

# Internet of Payments - Payment Services for an IoT-infrastructure

Joachim Dorschel

Managing Partner, DPS Group

HELP  
PAYMENT SECURE  
DATA

# DPS Group

Who we are and what we do





# DPS Group

## Competences and references

### Banking

Capital markets

Payments

Regulation

Compliance

Risk

### Retail

Omni channel

Self service

Mobile devices

Branch automatization

### Technology

Architecture

Software engineering

Quality management

Cloud migration

Digital transformation

### Selected customers



**METRO GROUP**

**equensWorldline**



**COMMERZBANK**

**finanz informatik**

Deutsche Bank



**Sparda-Bank**

**HypoVereinsbank**  
UniCredit Group

HELP SECURE  
PAYMENT DATA



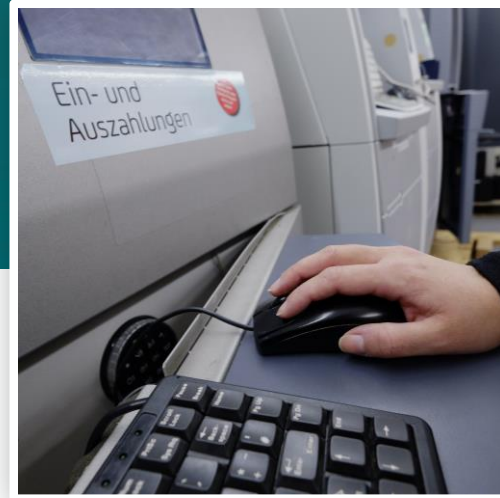
# DPS Group

ATM and customer self service banking

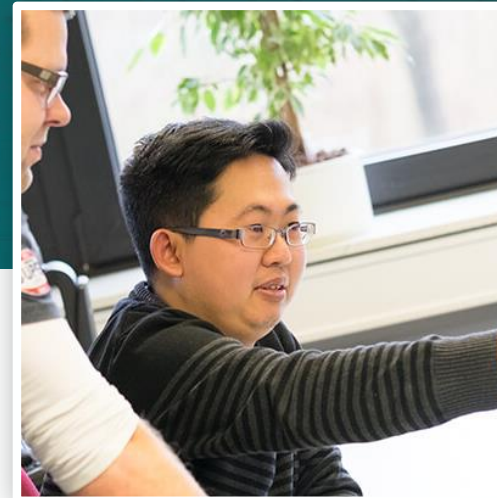
HELP SECURE  
PAYMENT DATA



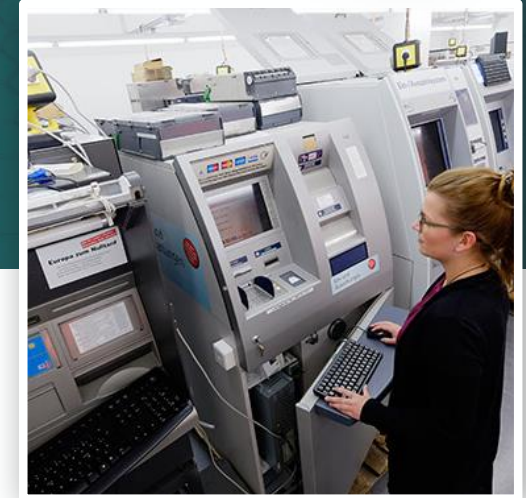
**29** years of experience  
in software  
development for ATM  
and self service  
infrastructures



**60.000** ATMs and  
terminal devices  
running with DPS  
eCMS software in  
Germany



**120** professionals  
working with our  
customers on  
innovative, reliable and  
efficient solutions



Since **3** years DPS  
Innovations is run as a  
dedicated r&d  
laboratory focused on  
blockchain, white label  
ATM networks, IoT etc.



