Federal Ministry
for Economic Affairs
and Energy

Blockchain in Smart Mobility

U.S.-German Standards Panel 2018

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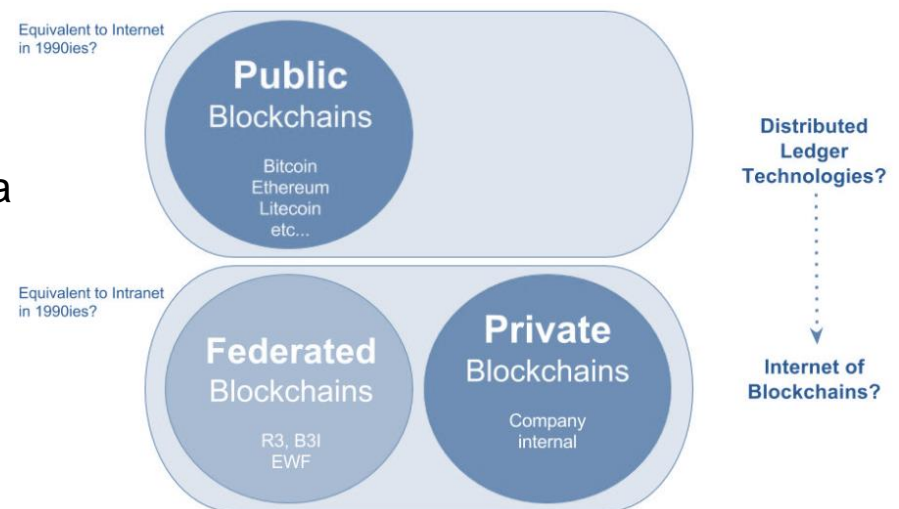
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Blockchain – The Opportunities

Blockchain is a technology for everyone who wants to spontaneously and straightforwardly form a group, build up and use infrastructure together (e.g. energy, parking spaces or vehicles).

Besides decentralization and transparency, efficiency in transaction costs is one of the foundations of success for applications based on Blockchain technology.

Blockchain/Distributed Ledger Technology will be used in the digitization of administration, an important application area will be the verification and approval of certificates, licenses, permissions (e.g. driving license).

Equivalent to Internet in 1990ies?

Public Blockchains

Bitcoin
Ethereum
Litecoin
etc...

Distributed Ledger Technologies?

Equivalent to Intranet in 1990ies?

Federated Blockchains

R3, B3I
EWF

Private Blockchains

Company internal

Internet of Blockchains?

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Trends in Smart Mobility

Autonomous vehicles can play an important role both in inner city traffic and on long distances (e.g. robotaxis, automated ridesharing).

Automated driving will further increase the requirements for short-term payment transactions. For efficiency gains in **traffic flow**, a kind of operating program for road traffic is necessary, which can be implemented by **micro-payment between vehicles**.

Passenger transport will in future be more characterized by **intermodality**. In conjunction with "sharing" models, in which the user no longer owns a means of transport, **new billing** and **access authorization mechanisms** are developed.

The **business models** of providers can consist both in the handling of mobility itself and in other concepts, e.g. the generation and resale of data or the handling of purchases during the use of the mobility offer.

Blockchain / DLT is particularly suitable for this.

Blockchain projects

SAMPL
Secure Additive Manufacturing Platform

Project partners and subcontractors

PROSTEP AG
(project coordinator)

