**2024 Hannover Fair Special**

# The X factor: From Gaia-X to Base-X – Better mobility with better data

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## The "X" factor – what is ... Gaia-X?

This 2-pager explains the implications of software development in Gaia-X mobility projects, supported by German government funding and involving the Deutsche Telekom Data Intelligence Hub (DIH) team. The focus is on Base-X, an open data and service ecosystem for smart city and mobility.

- **Gaia-X** (link): Was created in 2019 by French and German companies, including Deutsche Telekom, and with the support of both countries' governments.
- **GX AISBL** (link): Was established in June 2020 as a non-profit *Association Internationale sans but lucratif* (AISBL) under Belgian law, headquartered in Brussels.
- **GX principles** (link): Ask for data to be (a) federated (data remains stored with provider) and (b) decentralized (no single point of control) to foster trust and data sovereignty, enabling trustful cross-organizational sharing while complying with European data regulations.
- **GXDCH, Gaia-X Digital Clearing House** (link): Operationalizes GX principles as the one-stop place to get verified against the GX rules to obtain GX compliance in an automated way.
- **GX and dataspaces**: GX compliance enhances the data sovereignty protection in a dataspace.
- **GX projects**: Deutsche Telekom's T-Systems International (TSI) has pioneered application of GX in mobility projects like RealLab Hamburg (link) and Gaia-X 4 Future Mobility (GX4FM)
- **Base-X**: Was engineered in GX4FM to facilitate data-driven solutions to longstanding challenges in mobility and smart cities, and it premiered at Hannover Fair 2024 (link).

## "X"-terminate mobility's price-performance and sustainability problem?

While digital technology has propelled consumer benefits in industries like entertainment (music streaming on mobile) and telephony (free Internet calling) forward by leaps and bounds, mobility seems to be stuck, if not moving in reverse: The time and cost involved in traveling from point A to point B are continuously increasing: Stuck in traffic, link.

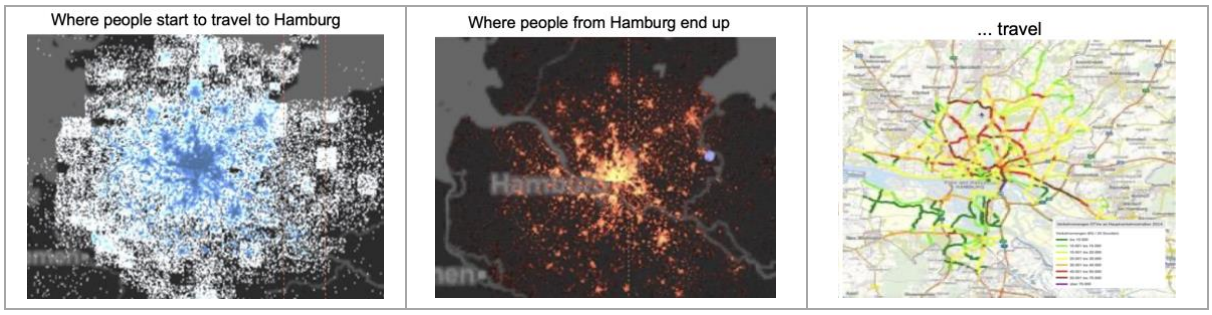


*Figure 1: Hamburg digital traffic twin (Schlueter Langdon et al. 2021, link)*

## The "X" solution: Think differently – "regional jets" ... or better data

**"Regional jet":** The arrival of smaller jets has transformed air travel by facilitating feeder lines from smaller cities, effectively bringing long-distance routes closer to our doorsteps. Similarly, the emergence of (a) micro-mobility in urban areas, such as shared electric scooters and bikes, and (b) autonomous shuttles can shorten the distance to public transportation, enticing a modal shift.

**Better data:** The glue to bind together various modes of transport from different providers, and then fit these packages to our diverse, individual needs is data, which can be available with a dataspace.

- *Supply*-side data: Comprehensive information on vehicles (capacity, location/routes, availability, cost), traffic conditions, and time of day/week (holidays, rush hours) is essential.
- *Demand*-side data: Our own unique circumstances (location, trip purpose) and preferences (speed, cost, comfort) necessitate a personalized digital travel profile or "travel twin", link.

## The train has left the station: From demos to real-life pilots

**Don't reinvent the wheel:** Our Base-X involvement builds on a demonstrator developed in the Reallabor Hamburg project (RealLabHH) as a lab of the German Federal Government's National Platform Future of Mobility (NPM) with funding from the German Federal Ministry for Digital and Transport (link). In 2022, RealLabHH was awarded the "Real Lab Innovation Prize" by the Federal Ministry of Economics and Climate Action (link). Back then our demonstrator was based on dataspace tech 1.0 primarly from the International Data Spaces Association (IDSA) and Fraunhofer Institutes.

**Software-as-a-Service (SaaS)** upgrade: For Base-X, we've upgraded the dataspace stack to a SaaS approach, which represents a fundamental shift in software delivery, transitioning from traditional on-premises installations to cloud-hosted solutions accessible over the internet. This simplifies maintenance and upgrades, allowing a business to concentrate on the use case, and to start small and scale fast. We used the Base-X experience to create a commercial offering, which provides an application development environment with a ready-to-use, built-in, GX-compliant dataspace (link).


*Figure 2: Deutsche Telekom team with CEO Hoettges, Catena-X team, and Federal Minister Wissing*

## Results: 30% faster trips

Results speak louder than words: Our pilot was tested with live data from RealLabHH mobility providers (link), including Hamburger Hochbahn AG, Sixt, and Tier Mobility (see Fig. 1), and by visitors at the launch of the system during the ITS World Congress in Hamburg, resulting in faster trips (link).

- **Lessons learned – 3 steps:** Decompose overall development into …
  1. *Dataspace* network: Use a dataspace to exchange better data with data sovereignty protection; what is … a dataspace, link
  2. *Data products*: Harmonize data exchange with data products like digital twins to build cross-organizational data chains; what is … a digital twin, link
  3. *Super-app*: Upgrade existing apps for data chains, see intermodal travel app demo, link
- **Business model shifts:** (1) Metamorphosis of automotive into mobility services (link), (2) explore selling urban mobility like A to B trips by the seat, link

## Mobility dataspace events

- Hub.Berlin 2023: With Federal Minister Wissing and Telekom CEO Hoettges (see Fig. 2), link
- Market-X by Gaia-X Vienna 2023: Mobility spotlight, link
- ITS WC 2022 Los Angeles: First dataspace case study with IDSA & Gaia-X on stage in U.S., link