BeeZero

Hydrogen powered mobility by *Linde*

Carsharing in 100 days

Approaches, Honeypots, Learnings & Wins

Munich, July 26th 2017

Todays Agenda

- BeeZero Facts

- (Technical) Project Setup & Learnings

- Development Organisation

- (Technical) Challenges

- After Relaunch - 1st Birthday

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BeeZero Facts

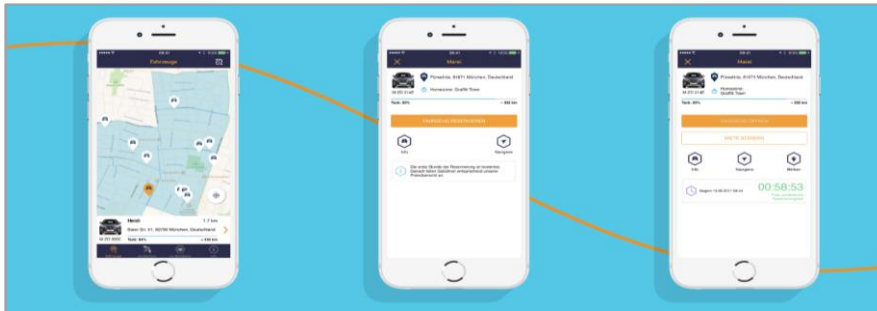# BeeZero
Meet the new form of sustainable mobility

50 Hyundai ix35 Fuel Cell
Zero emission driving with > 400 km
range and fast refueling

Zone-based car sharing (A-B-A-Trips)
Pick up your car in its home zone, drive
and return it to its zone

Mid/Long-range uses cases
Drive to the mountains or go shopping –
Use the high range of the fuel cell

Flexible booking – Best Price Guarantee
Spontaneous - 1h reservation free
No bookings of packages in advance

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Motivation & Goal

- **Create awareness and** bring "H2-as-fuel" closer to the customer

- Demonstrate **Linde's belief in the technology**

- **Leverage learning experience** for future Hydrogen projects

- Position Linde as **innovative company** – internally and externally

- Show demo case for **fast entrepreneurial business building**

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2 Project Setup & Learnings

BUY, PARTNER, MAKE

- Allow **Focus** on business development

- **Feature Set: Relation** between Backend Features, White-Label-Features, New-Features

- **How much control** is needed?

- **Time 2 Market:** 125 Business Days

- **Full-Service-Provider vs. Full-Service-Integration**

- **Deliverability** in fields of development and operations (bridge dev and ops)

