# The presentation of a technical concept

# for a borderless ticketing system

# in passenger transport

# It is a design and destined not perfect yet.

## Informationen

# First, let's take a look at the

# Baseline

# in passenger transport

# Informationen

https://www.destatis.de/DE/Themen/Branchen-Unternehmen/Transport-Verkehr/Personenverkehr/_inhalt.html

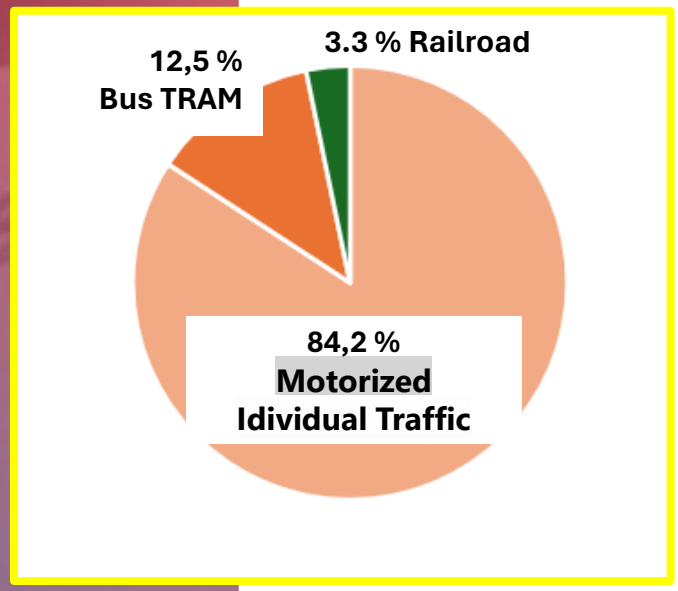
DESTATIS
Statistisches Bundesamt

## An evaluation by the Federal Statistical Office on user behaviour in passenger transport from 2022 in kilometres:

**Transportation and traffic**

**Passenger traffic**

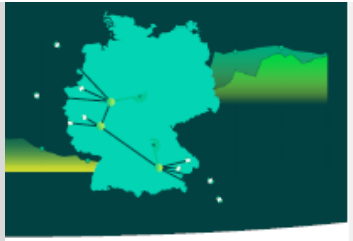
| 45 Mrd. | 6,7 Mrd. | 1,74 Mrd. |
|---|---|---|
| In motorized private transport | Transported by bus and tram | Transported by rail |
| 84,2 % | 12,5 % | 3,3 % |

