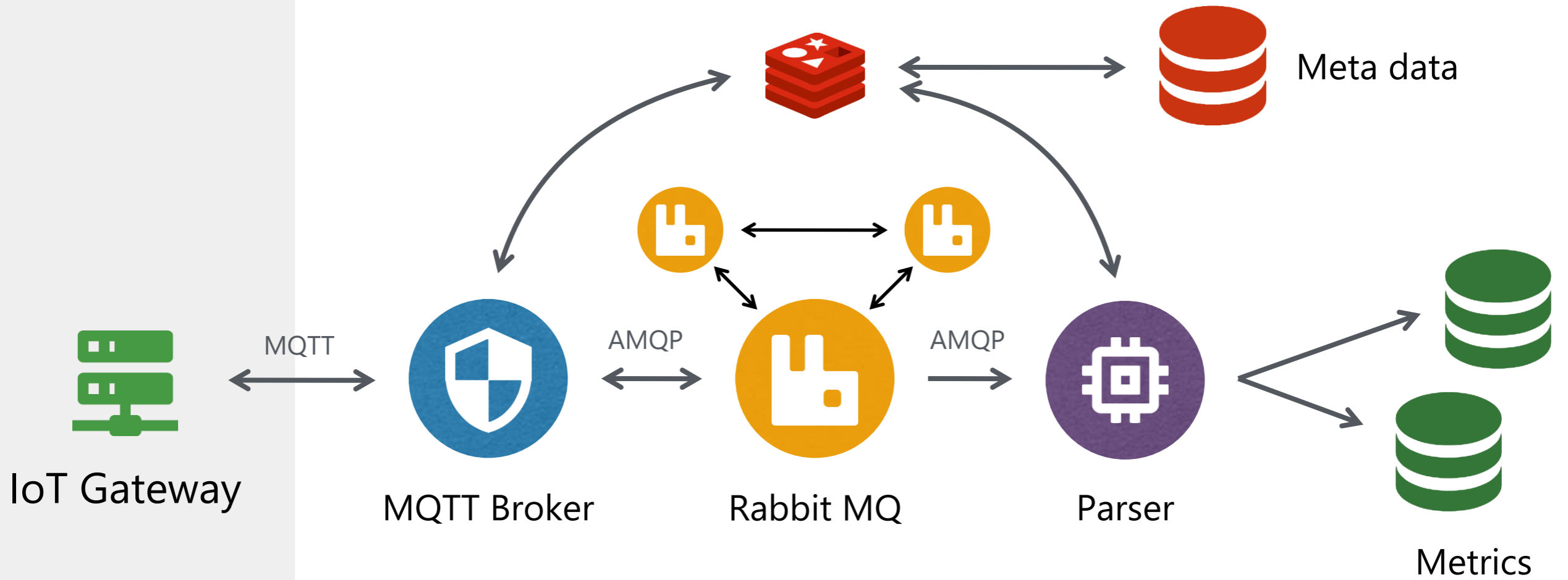


Hardware & OS

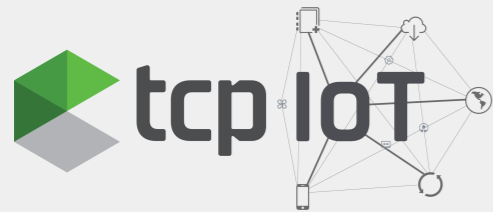


# IoT Cloud

## Application infrastructure



## System infrastructure



kubernetes



docker



GlusterFS

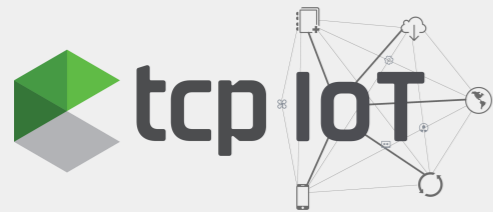


SALTSTACK

# Solid infrastructure

Proven Open-source Technologies

- Scalable
- High availability
- Kubernetes orchestration
- GlusterFS filesystem
- SaltStack provisioning



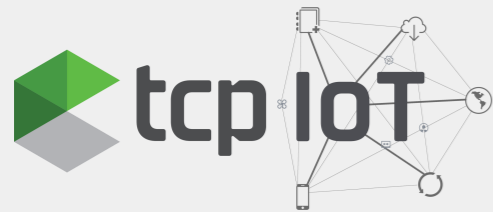
# MQTT Broker

Proprietary Software



- MQTT Message processing
- Authentication
- Multitenant isolation
- Scalable
- Written in NodeJS