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White-Label and Extend Existing Station Based System
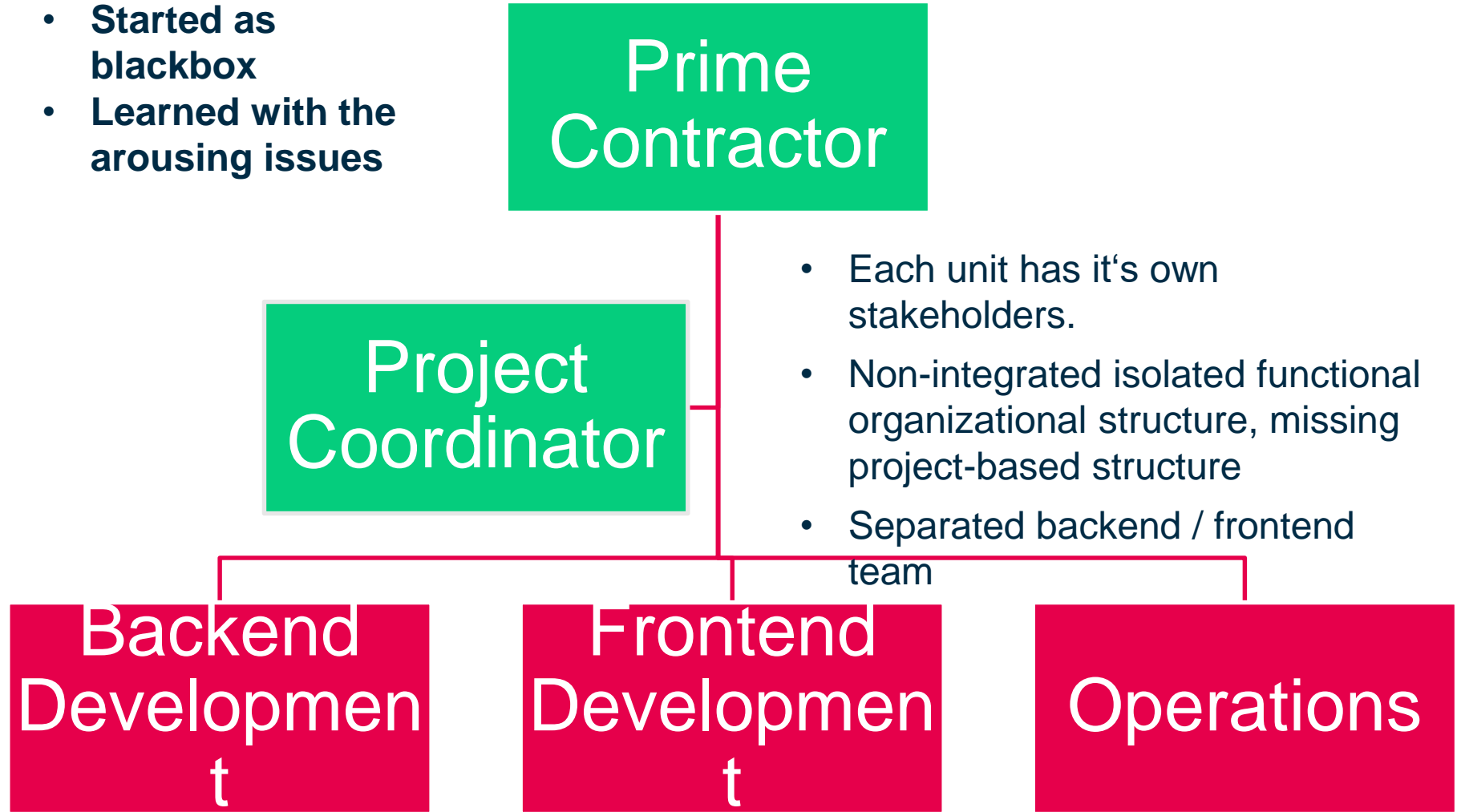*Get, set, stumbel, fall, wait for the doctor*

- Implementation Timeline: 6 month with MVP, Go-Live after 7 ½ month with MVP-Pain

- 10 month: Sever impact on business development

- 11 month: Business development blocked, Service degredaded

- 12 month ff: Incident peak, business critical service degredation

What happened?

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What happened – (External) Organisation

- **Started as blackbox**
- **Learned with the arousing issues**

```
            Prime
          Contractor
               │
    Project     │
  Coordinator───┤
               │
  ┌────────────┼────────────────┐
Backend     Frontend         Operations
Development Development
```

- Each unit has it's own stakeholders.

- Non-integrated isolated functional organizational structure, missing project-based structure

- Separated backend / frontend team

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What happened – Process Model