NXP Semiconductors Germany GmbH

consider it GmbH

3D MicroPrint GmbH

University Hamburg

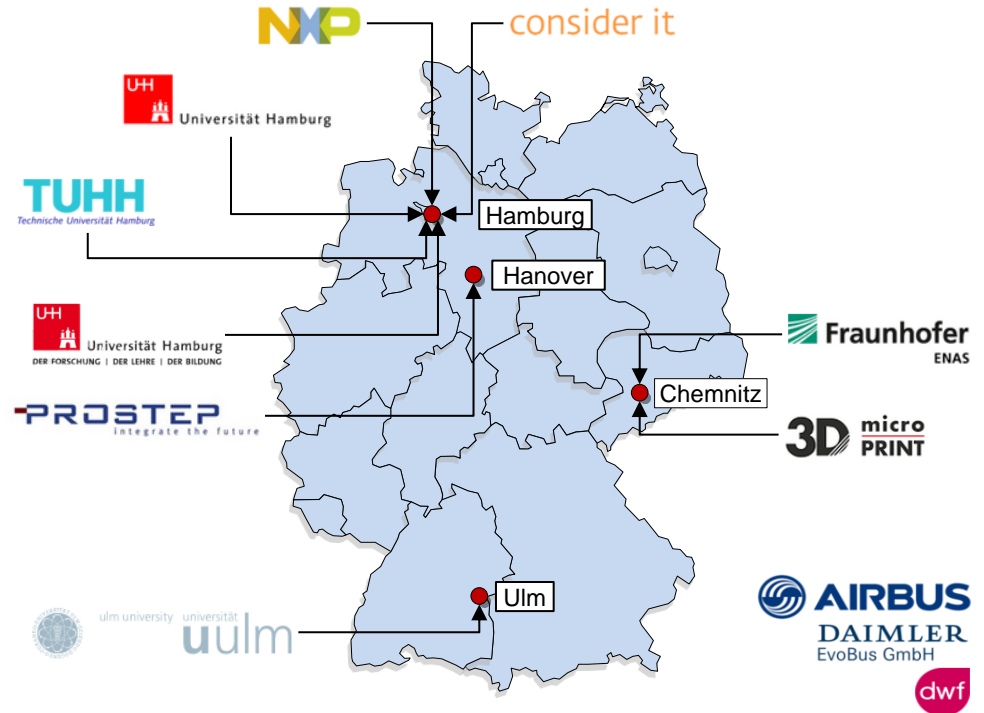**Technical University Hamburg-Harburg**

University Ulm

Fraunhofer-ENAS

Associated partners

Airbus Operations GmbH

EvoBus GmbH

Federal Ministry
of Economics
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SAMPL
Secure Additive Manufacturing Platform

Keywords
3D-Printing | Additive Manufacturing | RFID | Industry 4.0 | Blockchain Technology | Copy Protection | Copyright Protection | License Management | Chain of Trust | Secure Element

Duration
11/01/2016 - 10/31/2019 (36 months)

Research funding programme
Digital Technologies for Business (PAiCE);
Federal Ministry for Economic Affairs and Energy

Project coordination
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Objective
Within the project SAMPL a safety solution ("Chain of Trust") for additive manufacturing processes will be developed. The entire process from the creation of the digital 3D print data to the identification of the printed components using RFID chips is considered. In addition, digital license management based on blockchain technology will be integrated into PROSTEP AG's OpenDXM GlobalX data exchange solution for 3D data encryption.

With SAMPL it will be possible to secure printing processes with licensing and to distinguish between counterfeiting and illegal printing on the basis of the RFID components integrated in the printed objects.

Industries: Aerospace, Medical Technology, etc.

SAMPL
SECURE 3D PRINTING

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Pebbles
Peer-to-peer Energy Trading based on Blockchains

Project partners and subcontractors

Allgäuer Überlandwerk GmbH
(project coordinator)

Siemens AG

AllgäuNetz GmbH

**University of Applied Science Kempten,
Institute for Electrical Energy Systems (IEES)**

Fraunhofer FIT

SIEMENS

Fraunhofer
FIT

Kempten

Hochschule Kempten
University of Applied Sciences

AÜW

AllgäuNetz
Der Leitungsverbund

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Pebbles
Peer-to-peer Energy Trading based on Blockchains

Keywords
SmartGrid | System Integration | Renewable
Energies | Blockchain Technology, Peer-to-Peer
Trading | Smart Contract Configurator |
Smart Energy Community Platform

Duration
03/01/2018 - 02/28/2021 (36 months)

Research funding programme
Smart Service World II
Federal Ministry for Economic Affairs and Energy

Projekt coordination
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Homepage: www.auew.de

Objective
The aim is to develop a platform for point-to-point (P2P) trade
(neighborhood electrical current) and digital services for the
realization of new business models in regional energy supply areas.
The focus here is increasingly on regional implementation,
strengthening consumer rights, exploiting economic cost-cutting
potential and increasing acceptance of the energy transition.

