IIoT edge gateways slaan een brug tussen IT en OT

Digital revolution

Smart Farming View

- drive tractor
- determine route
- predict weather
- connect equipment
- operate seeding process

Human integra

Future

https://hbr.org/2014/11/how-smart-connected-products-are-transforming-competition

Digital revolution Smart Manufacturing View

- drives forklift
- determine route
- develop plan
- identify goods
- determine locations

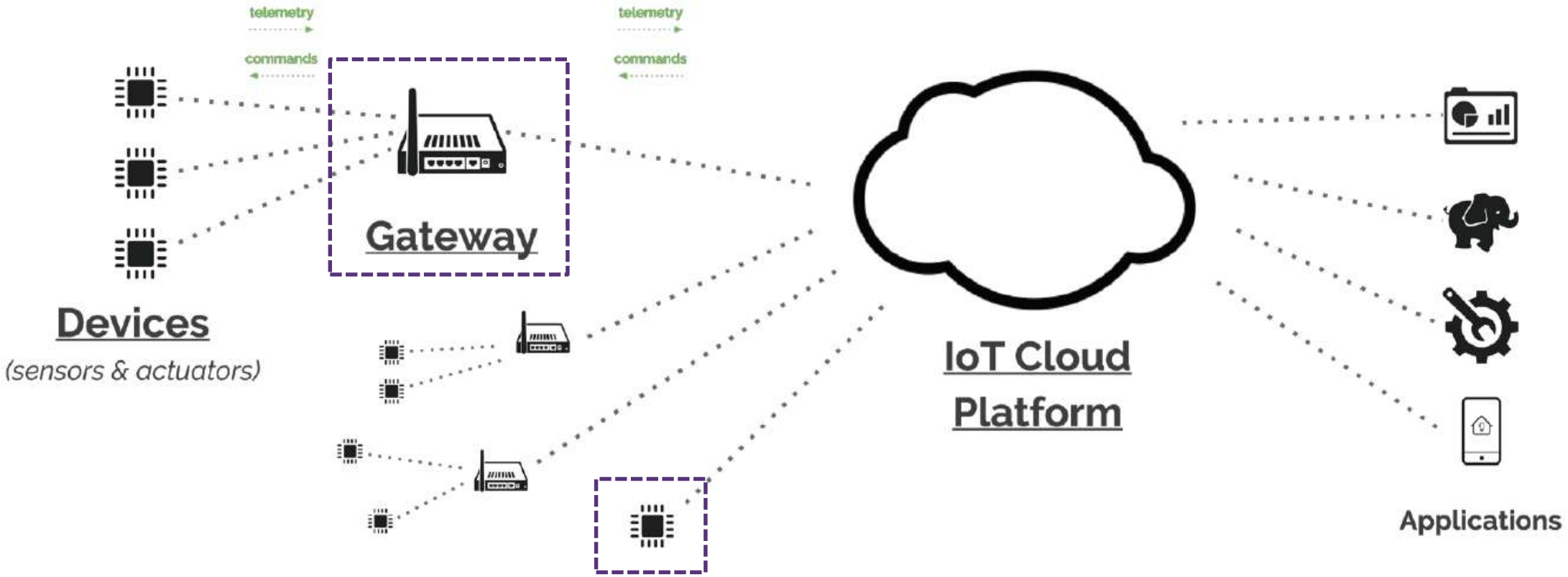