Backend: Product

Waterfall (per customer): Conflicting interests of customer driven business development and product strategy. Advanced in his life cycle. No timelines per feature. Resource pooling.
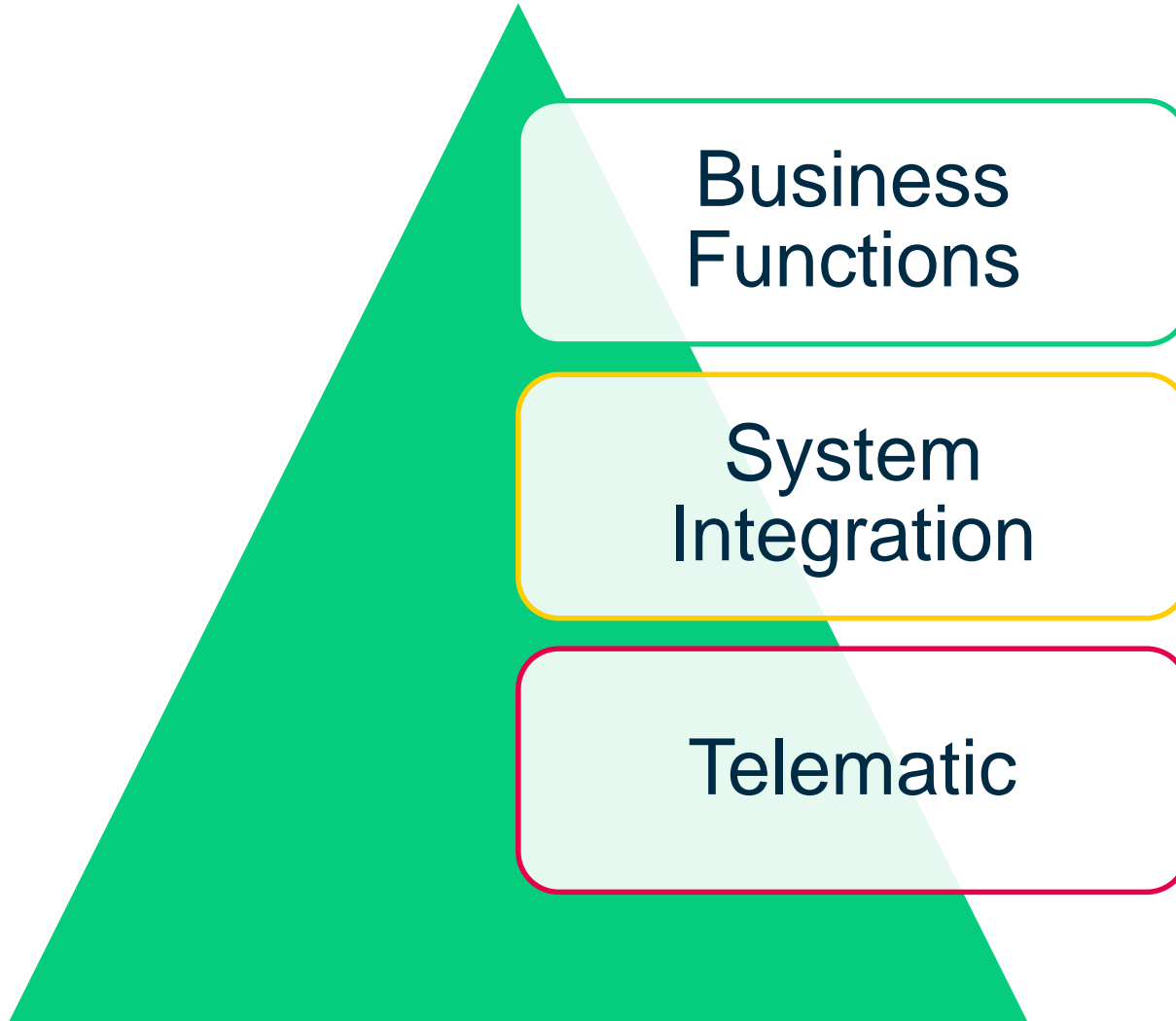
Frontend

Scrum, actually Kanban: Unable to deliver continuous results, since blocked through missing deliveries backend.

Business

Feature Driven Development: Enormous amount of ideas and feature requirements. Blocked, unable to give feedback

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What happened – Technical

Business Functions

System Integration

Telematic

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Issues with Telematic

- There is only one **final resistor :)**

- **Frozen GPS:** Lost, fix, dead, cold reboot

- **Frozen car data:** 1834km/h -> supersonic speed with zero emission

- **GPS Quality:** Fixing Behaviour, Sources, Filter Mechanism, Evaluating Strategy, Reliability

- **GPS Processing:** The issue with cheap receivers and 4 decimals

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GPS issues with four decimals