A demonstrator in the distribution network area of the AllgäuNetz is
under technical and regulatory investigation.

pebbles

BIoGPV

Blockchain-based virtual Large-scale Storage for Photovoltaic System Operators

Project partners and subcontractors

Discovergy GmbH
(project coordinator; SME, technology provider)
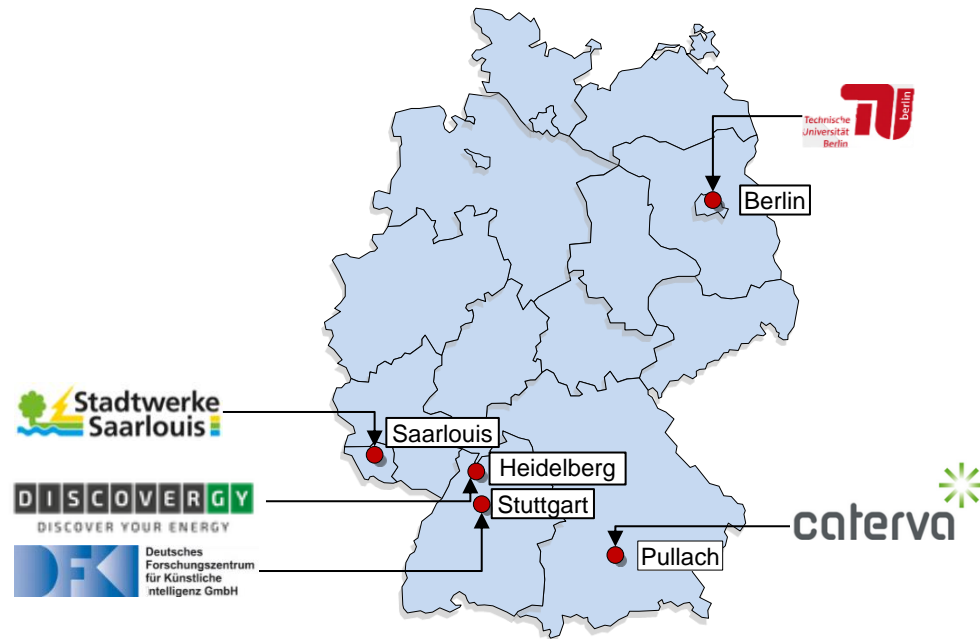
Caterva GmbH
(technology provider)

DFKI GmbH
(research centre)

Stadtwerke Saarlouis
(application partner)

Technical University Berlin

Federal Ministry
of Economics
and Energy

BloGPV
Blockchain-based virtual Large-scale Storage for Photovoltaic System Operators

Keywords
System Integration Renewable Energies |
Smartgrid | Blockchain Technology | Energy
Storage | Decentralised PV Battery Systems |
Value-added Services for Forecasts on
Electricity Consumption | Power Generation from
PV Systems | Price Development and Grid State

Duration
01/01/2018 - 12/31/2021 (36 months)

Research funding programme
Smart Service World II
Federal Ministry for Economic Affairs and Energy

Project coordination
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Objective
BloGPV is about the development of a virtual storage network for
photovoltaic (PV) system operators. With the help of existing platform
technologies, small home storage systems are combined to form a
virtual large-scale storage facility that optimises the power flows
between the participants and stabilises the network. This should
make the operation of the PV systems economical even without EEG
feed-in remuneration. The pilot is being carried out with energy
producers in the region of Hanover.

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SMECS
Smart Energy Communities

Project partners and subcontractors

CIS Solutions GmbH
(project coordinator; Smart IoT Platform, Smart Services, forecasts)

Energiearchitekten Chiemgau
(regional energy products, balancing group management, Smart Meter, cooperation with network operators)

Energieforen Leipzig GmbH
(knowledge transfer and networking, initial situation, requirements analysis)

CAS Software AG
(CRM-platform/service provider, customer portals, business models)