Human inte

15 maart 2018 ••• Hart van Holland Nijkerk

Industrial Ethernet

Future

Industrial IoT Need and Essence



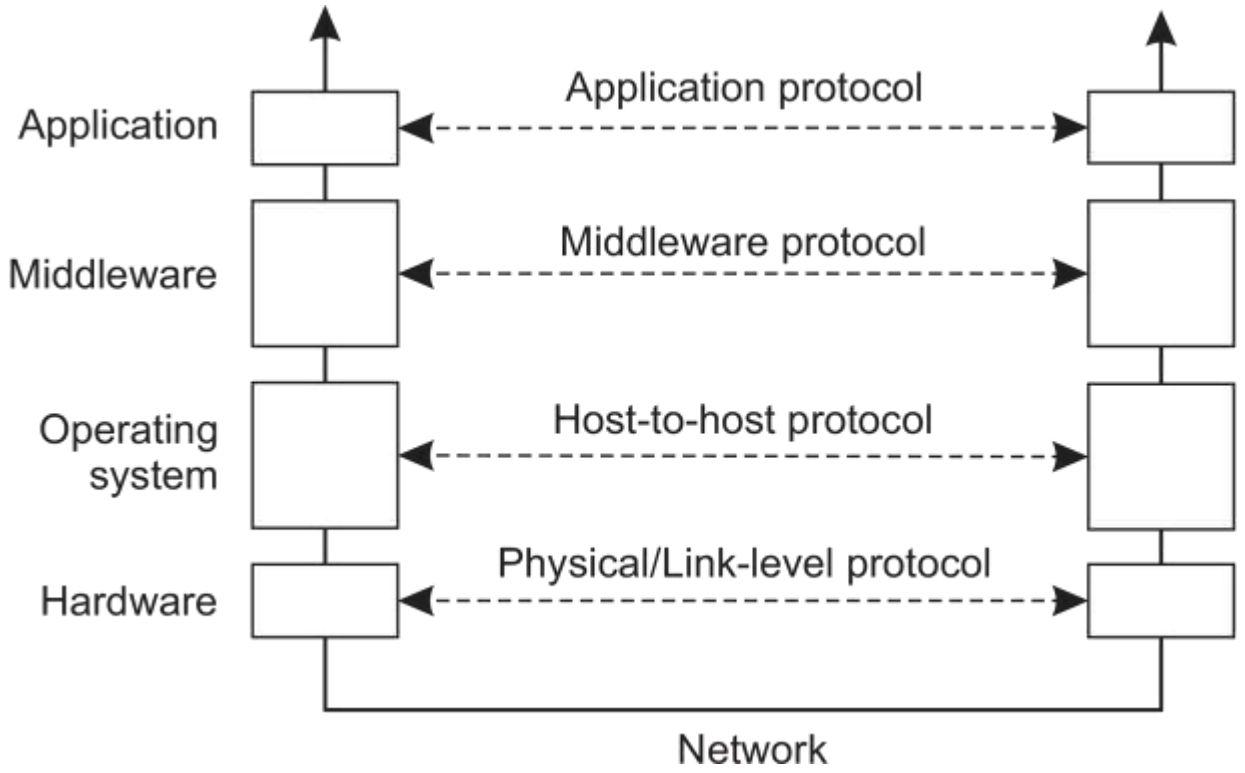
Industrial IoT (Edge) Gateways Introduction

Industrial IoT (Edge) Gateways Introduction

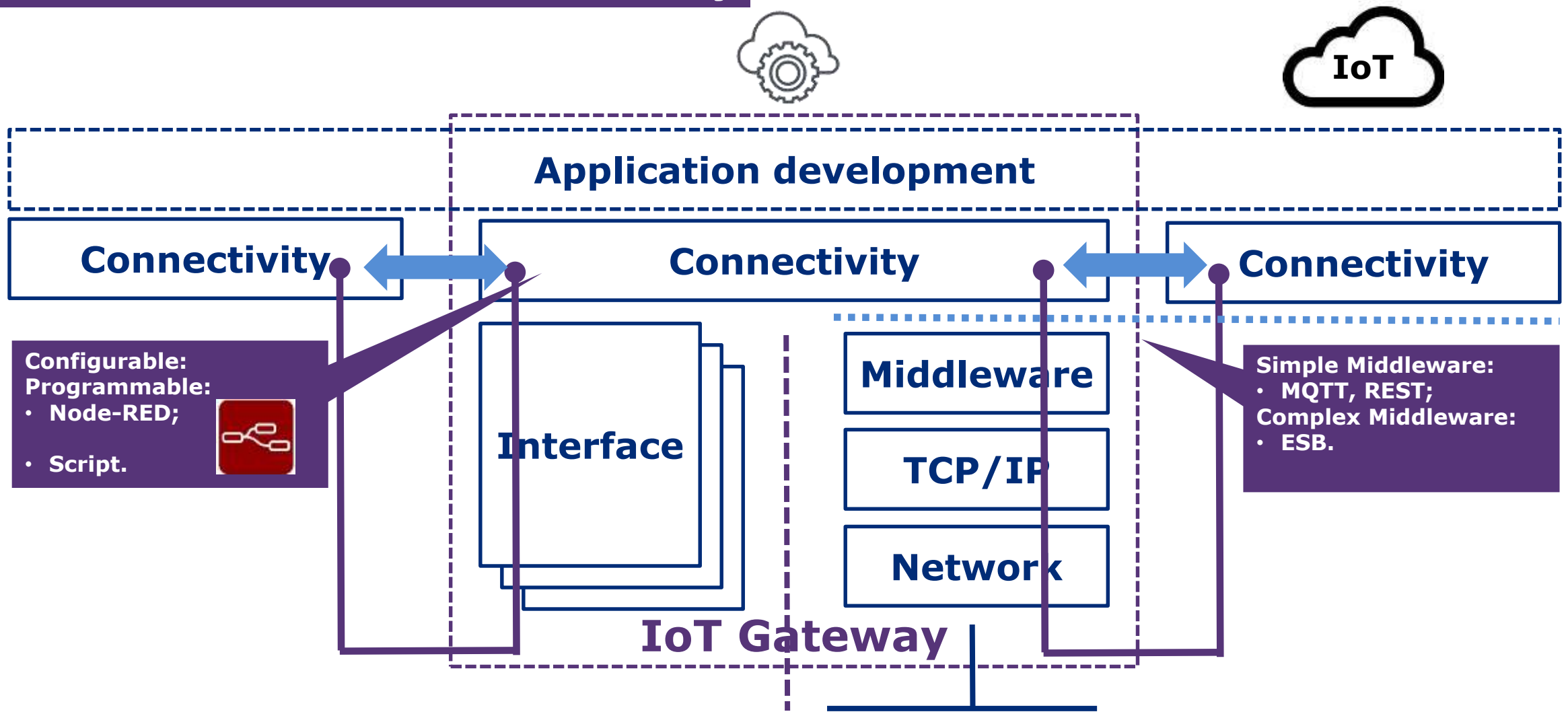
- A gateway supports modularisation and fast evolution.
- Slow evolution trough backwards compatibility and standards.
- A gateway is complement to standards.

