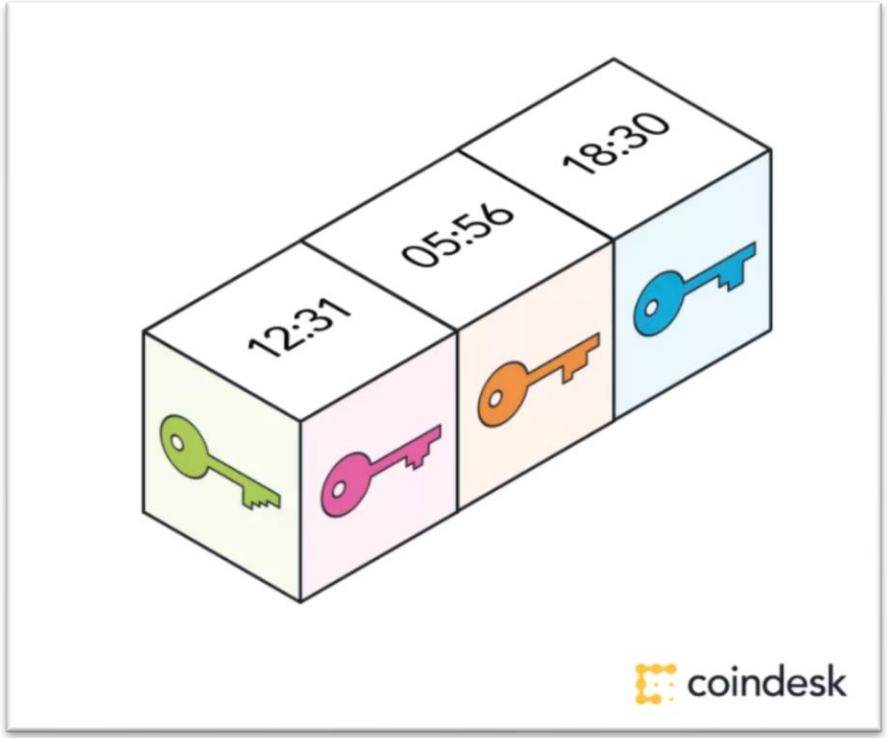
Blockchain Take the Wheel:

Potential Applications for Blockchain in the Automotive Industry

April 13, 2021 – Blockchain @ Butzel

Refresher on Blockchain

- Immutable electronic ledger
- Block = A group of records
- Blockchain = A string of blocks
- Basic Characteristics:
  - Permanent
  - Secure and tamper resistant
  - Public or private



Source: Coindesk, *What is Blockchain Technology?* (Mar. 9, 2017)

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AUTOMOTIVE BLOCKCHAIN: THE SCOPE OF THE OPPORTUNITY

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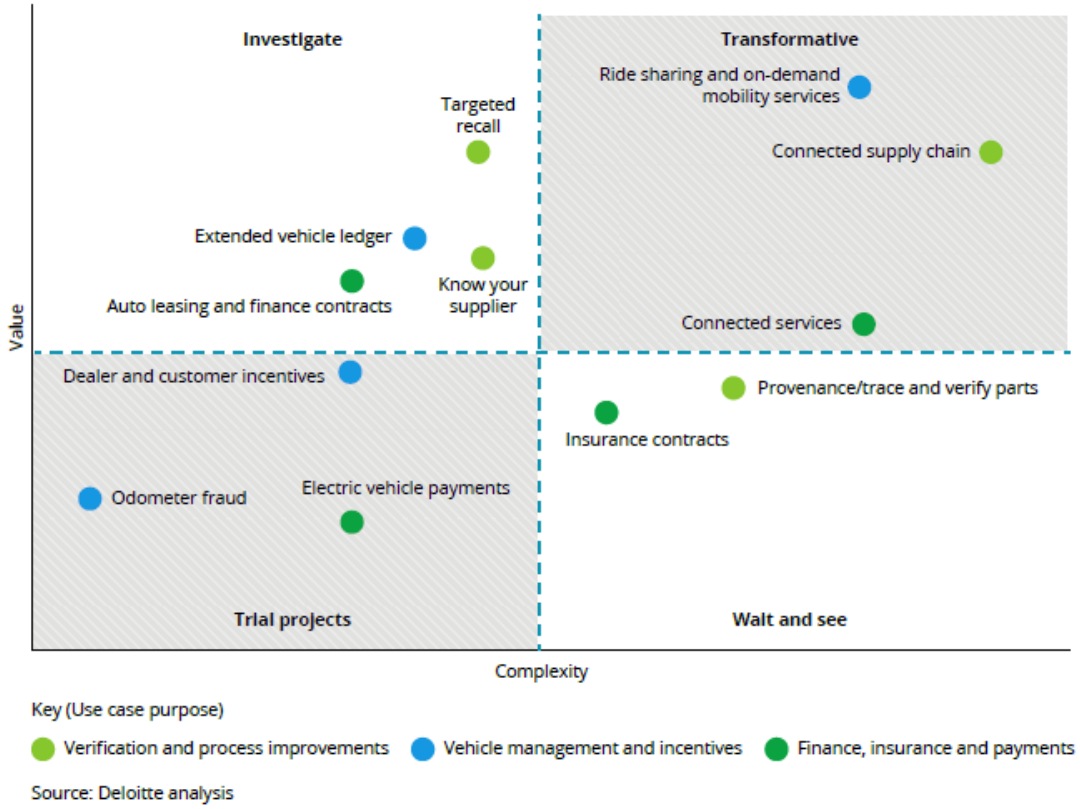
Potential Consumer Oriented Use Cases

