



DB Systel Innovations

DB Systel GmbH | July 2020 | Frankfurt am Main, Germany

DB Systel

Moving the digital future.
Together.

Digital Innovations for Strong Rail



Germany needs Strong Rail – for people, for the climate, for the economy, and for Europe.

Digitalization is a key factor here and will greatly influence the future of mobility. In this highly dynamic market, innovative solutions are needed to tackle current and future challenges within the mobility sector. Purposeful, early adoption of relevant trends and technologies for Deutsche Bahn is therefore essential.

Successful implementation of innovative ideas requires a systematic innovation process, which we established in recent years and have continued to expand. In our innovation ecosystem, we work closely with innovation partners, both within and outside of the DB Group, to identify digital trends and literally bring them on track. Our three-pronged approach, comprising the Skydeck Accelerator program, targeted support for internal ventures, and research work, enables us to quickly produce scalable results. Furthermore, early validation helps to support our long-term goals of increasing capacity, efficiency, and quality at Deutsche Bahn.

This presentation gives you an insight into DB Systel's work as a digital innovator and introduces you to some of our key innovations.

Be inspired and work with us - your digital partner - to develop ideas for the future of mobility!



Nicole Göbel
CEO at DB Systel

Our innovation journey – three key cornerstones



Trend.Radar & Research



Digital.Trend.Radar enables us to take the pulse of the market, visualize and evaluate digital trends, make recommendations, and initiate technological innovations.

Our trend analysis team works with a network of experts to choose DB-relevant technologies from a myriad of new trends and subsequently evaluate their technical maturity, impact on the rail business, and benefit to the DB Group.

Skydeck



In our innovation hub, we test the latest technological trends to determine their suitability for use at Deutsche Bahn. DB employees receive methodical, structured support to develop their ideas into real prototypes.

The most promising ideas from the initial incubation phase then progress to the accelerator phase.

Over the course of the ten-week program, the teams develop business models, conduct interviews, examine the feasibility and profitability of an idea, and build prototypes. Here, the objective is to convince investors to back a particular project so that it will ultimately become an internal venture or project within the DB Group.

Venturing

Following successful completion of the incubation and accelerator programs, the Venturing team provides financial support to teams when they need it most, that is, to develop their prototypes into the very first core products and services.

In addition to financial support, the Venturing team also provides mentoring services as well as advice on marketing, sales, strategies, and legal issues. It also connects participants with the right contact persons. These three pillars turn ideas into digital realities!

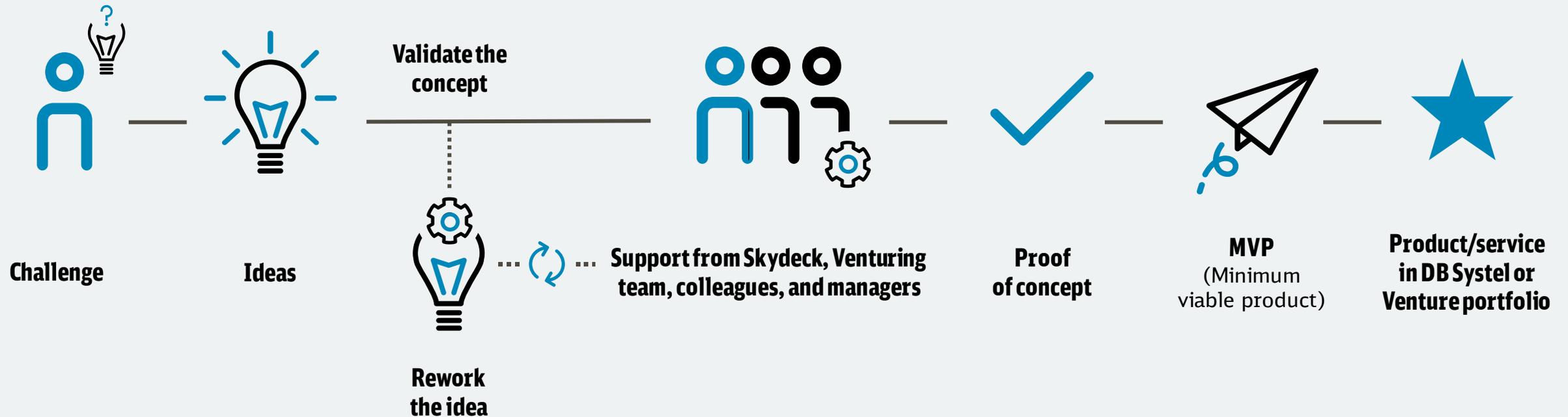


Developing an innovation-friendly culture that promotes active participation!