Gateways:

- Internet gateway;
- Middleware gateway;
- Application gateway;
    - Common Gateway Interface;



IoT Gateway General structure



IoT Gateway Functionality

Traditional

Local (Network) connectivity
- Signal interface
- Point-to-Point (RS232)
- General Bus (USB)
- Fieldbus (RS485, PROFIBUS, Devicenet,..)
- PAN (Bluetooth);
- Ethernet
- …

Network and protocol (Middleware) bridging:
- Asynchronous (e.g. MQTT/AMQP);
- Streaming;
- Event-based;
- Store-and-forward,

Intelligent

Local data processing:
- Aggregation;
- Transformation;
- Filtering;
- Consolidation;
- Storage;
- Analytics

General

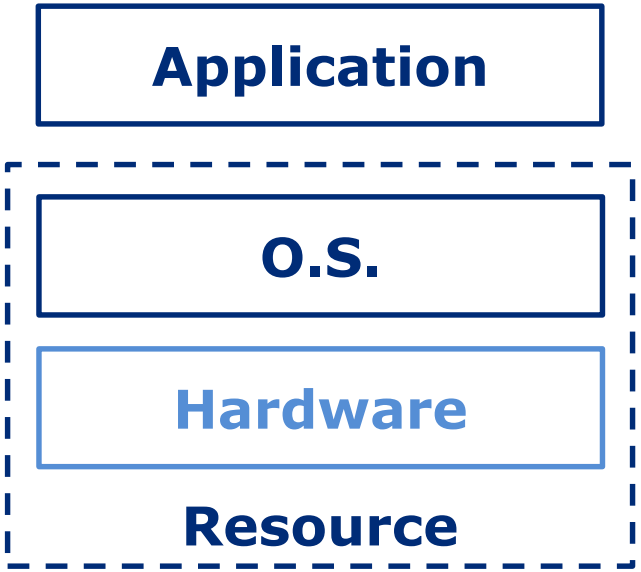
- Device and asset control and management (act as agent)
- Containerisation;
- Application logic (Microservice Architecture);
- Gateway management.

IoT Gateway Characteristics

- Middleware accessibility;
  - GPIO (Signal interface);
  - Point-to-Point (Data interface);
  - Fieldbus;
  - Network.
- Middleware protocol conversion;
  - Synchronous, Asynchronous.
- Direct connectivity to IoT platform.
- Bi-directional connectivity.
- More then one interface.
- IoT Gateway software is local process.

IoT Gateways General structure

- Two kinds of components:
  - Commercial Off-the-Shelf (COTS)
  - Custom-made
- Software as IoT Gateways;
  - COTS:
    - KepServerEX (IoT Gateway);
    - Node-RED.
  - Custom-made with SDK.
- Hardware for IoT Gateways;



IoT Gateways Expandable hardware example

Special-purpose Hardware

- Different operating systems available: Windows, Linux…
- Integrated switch;
- GPIO;
- Different communication possibilities (RS232, RS485, Ethernet, CAN/MODBUS/TCP, Wifi.
- Robust housing.

Software

IoT Gateway

kepware®

- Kepserver;
- IoT Gateway device;
- REST Web service.
- MQTT Client;

IoT Gateway Modulair hardware example

Hardware

- RevPi core 3;
- Fieldbus interface;
- GPIO.

Software

- O.S. : Linux;
- Middleware Integration:
  - Node-RED;
  - OR Custom (SDK).

Industrial IoT Gateways Characteristics & Examples

- **Installation**:
  - DIN-rail mounting;
  - Industrial Housing;
  - 24VDC power supply;
  - IP67
- **Interfaces**:
  - Field buses:
    - Ethernet (PROFINET, MODBUS/TCP, …;
    - Serial-bus (PROFIBUS, CAN, DEVICENET, …)
- **Environment conditions**:
  - Extended temperature range (-40°C..70 °C)
  - Dust, moisture and vibration possible
  - Risk of mechanical damage caused by chemicals and other influences.
  - High EMC requirements
  - Certificates
  - High MTBF Values

Harting MICA

Simatic IOT2000

Kunbus RevPi

Hilscher NetPi

Industrial IoT Gateways

Commercial Off-the-Shelf (COTS)

Nexcom CPS 200

Hilscher netIOT Edge

References

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