- Secure in-vehicle payment
- Mobility as a Service (MaaS): Ridesharing and vehicle sharing
- Protection of personal data and information
- Auto insurance pricing and delivery



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Potential Supply Chain Oriented Use Cases

- Protection against the insertion of counterfeit components
- Managing vehicle safety defects and warranty concerns
- Payment and PO completion at stages in manufacturing
- Comprehensive protections for autonomous vehicle systems
- Fleet location and condition management

Heat Map: Blockchain Startups Transforming the Automotive Industry

January 2019

This Heat Map illustrates the geographical distribution of over 250 Blockchain startups disrupting the automotive industry.

startUS INSIGHTS

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Current Disclosed Projects and Partnerships

- **Amo**: A blockchain **platform connecting cars, people and service providers** through an integrated database. With just a click, users can monetize their weekend drives or other trips.
- **Autoblock**: Gives users a new **way to buy and sell cars via its ecosystem** built on the blockchain.
- **Axt**: A **single solution for dealers and lenders** through which a more robust vehicle history report is created and being offered to consumers at a fraction of the cost.
- **BigChainDB** – Develops an ownership transfer service called CarPass in an effort to **centralize all information about a vehicle to fight fraud**. The pass includes title, service providers, prior damage, maintenance, and inspection history.
- **carVertical** – A startup working on a blockchain-based solution **solving the problem of nonexisting transparency about car usage histories**.
- **DAV** – Develops a blockchain-based transportation protocol **enabling a decentralized, peer-to-peer transportation network**.
- **GEM** – Creates a personalized experience where customers are **charged based not only on distance but driving behavior**, time of day, geolocation, etc.
- **Loyyal** – Leverages blockchain and smart contract technology to **provide loyalty and rewards network infrastructure solutions**.
- **One Car Payment** – Develops a blockchain driven algorithm that helps consumers save money on the long-term costs of owning a vehicle by **providing a payment service that combines all vehicle payments into one single monthly fee**.
- **VLB** – Provides a range of services for producers and distributors of spare parts, insurance companies, as well as fleet management companies. Among these, VLB increases the transparency of spare parts, handles claim management efficiently, and **reduces costs for vehicle maintenance and repairs**.

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USE CASE 1: SUPPLY CHAIN MANAGEMENT

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Minimizing Supply Chain Challenges

- Enhanced traceability
- Store data from bills of lading through quality inspection for components and complete vehicle assemblies
- Minimizes execution errors including inventory data, missing shipments and duplicate payment
- Relieves coordination problems between partners including financing, contracting and international transactions

Existing Project: Logistics Management

- IBM, Mercedes-Benz, Koopman Logistics Group
- Project will build a part tracking system for component delivery
- Approach: Establish where components are, quantities, base information on performance requirements, and international crossings.

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USE CASE 2: DIGITAL DATA PASSPORT

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DATA and the CONNECTED CAR

Version 1.0

Today's connected technologies are making transportation safer and more convenient. Many new features are enabled by the collection and processing of data. Cars are becoming part of a trusted mobile ecosystem that ensures data flows between a network of carmakers, vendors and others to support individuals' safety, logistics, infotainment, and security needs. This visual represents devices that may be employed in today's connected cars; no single vehicle will have all of these features, but most new vehicles have some. Much connected car data is protected by technical controls, laws, self-regulatory commitments, privacy policies, and other emerging mechanisms or controls.

Produced by FUTURE OF PRIVACY FORUM
FPF.ORG

DATA RECEIVERS

A growing number of entities receive and transmit data through the connected vehicle ecosystem

OTHER CAR (V2V)