Fraunhofer IAO
(research partner; requirements analysis, IoT, data analysis, forecasting and optimization, business models)
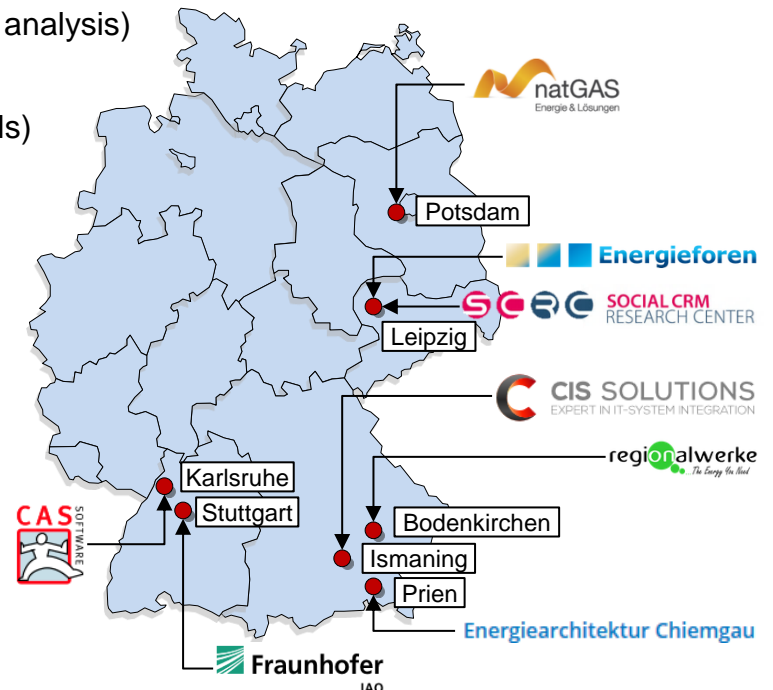
University Leipzig/Social CRM Research Center
(research partner; cooperative CRM, community management, blockchain, sustainability, data analysis -and modeling)

regionalwerke GmbH&Co.KG
(users and potential platform providers)

natGas AG
(balancing group management, connection of facilities)

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SMECS
Smart Energy Communities

Keywords
SmartGrid | System Integration of Small and Medium-Sized Energy Producers | Blockchain Technology | Direct Marketing (EEG2014/2017) | Processes for Market and Network Integration | Optimization Mechanisms Including Forecasts | Smart Contracts

Duration
02/2018 - 02/2020 (24 months)

Research funding programme
Smart Service World II
Federal Ministry for Economic Affairs and Energy

Project coordination
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Objective
SMECS researches innovative forms of cooperation between regionally active electricity producers. The focus is on small energy producers and cooperatives.

Targets are
  a. the development of a marketing and management process for smart energy communities and
  b. a cloud and data-based platform to support cooperation and customer processes.

This is intended to prepare energy trading for upcoming market changes, including direct marketing and the new changes in energy law. The pilot project is taking place with energy producers in the Chiemgau region and the Energy Producers Association of Eastern Bavaria.

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Charge4c
Civic Platform for Intelligent Charging of Electric Vehicles

Project partners and subcontractors

Ampido GmbH
(lead management, SME, technology enterprise)

bridgingIT GmbH
(consulting)

DFKI GmbH
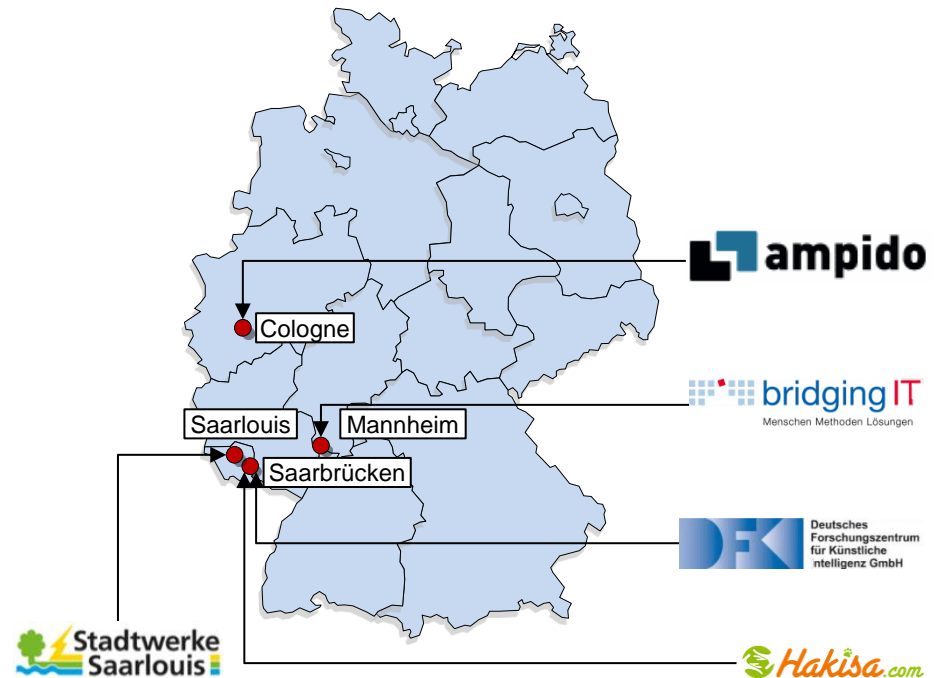(research center)