The basis for DB Systel's innovation endeavors

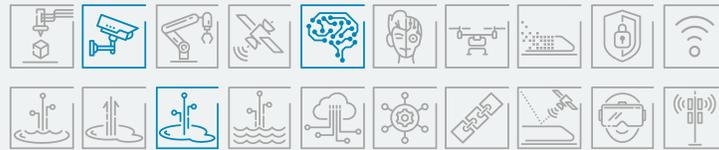


DB Systel is innovative in all areas. New solutions to problems emerge from daily tasks, purposeful innovation endeavors such as those undertaken in ☉ Skydeck, and inspiration from our very own ☉ Digital.Trend.Radar. Ideas not only receive systematic, comprehensive support but are also funded and developed into a product or service once the relevant checkpoints have been satisfied:



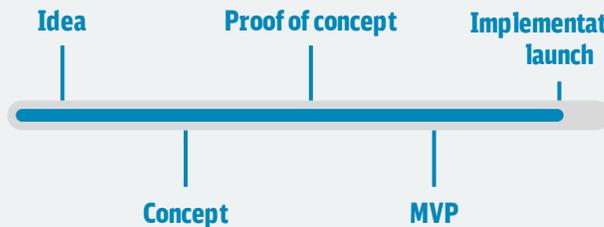
Joint research projects in partnership with universities and other companies provide a further platform for innovation. Examples include ☉ Rail2X, ☉ SPEAKER, ☉ SIM3S, and lots ☉ more!

Key innovations at a glance



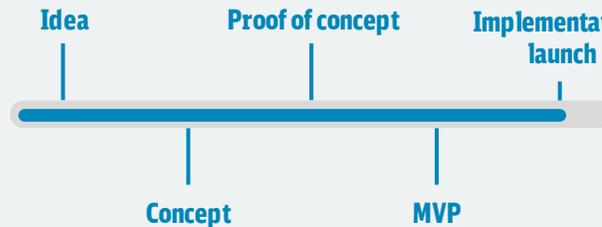
SEMMI – AI Concierge Service

SEMMI, a human-machine interface (HMI) based on artificial intelligence (AI), answers travelers' questions in their own language, thus relieving staff of these routine inquiries and enhancing the service offering, for example, if no staff are on site (e.g. in rural areas).



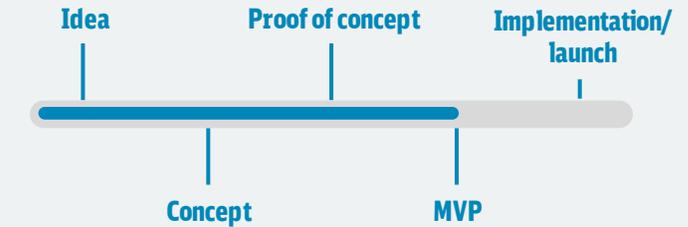
Acoustic Infrastructure Monitoring (AIM)

Acoustic Infrastructure Monitoring (AIM) is a universal predictive maintenance solution for early fault detection in mechanical systems based on acoustic signals. Early fault detection and an improved reporting system increase availability and reduce operating and maintenance costs.

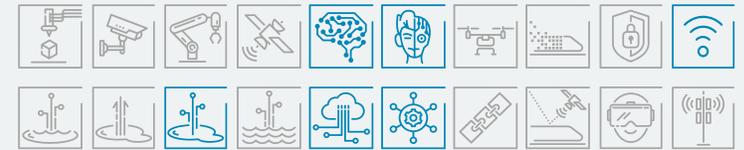


Smart Indoor Locationing Everywhere (SmILE)

Smart Indoor Locationing Everywhere (SmILE) taps into the earth's magnetic field for indoor navigation and geolocation of points of interest, thus making it possible to navigate within complex building structures such as stations, warehouses, and workshops even when other technologies have reached the limit of their capabilities.