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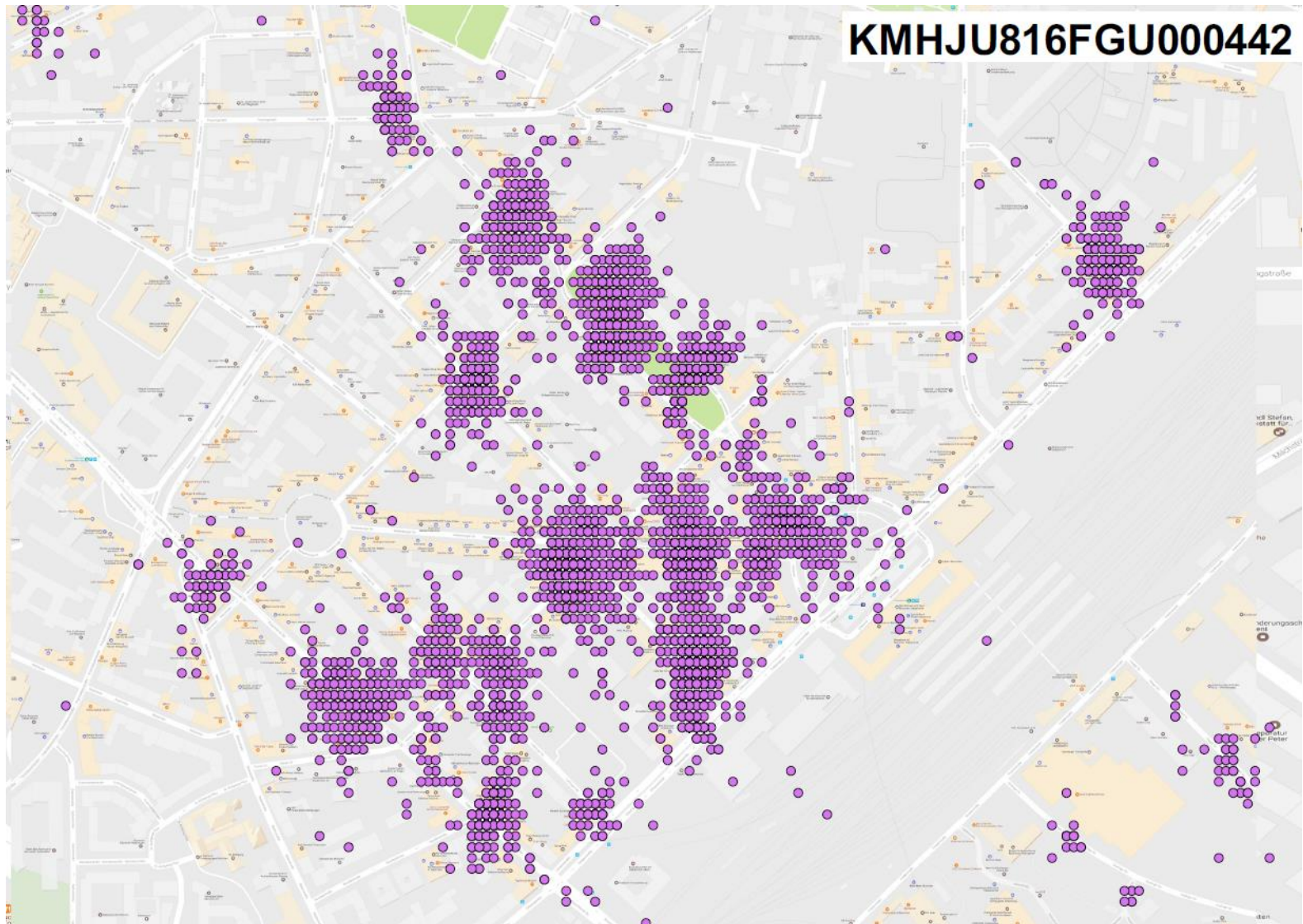
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Development

Organisation

Challenge / New Team Goals / New Project

- We want to be in **full control / ownership** of our system

- **Rebuild** existing function scope for backend and all frontend systems (from scratch)

- Enhance user experience and create a **reliable** service for our customers (replace telematic)

- **Integrate** Gamification und Fleet Management originally developed as addition for former system.

- **Migrate** all existing data

- **Zero-Downtime**, please!

- You have got **100 days**!

- ## Challenge Accepted.

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Organisation – Business – Ops- PO

Business Owner

Product Manager

UX   PO / BA

Tech Expert

IT Ops Coordinator

Customer Care

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Organisation – Business – Ops- PO

Monthly: Priorities
Daily: Stand-Ups

Business Owner

Product
Manager

IT Ops
Coordinator

Customer Care

UX   PO / BA

Tech Expert

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Organisation – Business – Ops- PO

Weekly

Business Owner

Product Manager

IT Ops Coordinator

Customer Care

UX

PO / BA

Tech Expert

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Organisation – Business – Ops- PO

Business Ow...

Product
Manager

UX   PO / BA

Tech Expert

every 6 weeks
2-3 day workshop

IT Ops
Coordinator

Customer Care

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Organisation – Business – Ops- PO

Business Ow...