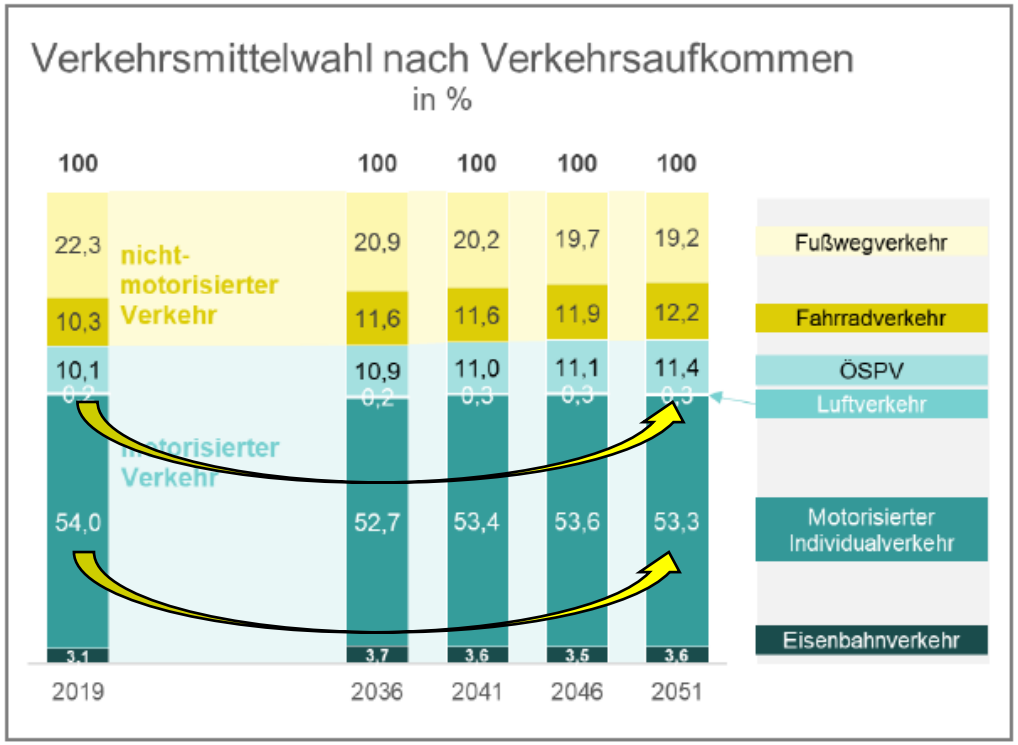



Initiative SIV · Schienen Individualverkehr

Boundless ticket system
Creator: Dipl. Jürgen Mülders, Initiative-SIV

# The forecast from 2023, prepared by the Federal Ministry of Transport, shows a look from 2019 to 2051, that there is hardly any change in the volume of traffic.






| Verkehrsmittel | Modal Split 2019 | Modal Split 2051 | Veränderung 2051/2019 | Struktur-effekte | Prämissen-wirkung |
|---|---|---|---|---|---|
| **Verkehrsaufkommen [Personenfahrten]** | | | | | |
| Eisenbahnverkehr | 3,1% | 3,6% | +0,5 %P | +0,1 %P | +0,4 %P |
| MIV | 54,0% | 53,3% | -0,7 %P | +2,0 %P | -2,7 %P |
| Luftverkehr | 0,2% | 0,3% | +0,1 %P | +0,1 %P | +0,0 %P |
| ÖSPV | 10,1% | 11,4% | +1,3 %P | -0,4 %P | +1,7 %P |
| Fahrradverkehr | 10,3% | 12,2% | +1,9 %P | +0,5 %P | +1,4 %P |
| Fußwegverkehr | 22,3% | 19,2% | -3,1 %P | -2,3 %P | -0,8 %P |
| **MIV** | **54,0 %** | **53,3 %** | **- 0,7 %** | | |
| **ÖSPV** | **10,1 %** | **11,4 %** | **+ 1,3 %** | | |

**Öffentlicher Straßenpersonenverkehr (ÖSPV)**

= Der Modal Split, bezogen auf das Verkehrsaufkommen, zeigt im Zeitverlauf nur geringe Veränderungen.

– Lediglich der Fußverkehr verliert 3 Prozentpunkte bis 2051. Dies liegt zum einen an der Bevölkerungsstruktur, zum anderen gibt es zwar Prämissen, die direkt auf eine Steigerung des Fußverkehrs abzielen, jedoch **verliert der Fußverkehr durch die Prämissen zum massiven Ausbau der Fahrradverkehrsinfrastruktur und des ÖSPV**, die wiederum beide Anteile hinzugewinnen.

Grau → siehe Glossar

# Informationen

**A change could be the introduction of this**

**Limitless ticketing system.**

**It solves almost all customer requests and**

**almost all the wishes of the providers.**

## Informationen

**The fact that it is not easy is shown by the fact that 9-EUR ticket and today's D-Ticket. Both have some important issues for customers and vendors.**