Key innovations at a glance



Automated Shunting

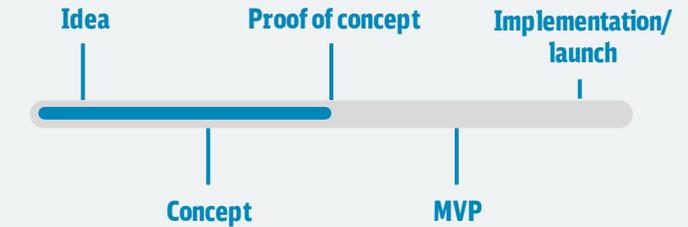
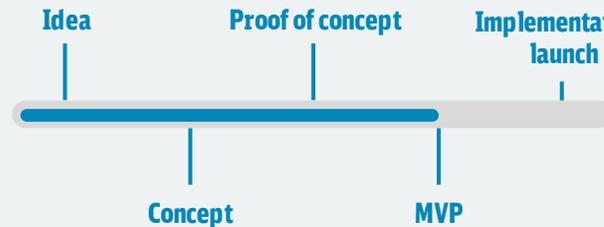
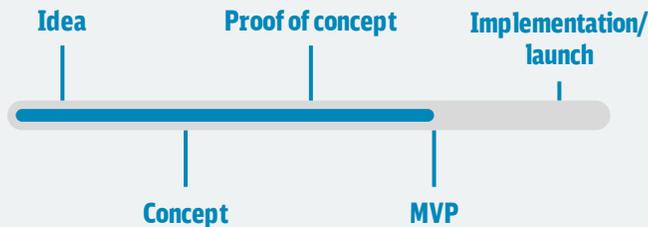
Automated shunting enables industrial railways to modernize and digitalize their shunting processes by combining dispatching solutions with automated control of shunting locomotives, thus counteracting the current shortage of shunting locomotive drivers, which is expected to intensify further due to age distribution.

IDA - Intelligent Camera Diagnostics

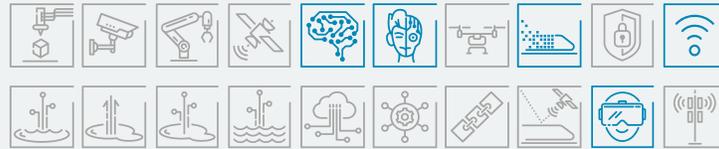
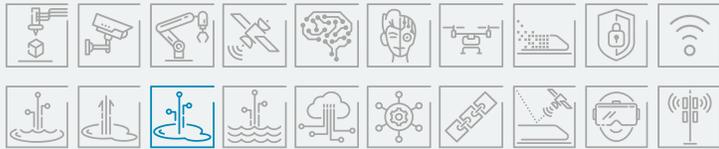
Intelligent Digital Assistant (IDA) conducts image and video analyses and automatically provides information to support various decision-making processes. Such information serves to improve both workflow quality and process efficiency. Within the scope of TecEX, AI models for automatic camera diagnostics are developed together with the House of AI for vehicle maintenance in long distance transport.

Artificial Intelligence (AI) Translation Tool (KITT)

The artificial intelligence (AI) translation tool facilitates the use of machine translation in end-to-end communication within international rail freight transport. Speech recognition and speech synthesis are also deployed here, thus making it possible to overcome language barriers at border crossings with little effort.

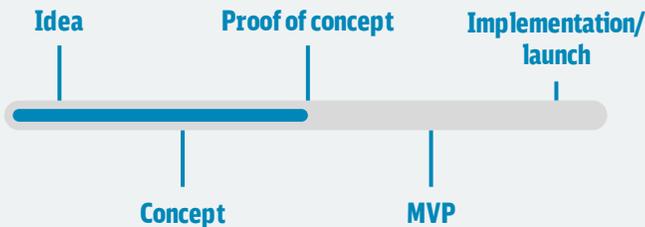


Key innovations at a glance



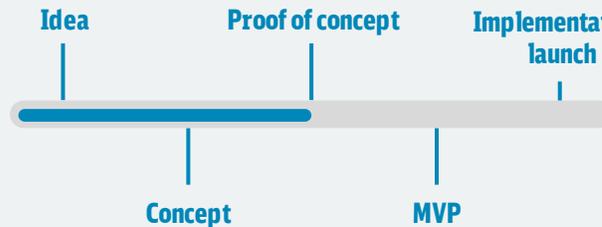
Event Radar

Various events influence traveler behavior and therefore impact DB's business processes. Event Radar is a central data source for such events. It visualizes data and conducts analyses that generate added value. The idea behind such an adaptive system is to enable the DB Group to optimize its services in good time.