# IoT and Industry 4.0

Commercial relevance and what  
this means for payments



# IoT and Industry 4.0

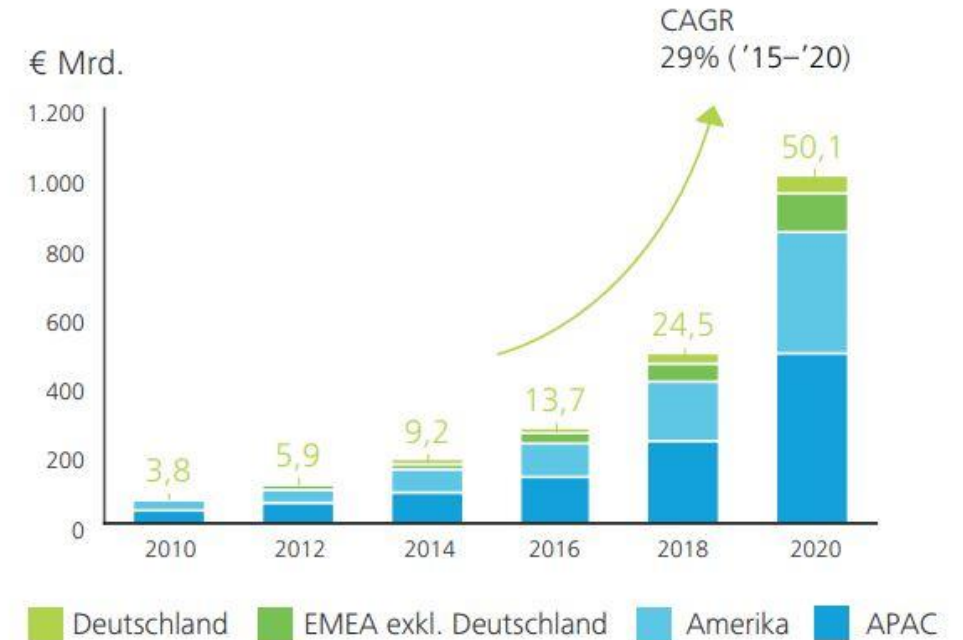
## Developments and expectations

### Most relevant use cases:

- Connected cars
- Connected products
- Smart cities
- Predictive maintenance
- Connected logistics
- Smart grids
- Connected manufacturing
- ...

### Related business models:

- Pay-per-use
- Customer-oriented lot-size 1
- Usage-dependent financing
- ...



Quelle: Tech Navio, Deloitte





# IoT and Industry 4.0

## IoT and Payments



Digitalization of business workflows and manufacturing processes requires integrated **features for the initiation, receipt and tracking of payments.**

Such features include:

- Person-to-machine, machine-

to-person and machine-to-machine payments

- Integration of payment instruments
- Technical links between things and payment obligations
- Machine wallets

- Connectivity between open banking API's and IoT infrastructure

Integration of electronic commerce, industrial manufacturing and payments is the basis for an **IoT / IoP digital ecosystem.**

# IoT and Industry 4.0

## Technical paradigms



### Connectivity

In an IoT infrastructure, all devices (things) are connected. This relates to smart devices as well as sensors, control panels, terminals etc.

### Edge and fog

Computing operations are shifted from central server applications into the network using the computing resources of the devices within the network.

### Big data

Any data generated within the network is collected, aggregated and processed to generate insights with respect to efficiency and chances for improvement.

### Convergency

Standard communication protocols and architectures (e.g. OPC-UA) allow an ubiquitous exchange of messages.



# IoT payment services

Exemplary scenarios



# IoT payment services

## Electronic commerce



Consumers require seamless integration of payment functionalities when purchasing goods or services online and offline.



Online shops and service providers are required to accept multiple communication channels and payment methods.



Any connected device (wearables, smart home components, mobile...) may initiate valid purchase orders as well as payment instructions.



Public infrastructure providers may establish smart devices controlling the provision and the billing of services



Delivery services integrated into a seamless digital delivery management provide information facilitating a correct and fair delivery and payment handling.