Product Manager

IT Ops Coordinator

weekly

UX

PO / BA

Tech Expert

Customer Care

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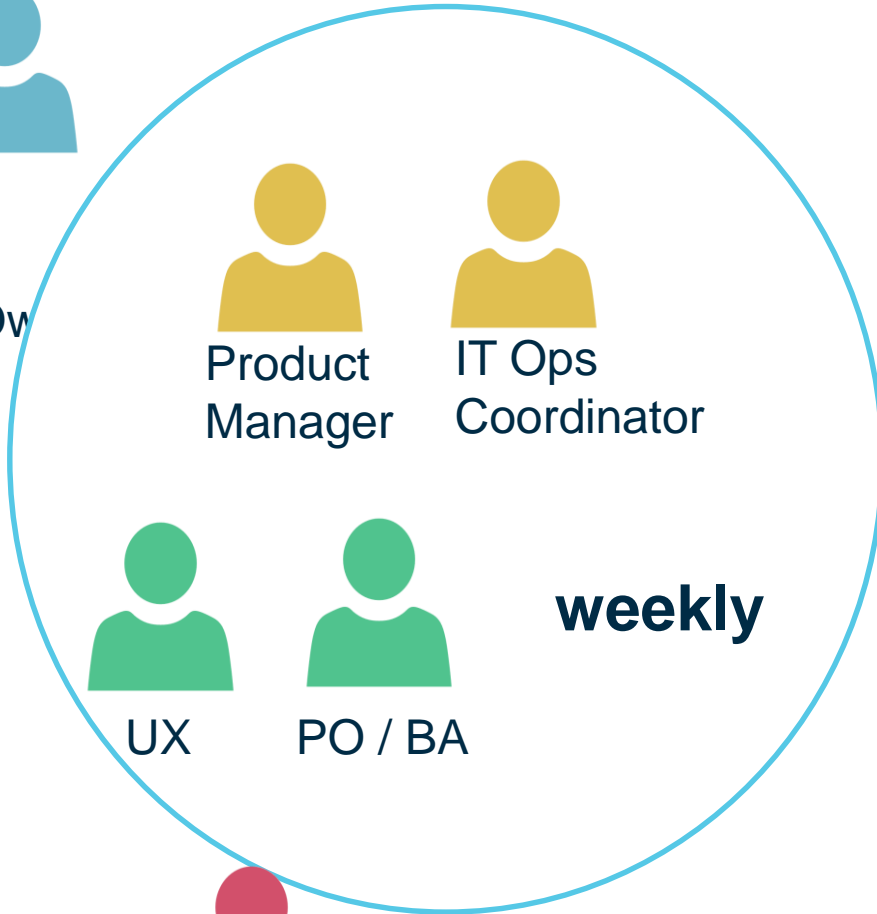
Organisation - Development

Kanban: Web

**2 week sprints
With CI**

Product Manager

UX
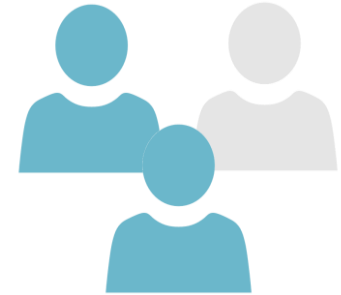
PO / BA

SCRUM Master 1

SCRUM Team 1

Tech Expert

Tech Expert

SCRUM Master 2

SCRUM Team 2

Kanban: Mobile

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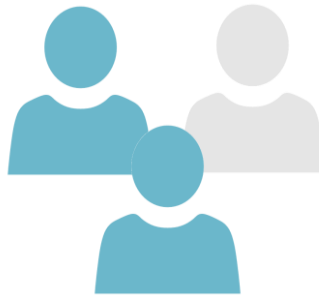
Key Achievements in Organisation Setup

- Successfully applied **process model cross-company**

- **Committing to agile methodology** even on business-side

- Process for **continuous backlog refinement** incl. stakeholders and business owners

- **Balanced key persons** – resource-wise - between IT development and IT operations

- Created legal frame to support **agile software development in budget driven environment**

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How to get entrepreneurial thinking (into Linde)