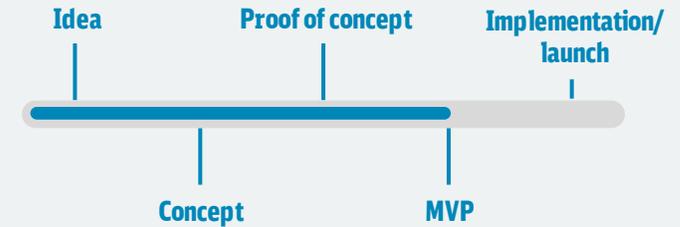
Augmented Reality Remote Assist

Often, in the case of infrequent repair orders, the expertise of technical experts is not immediately available on site. The idea here is to evaluate how augmented reality (AR) can be used together with a live link to an expert to provide remote support during repairs. AR technology will be made available wherever it delivers tangible added value.



Blockchain Platform

The blockchain platform provides customers with a software development kit to develop their own blockchain solutions. A further goal here is operations management in relation to blockchain nodes.

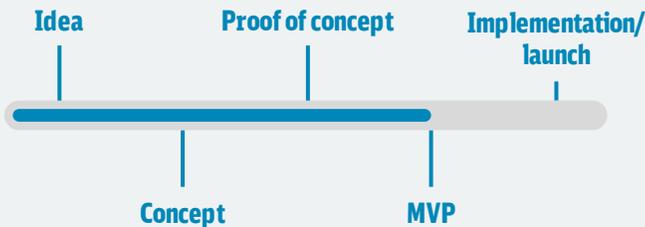


Key innovations at a glance



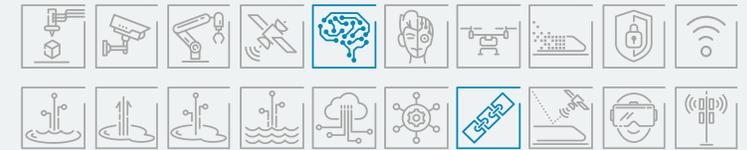
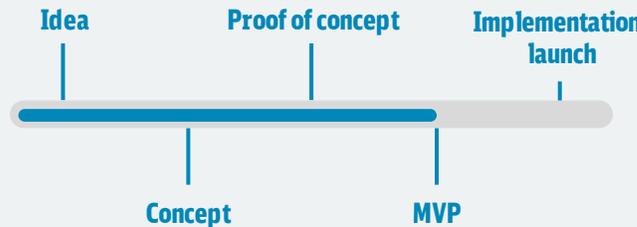
Skill Card

The current credential card for external building site personnel is to be replaced with an electronic credential card. An NFC-enabled card and a custom developed app will be used for this purpose. This system protects against forgeries and manipulations, thus providing greater security and preventing incorrect invoicing.



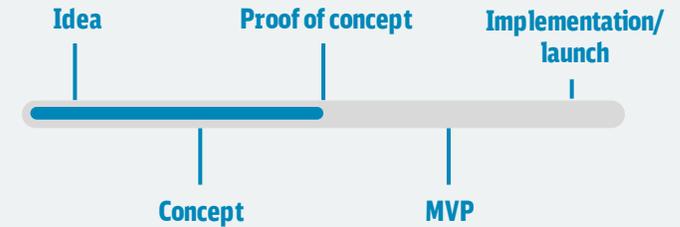
Intelligent Document Analysis

Intelligent document analysis will be used in application management, objection management, and for tax assessment notices. The use of artificial intelligence in these three projects will simplify and accelerate processes, improve quality, and ensure both accuracy and legal certainty.



Open Mobility Ecosystem "Passepartout"

Here, the goal is to be able to use a single ticket across the entire travel chain through the creation of a neutral mobility-as-a-service platform to facilitate blockchain-based revenue allocation. Optimized customer management will be achieved by means of artificial intelligence.