Hakisa GmbH
(SME, technology enterprise)

Stadtwerke Saarlouis GmbH
(application partner)

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Charge4c
Civic Platform for Intelligent Charging of Electric Vehicles

Keywords

Electric Vehicles | Parking and Charging | Blockchain Technology | Load Management for Renewable Energies | Machine Learning | Methods for Forecasting Supply and Consumption | Dynamic Pricing of Charging Processes and Parking

Duration

01/01/2018 - 12/31/2021 (36 months)

Research funding programme

ICT for Electric Mobility
Federal Ministry for Economic Affairs and Energy

Project coordination

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Objective

The goal of Charge4C is the creation of an innovative sharing platform, which enables a dynamic pricing of parking and charging and can organize communities and corresponding services around charging points in the private and public sector. As a result, citizens are increasingly involved in the development of the charging infrastructure, network utilization is optimized and peak loads are avoided. The services offered in the area of e-mobility, the electricity price and the price for parking can vary at charging points, depending on the current electricity supply and location. The owners of the areas on which charging stations are erected participate in the revenues. Each column is equipped with sensors so that the digital control platform not only determines the service price but also records its specific charging profile.

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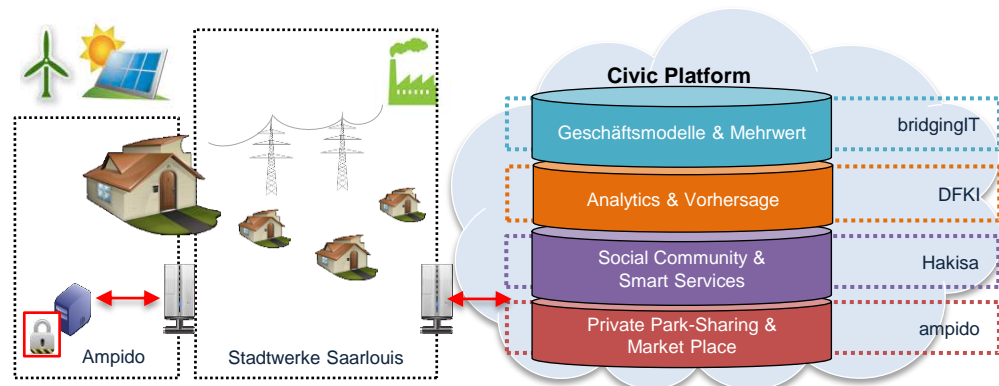
ISÆN

Individual perSonal data Auditable addrEss Number

Project partners of the study

FZI Forschungszentrum Informatik
(Smart Data accompanying research)

Fraunhofer IESE

ITSO GmbH

BBW-Hochschule

Peter Schaar, Chairman of
the European Academy for
Freedom of Information
and Data Protection

Implementation

ævatar®.COOP
http://aevatar.com/

All of Me, Privately

Identity Management for travelers: Aevatar-Implementation on base of ISÆN
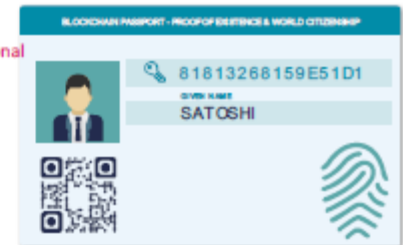
source: David Robert, Paris, 2016

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ISÆN
Individual perSonal data Auditable addrEss Number

Keywords
Blockchain Technology | Identity Management |
GDPR | Travel documents

Standardization
CEN Workshop 84 on a Self-Sovereign
Identifier(s) for Personal Data Ownership
and Usage Control (CEN WS ISÆN)
*Initiated by Voyages-SNCF – Groupe SNCF (FR)
et al.*
https://www.cen.eu/work/areas/ICT/Pages/WS-
IS%C3%86N.aspx

Research funding programme
Smart Data – Innovations from Data; Federal
Ministry for Economic Affairs and Energy

Study coordination
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Homepage: http://smart-data-programm.de

Objective
ISÆN (Individual perSonal data Auditable addrEss Number) is a
French standardization initiative for identity management that is
based on blockchain technology. ISÆN is designed to help internet
users have better control of their personal data.