**What's need to found
a startup (within
Linde)?**

- ✓ **Dedicated team and budget**

- ✓ **Sponsor (group) with passion to support**

- ✓ **Start-up mindset/freedom to act**

- ✓ **Buy-in from support functions to ensure speed**

- ✓ **Prioritization**
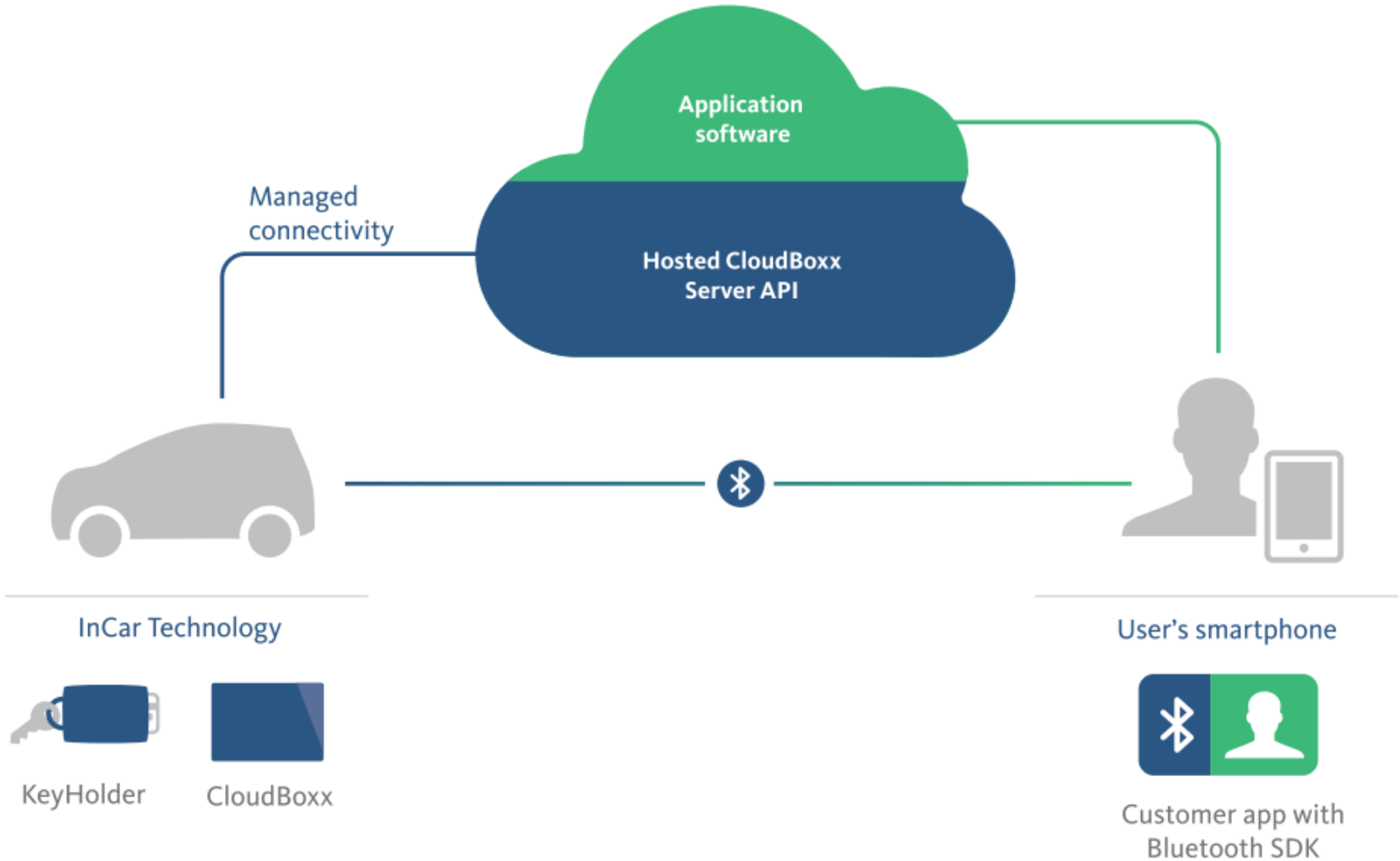
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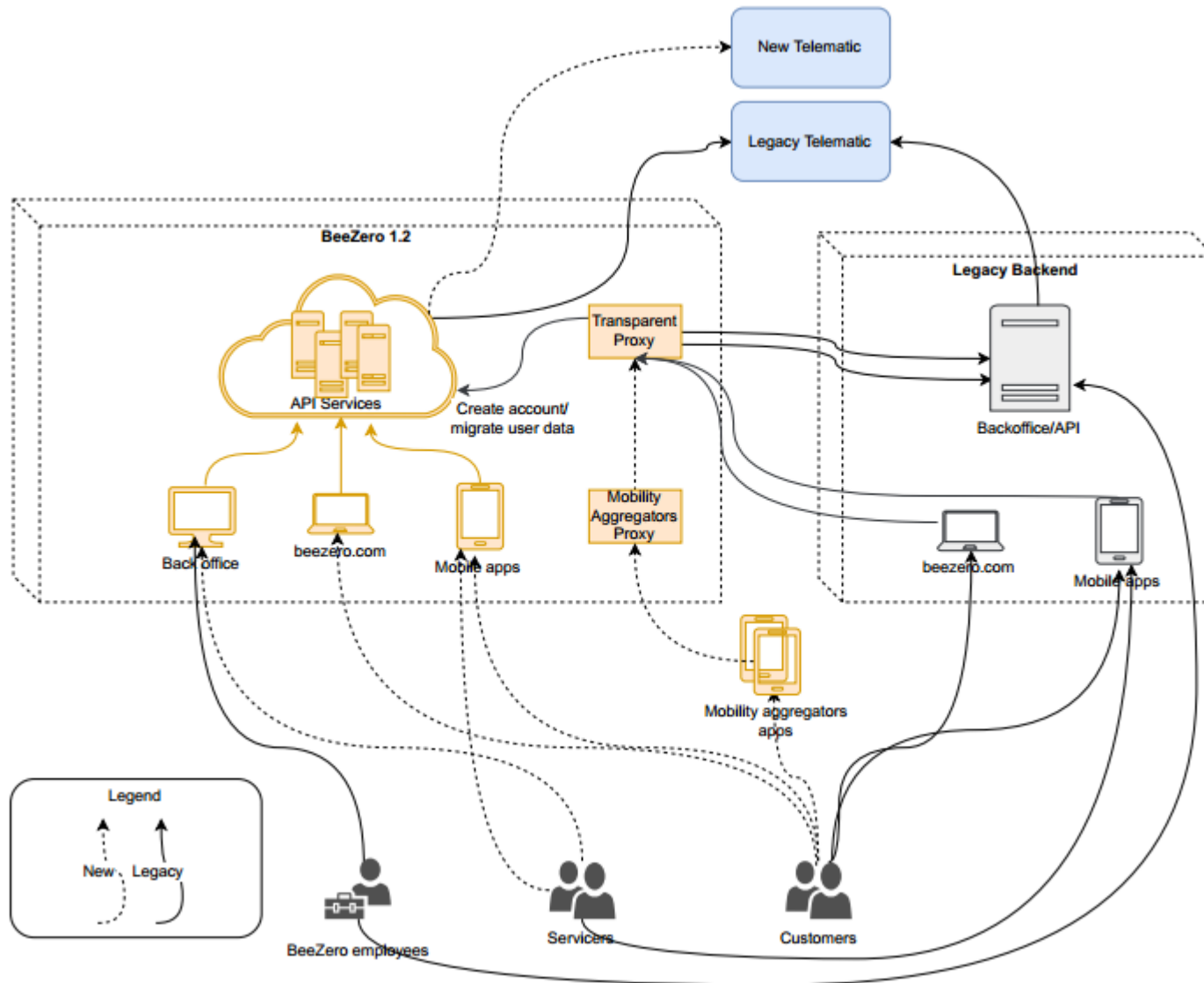
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Challenges: Technical