TRAFFIC LIGHT (V2I) & LICENSE PLATE READER

CAR MAKER

THIRD PARTIES

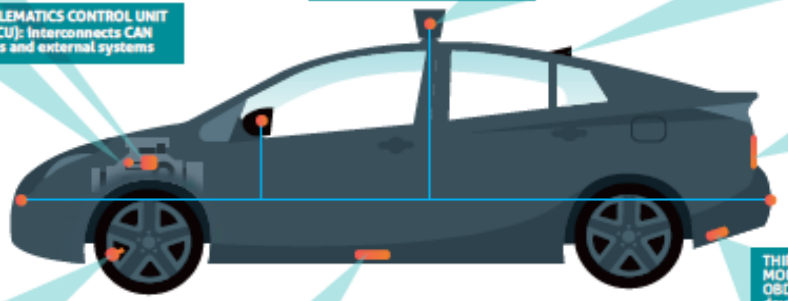
TOLL BOOTH

EMERGENCY SERVICES

SATELLITE

WIRELESS CONNECTIVITY

- CELLULAR
- NON-CELLULAR
  - BLUETOOTH
  - WIFI
  - DSRC RADIO
  - SATELLITE/GPS
  - SHORT RANGE RADIO
  - SHORT RANGE RADAR



CAN-BUS: Internal communication bridge between Electronic Control Units

AUTONOMOUS VEHICLE IMAGING AND SCANNING: LIDAR, radar, ultrasonic sensors, or exterior cameras

DSRC RADIO: vehicle to vehicle and vehicle to infrastructure communication

TELEMATICS CONTROL UNIT (TCU): Interconnects CAN Bus and external systems

License Plate

THIRD PARTY MONITORING DEVICE: OBD-II or external device communicates with fleet operator

TIRE PRESSURE SENSORS: short range radio, goes to radio receiver

EVENT DATA RECORDER: black box with accident data

CRASH DATA RETRIEVAL UNIT: extracts EDR data

RFID VEHICLE TAG: enables short-range tracking

ELECTRONIC TOLL COLLECTION SYSTEM: transponder sends ID via radio

CABIN MONITORING SYSTEM: e.g. monitors eye movement to measure attention

VEHICLE SERVICES: Links to, e.g., roadside assistance and preventative maintenance reminders

GPS UNIT: uses satellite to inform location, navigation

VIN NUMBER: long-used unique vehicle identifier

OBD-II PLUGIN: pulls data from port, or generates own location or movement data

OBD-II PORT: interface to driving and operational data

TOUCH SENSORS: detects driver fatigue through grip, pulse

SIM CARD: connectivity point for transmitting onboard information

WIFI NETWORK: enables in-car internet access

INFOTAINMENT SYSTEM: access entertainment and navigation apps

USB PLUG-IN: connects via USB port for power or data transfer

PHONE- PROJECTING SOFTWARE: mirrors apps from smartphone

SMART PHONE: connects to car via Bluetooth, WI-FI or USB

KEY FOB: supports keyless entry

TYPES OF DATA

VEHICLE & SAFETY functioning of vehicle, including maintenance status, mileage, and operations

DRIVER driver physical characteristics or how a person drives a vehicle: i.e. speed, seat belt use, braking habits

LOCATION precise geographic location of a vehicle

ACCOUNT personal accounts established by vehicle owner

Vehicle User Data Passport

- Gives a vehicle owner the ability to access the history of their vehicle
- BMW's VerifyCar allows access to odometers, tachographs, replacement and repair status, and accident information
- Renault's Car Passport allows access to all information upon the sale of a vehicle

Vehicle Data Passport

- Protect data sent and received from telematics systems including software-based navigation, V2V communications
- Store data in a more secure, crypographically protected manner that cannot be reverse engineered

Existing Project: Synthetic Identity Fraud

- General Motors, Spring Labs
- $15 million has been raised to fund the project, and it is currently in development. There is no word yet on when it will be ready to be deployed.
- Approach: Attack the aggregation of multiple identities that are combined to create a fake loan applicant.

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USE CASE 3: RECALL AND WARRANTY MANAGEMENT

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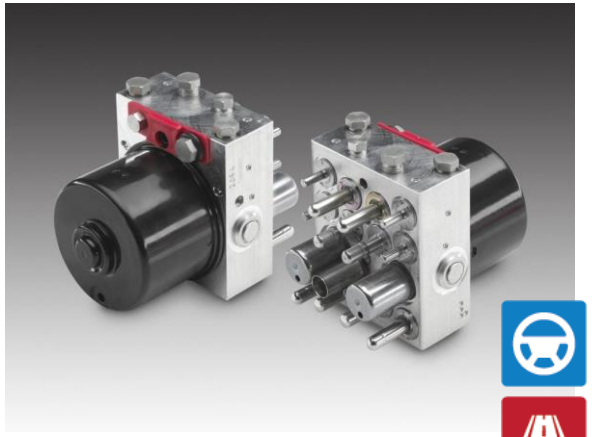
Spinach and Air Bags



NHTSA
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

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Drilling Down to the Details

- Allow manufacturers to identify each unique component
- Traceability for individual VIN numbers down to the individual impacted component
- Verify which components have been replaced and if future recalls are required, authenticate components in vehicles
- 3GT / Conflict Mineral compliance (BMW project)
- Addressing the $45B counterfeit part problem
- Target responses to reduce costs in the $22B recall area

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QUESTIONS AND ANSWERS

THANK YOU

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