The ISÆN initiative is developing a data protection technology that
will allow internet users to have their identity authenticated online,
and to provide reliable proof of their identity on the internet. The
technology also gives users the possibility to actively specify and
control who is allowed to use their personal data and also to

withdraw consent from these entities if necessary.

This method has been studied as part of the Federal Ministry's
accompanying research programme on Smart Data. The study can
be found online at:

http://www.digitaletechnologien.de/DT/Redaktion/DE/Downloads/
Publikation/smartdata_studie_isaen.html.

Smart Data

Sicheres Identitätsmanagement im Internet

Eine Analyse des ISÆN-Konzepts (Individual perSonal data
Auditable addrEss) durch die Smart-Data-Begleitforschung im
Auftrag des Bundesministeriums für Wirtschaft und Energie

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Current News

Daimler & BMW: long-lasting Competition, new Cooperation

"At Daimler and BMW, we believe it's time to offer our customers a truly comprehensive mobility offering

– without more apps, more passwords and more log-ins.

We believe in variable and seamless solutions that bring together everything related to mobility:

from car sharing and ride railing to parking and charging electric vehicles.

Many of these plans require not only a new view of our own business,

but also new partnerships with others."

– Dieter Zetsche: Chairman of the Board of Management of Daimler AG

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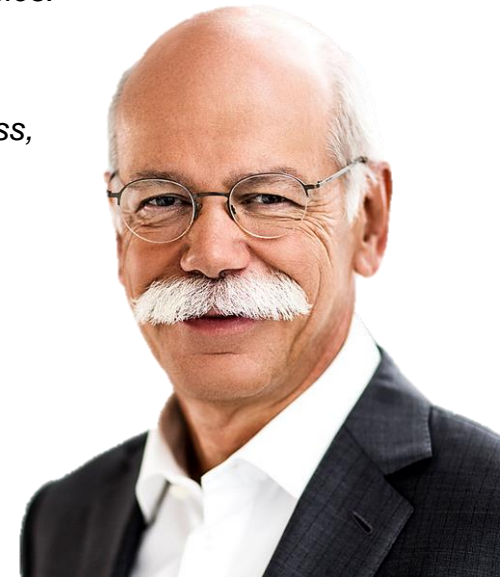
Daimler & BMW: New Mobility offerings

Joint car sharing with car2go and DriveNow:

Customers will have access to a total of 20.000 vehicles in 31 metropolitan areas around the globe.

Joint mobility as needed: ReachNow and moovel as mobility platforms will offer customers access to different modes of transport.

Joint driver services: mytaxi, Chauffeur Privé, Clevertaxi and Taxibeat will together create the largest taxi service in the world and thus help to reduce individual traffic in the cities.

Comfortable parking: Parkmobile and ParkNow will help customers find a parking space and offer ticket and cashless payment.

Customer-friendly charging solutions for electric vehicles:

ChargeNow and Digital Charging Solutions will together provide an attractive network of more than 143.000 publicly accessible power connections.

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Conclusions

Mobility will change, away from ownership based models towards service models

Blockchain/DLT is the right technology to support this trend

Even in a decentralized platform economy, stakeholders need to get on the train to make technology successful

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Conclusions

Blockchain/DLT alone will not completely solve the IT security problems. Questions regarding the security design of DLT are the subject of the work of the cyber security authorities such as BSI.

When designing Blockchains, safety aspects and technical standards must be taken into account at an early stage. Uniform safety levels for Blockchains must be defined and enforced in the medium and long term.

We need interoperability standards between different Blockchains to ensure technological openness.

Development and testing of DLT must be carried out
before a maybe too early regulation.

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Society, Innovation, Technology

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Thank you for your attention!
More info and examples:

Development of digital
technologies

Digitisation – the future of our economy

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