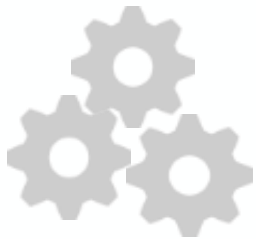


# IoT payment services

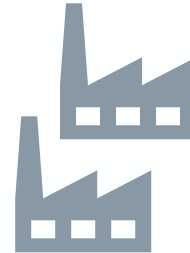
## Smart manufacturing and pay-per-use



Machines and components are remunerated on a per-use-basis. Devices and related sensors provide the data relevant to invoice.



Machines and components may enter into distributed service relationships. Pay-per-use arrangements may apply to single components, machines, products or systems.



Instead of selling machines manufacturers may offer machine work as a service.



Sharing machine capacities increases the degree of efficiency. This may lower production costs and leads to a more sustainable production infrastructure.

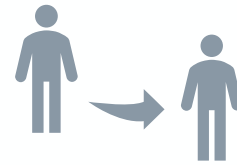


# IoT payment services

## IoT-based financing



Investment loans are tied to the investment good, i.e. the device itself. Conditions of the loan may be altered based in the degree of usage.



With each secondary purchase, payment obligations are automatically transferred to the new purchaser.



Principal and interest payments are affected by the device itself. Special IoT wallets based on stable cryptocurrencies can be used for this purpose. In case of shortfall in payment, the device acts in a predefined way, e.g. puts itself out of action.



Smart contracts safeguard an automated execution of contractual arrangements without human intervention.



# IoT payment infrastructure

Key requirements



# Requirements

## Authentication

### Multi-Factor Authentication (MFA)

Payment regulations regularly require authentication by a minimum of two independent factors. State-of-the-art MFA procedures are regularly based on human interaction.



- IoT-related authentication must safeguard independancy of credentials within or in the context of each single device
- New standards are required for payment authentication without human intervention

### Secure device identification

IoT payment infrastructure components must safeguard, that device identification software, hardware and sensors cannot be separated in an unauthorised way.



Establishment of a secure administration shell as a inseparable respresentation of an IoT device (e.g. RAMI 4.0).



# Requirements

## Transaction security

### Transaction handling

Transactions must be stored, forwarded and chained in a way that data consistency and security is safeguarded also in any case of device or network failure



- Specific standards and protocols are required when payment functions are integrated in edge and fog computing environments.
- Transaction security may be facilitated using decentralised data storage principles such as Distributed Ledger Technologies (DLT).



### Transaction monitoring

Any transaction must be retrievable due to

- regulatory obligations and
- legal requirements for disputes handling also in distributed IoT networks.

# Requirements

## Transaction assignment

### Legal entities

Legally, IoT devices can not have rights and obligations and can not be the originator or beneficiary of a payment transaction.



- In a machine-to-machine payment transaction, the legal entities involved must be determined in a legally safe and unambiguous way.
- The legal entities involved may change before, after and during transactions as devices are sold, purchased, leased or integrated in other devices



DLT can keep the link between devices and legal entities up to date and ensure an unambiguous and inalterable identification at any time.





# Requirements

## Privacy and data security

### Security threads

Edge and fog computing networks offer a specific surface for security threads.



IT security standards for payment networks need to be expanded for IoT infrastructures.

### GDPR, PSD2, Privacy and electronic communication directive

Payment transaction data is protected by various European and national statutory provisions. The applicable legal framework depends on the role the data processor within the IoT network.



IoT applications including payment functionalities are regularly bound to much stricter privacy laws than "ordinary" industrial applications.