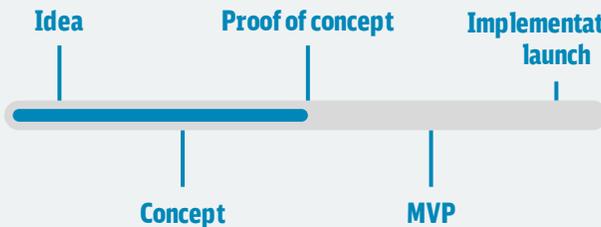


Key innovations at a glance



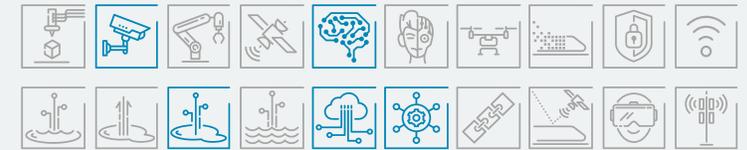
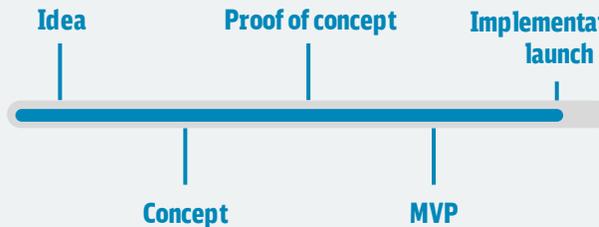
Revenue Allocation "Split"

Often, revenue within transit authorities is still allocated manually. Furthermore, contracts are invoiced on a quarterly basis only. Consequently, ticket combinations with other partners are just too complex, as is real distribution (e.g. for check-in/be-out pricing). The idea behind a blockchain-based solution is to not only reduce the time and costs associated with revenue allocation but to make processes more transparent.



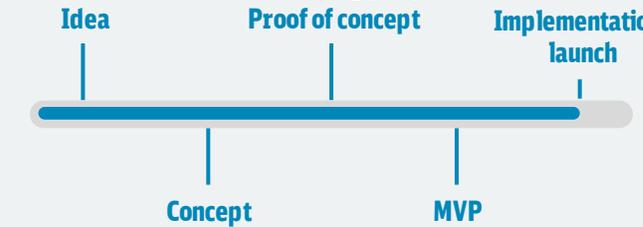
Emergency Service

Emergency Service is an emergency call platform for use in a wide range of areas within Deutsche Bahn. It provides both manual and automatic alerting and location services for employees. Emergency Service provides a central platform for manual or (semi)automated alert processing.

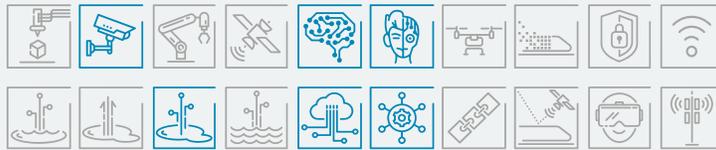


Route Knowledge

Before a train driver can drive a train on a particular route, they must demonstrate knowledge of that route. The need for a train driver to be accompanied on their route requires additional personnel and a great deal of time. It is also costly and causes resource bottlenecks. To make some savings in this regard, dashcam videos incl. GPS coordinates are recorded, anonymized, edited, and made available for training purposes.

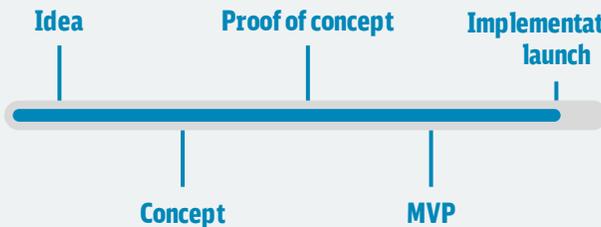


Key innovations at a glance



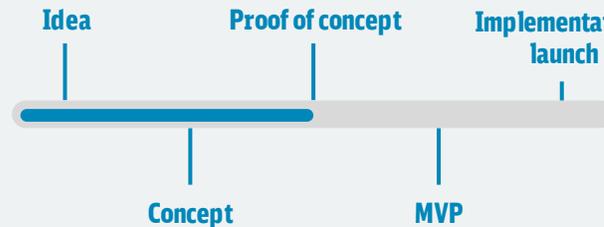
EVE – Virtual Reality (VR) Training

Virtual reality (VR) makes it possible to provide realistic training without diverting scarce resources from operations. In addition to processes undertaken by train crew (e.g. operating a wheelchair lift), training can be provided in relation to potentially dangerous situations, thus increasing the safety of DB employees.