Some technical challenges

- Reliable Mobile-to-Machine-Communication

- Multi-Channel-Data-Stream: Accuracy of GPS sources, Timing of Data Propagation

- Travel-Salesman-Problem / Vehicle Routing with Time Windows

- Stability of Booking Functionality: Convenient User Experience

- Power Consumption / Battery Monitoring

- Address Resolution

- Customer Data Quality

- Data Privacy: Fulfill compliance to "Datenschutzgrundverordnung" / BDSG.

- Zero-Downtime-Switch-Over

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Telematic Integration

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Zero-Downtime Switch-Over

Key achievements

- Customer facing incident rate dropped by 99% in first month in fields of GPS / telematic although utilization rate increased by factors

- Process cost for car servicing dropped by 50-60%

- Car-blocking-times were reduced from hours to 20mins in average

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Our 1st birthday
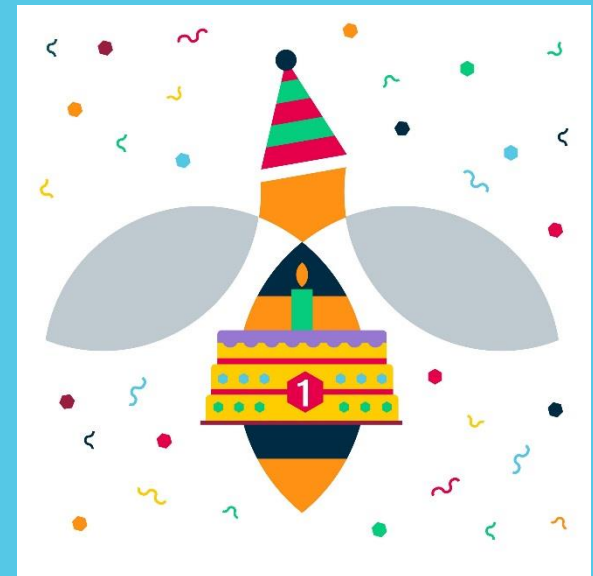
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Lighthouse story after less than one year in operation
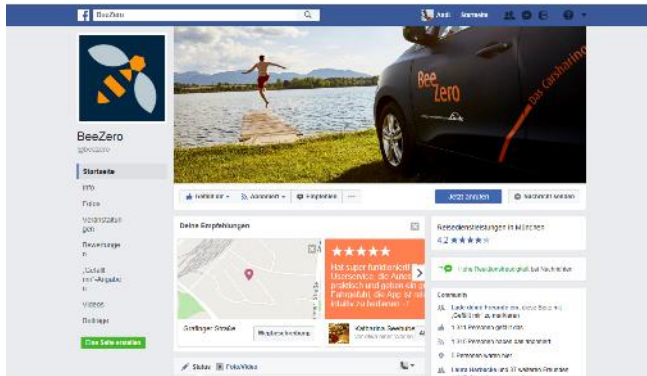
BeeZero achievements so far

- The **world's first hydrogen carsharing** launched in Summer 2016 – only one year after project idea

- **>3.000 registered customers**, utilization in line/ above business case

- **USP:** Zero emission carsharing for longer trips

- **High visibility** in politics and media, **Greentech Awards top 3**

- **Recognizable brand** and **proprietary IT systems** developed

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A customer facing brand and movement
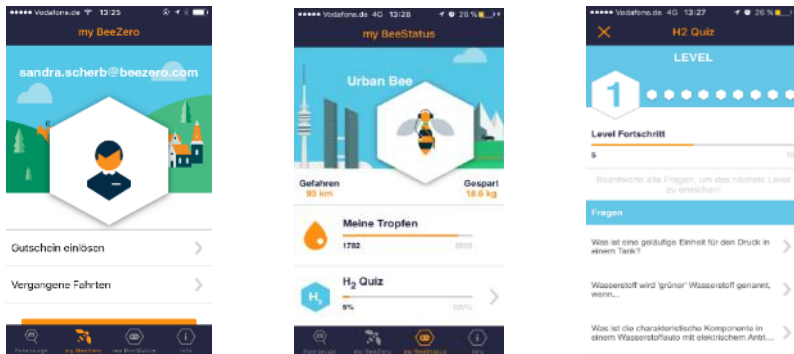
BeeZero Community
Community with >3.000 users
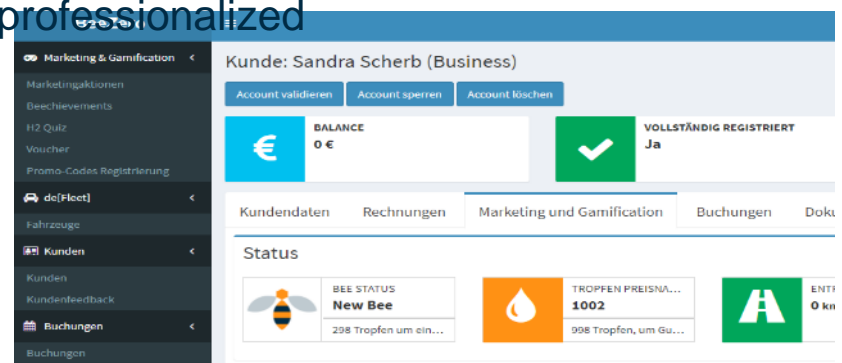

BeeZero Website
Entry point for new customers

Unique BeeZero App & Gamification
Collect drops and gain" beechievements"

Own BeeZero backend developed
Customer and fleet mgmt. professionalized

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BeeZero
says thank you…

Thanks for listening –
let's start Q&A

- ✓ **Everybody who want to experience a hydrogen ride is welcome to go first her/his first trip.**

- ✓ **Your free entry / registration to BeeZero Promo Code: 476F6F67**

- ✓ **Every question / discussion about technical, organization or hydrogen mobility itself is very welcome!**

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