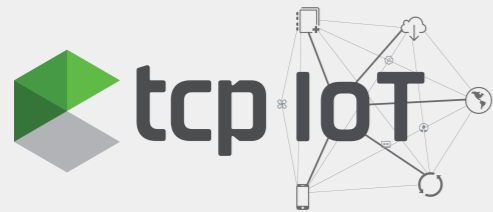


# Message handling

RabbitMQ



- Message routing
- Multiprotocol support
- Solid backend
- High availability
- Durable
- Scalable



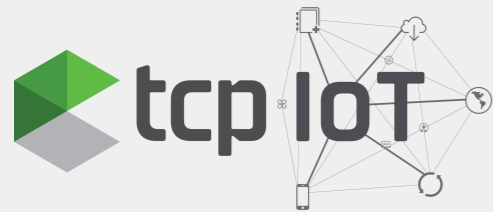
# Message processing and storing

Proprietary Parser and Open-source Databases



- Support for various formats
- JSON and SenML
- Meta-data
- InfluxDB and ElasticSearch
- Data analysis





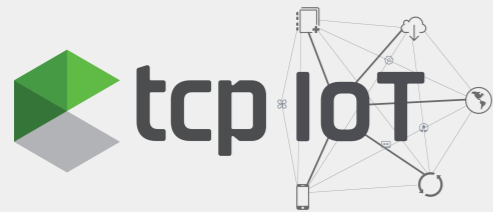
# Infrastructure Monitoring

Prometheus



- Time-series database
- Scrapers
- OS level monitoring
- Kubernetes cluster
- Application metrics





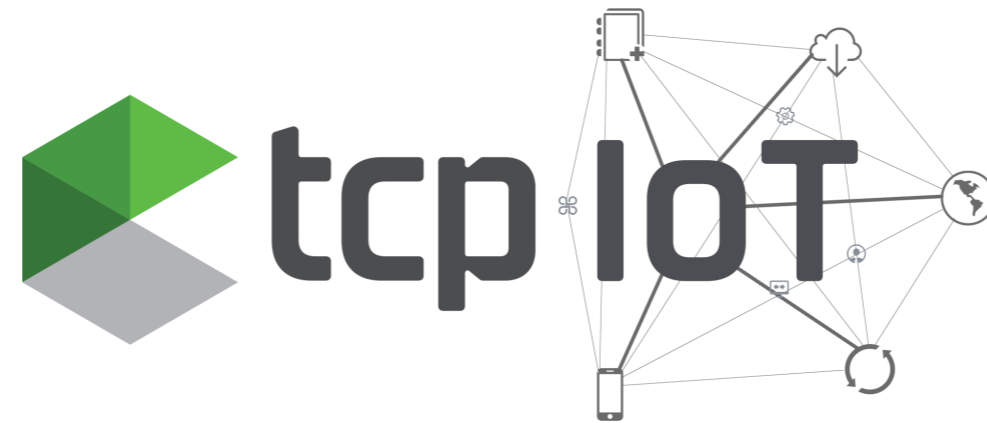
# Visualisation

Grafana



- Metrics visualisation
- Dashboards
- Alerting
- User-friendly
- Customizable





# IoT Platform Demo



Tesla Sensor

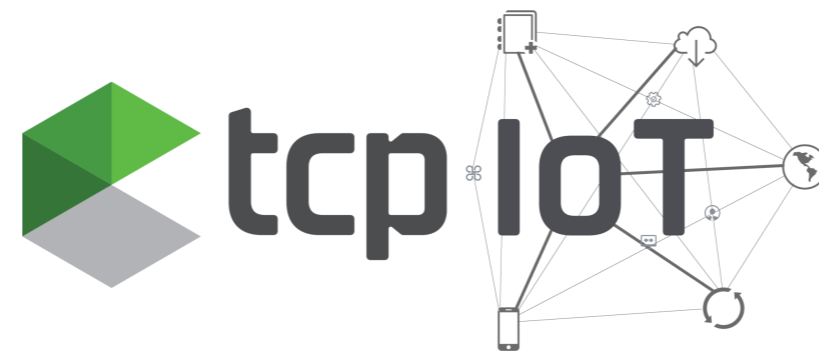


AAEON Gateway



TCP Cloud





# Thank you for your attention

**Jan Pokorný**

IoT Gateway

[jan.pokorny@tcpisek.cz](mailto:jan.pokorny@tcpisek.cz)

**Jiří Hýbek**

Cloud Infrastructure

[jiri.hybek@tcpisek.cz](mailto:jiri.hybek@tcpisek.cz)

[www.tcpisek.cz](http://www.tcpisek.cz)