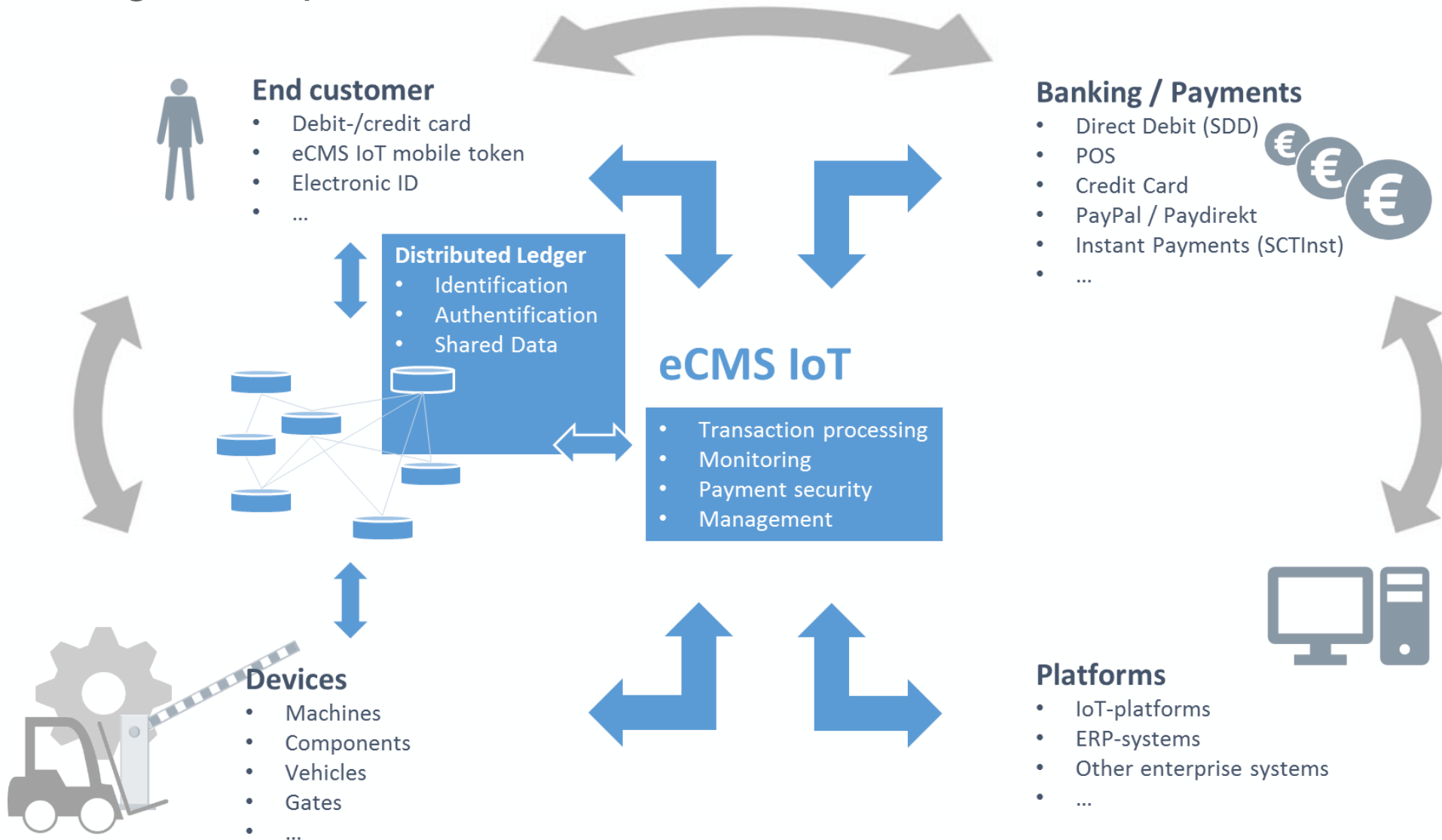
# DPS eCMS IoT Server

Basic concept



# eCMS IoT Server

High level product architecture





# Further Questions?

HELP SECURE  
PAYMENT DATA



Joachim Dorschel  
Managing Partner  
+49 177 6494202

[Joachim.Dorschel@dps.de](mailto:Joachim.Dorschel@dps.de)



Thomas Kanold  
Managing Director  
+49 174 332 46 72

[Thomas.Kanold@dps.de](mailto:Thomas.Kanold@dps.de)



Joachim Weber  
Sales Director  
+49 172 71163 76

[Joachim.Weber@dps.de](mailto:Joachim.Weber@dps.de)

# 2018 Europe Community Meeting