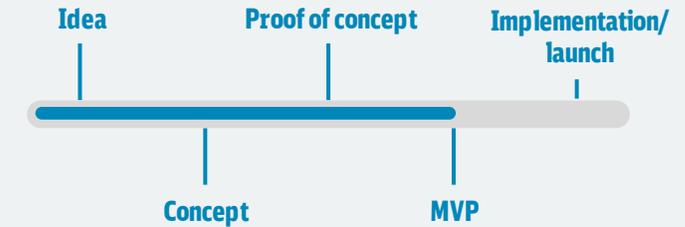
FOS for Traveler Alerts

At present, traveler alerts are triggered manually prior to travelling by train. In the future, train positions will be transmitted to the cloud in real time where they will be combined with infrastructure and train dispatching data and supported by artificial intelligence (AI), thus making it possible to accurately predict when (and where) a train will reach the station.



Asset ID – Uniform Digital Identifier

The concept of an asset ID as a cross-industry standard for the digital identification of all assets provides, in conjunction with a distributed ledger, secure and open cooperation between affiliated partners to unlock the potential for improvement through automated processes both within and outside of Deutsche Bahn.

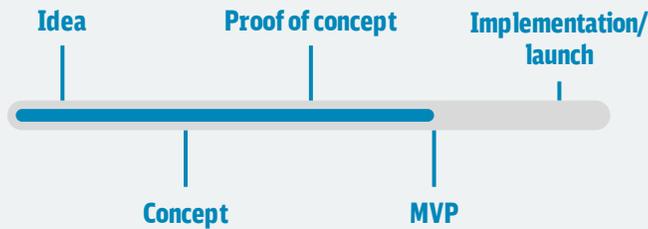


Key innovations at a glance



Mobility Simple

Thanks to interface-based microservices, geopositions can be used to answer questions in relation to a mobile user's context in various modes of transport, thus optimizing services and processes for end customers and employees (while complying with the relevant data protection and security standards) and ultimately making the travel experience easier and more convenient.



DB Systel's Innovation Network

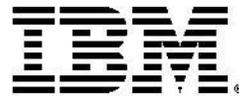


Innovation requires a diverse ecosystem.

To this end, DB Systel works closely with other innovation drivers both within and outside of Deutsche Bahn.

Here, the focus is on mutual inspiration, joint funding of promising ideas and, above all, the benefits to our end customers.

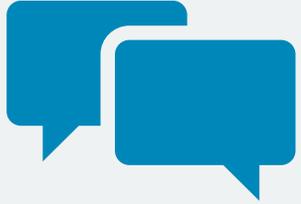
In addition to companies within the DB Group, the following are also innovation partners of DB Systel:



**The best way
to predict the future
is to invent it.**



Alan Kay



Talk to us – your digital partner – about any challenges or ideas you may have!



DB System GmbH
Jürgen-Ponto-Platz 1
60329 Frankfurt am Main, Germany



skydeck@deutschebahn.com



@DBSystem



DB System GmbH



Pictogram legend



IT infrastructure



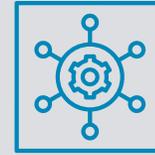
Connectivity



Cloud services



Cyber security

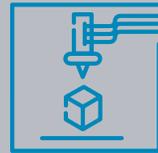


Development platforms



Data management

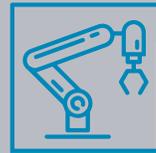
Technologies



3D printing



Sensor technology



Robotics



Geolocation



AI



Human-machine interface



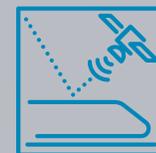
Drones



Digital twin



Blockchain



ATX



AR/VR



5G