**e.g. the social ticket, the payment of providers between the federal and state governments, and**

**uniformity and limitlessness.**

**The aim is to:**

**A single,**

**+ very simple,**

**+ barrier-free,**

**+ always available,**

**+ fair and socially just**

**ticketing system,**

**for all providers of public transport services**
**Vehicles and parking spaces**
**and for all people,**

**simply limitless.**

# The structure is renewed:

**In the future, there will be:**

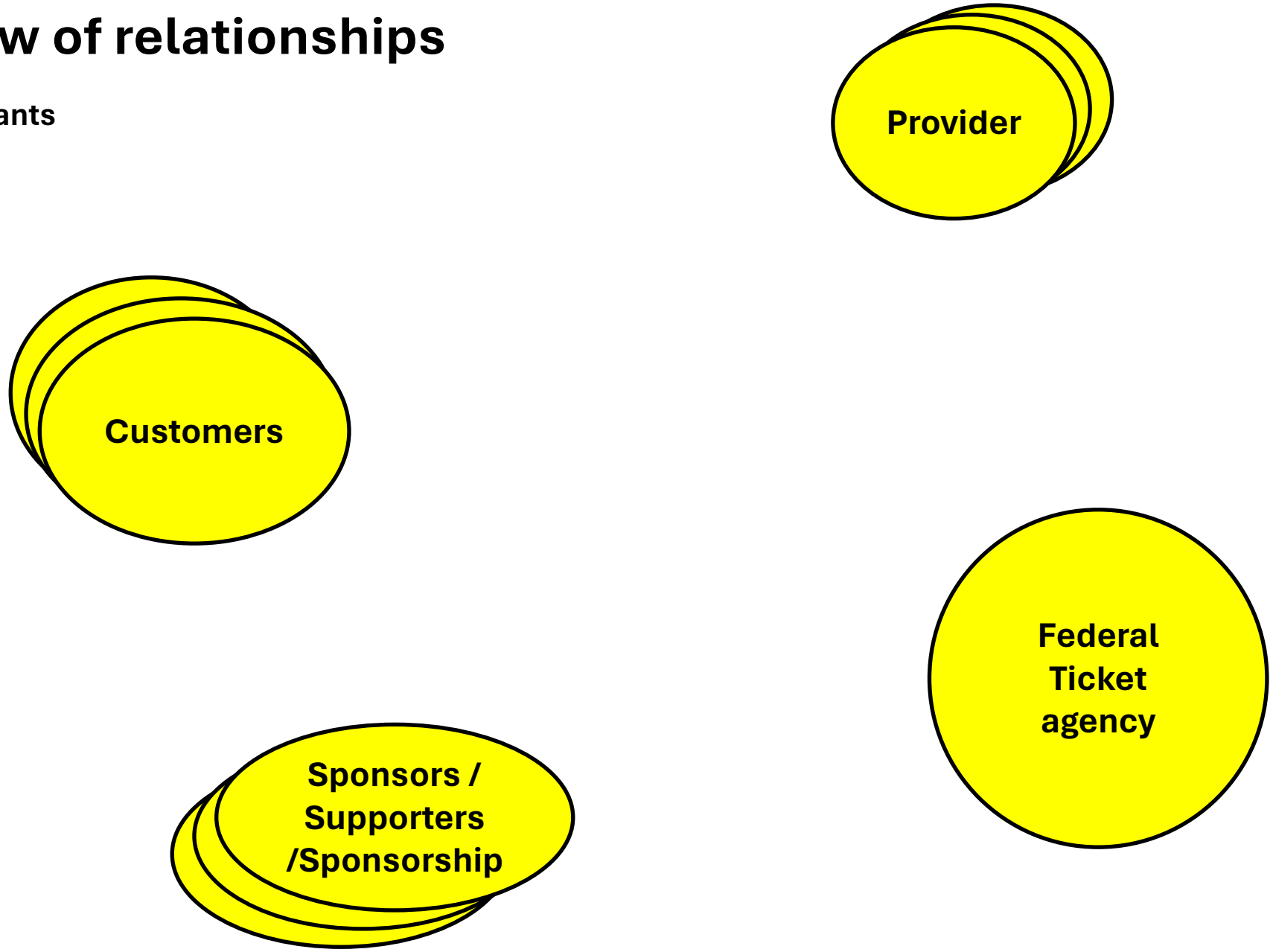
1. **the Federal Ticket Agency (BTA),** with customer data, provider data, contracts and invoices, and it provides everyone with information in a unified IT system (APP, website),

2. **the providers** of vehicles and parking spaces in public spaces, they apply to the BTA, (equality and multiple offers for one route are normal, borderless)

3. **the customers,** possibly with their sponsors, register with the BTA, with the appropriate data, bank details, etc. this also applies to guests, e.g. in the case of residence permits.

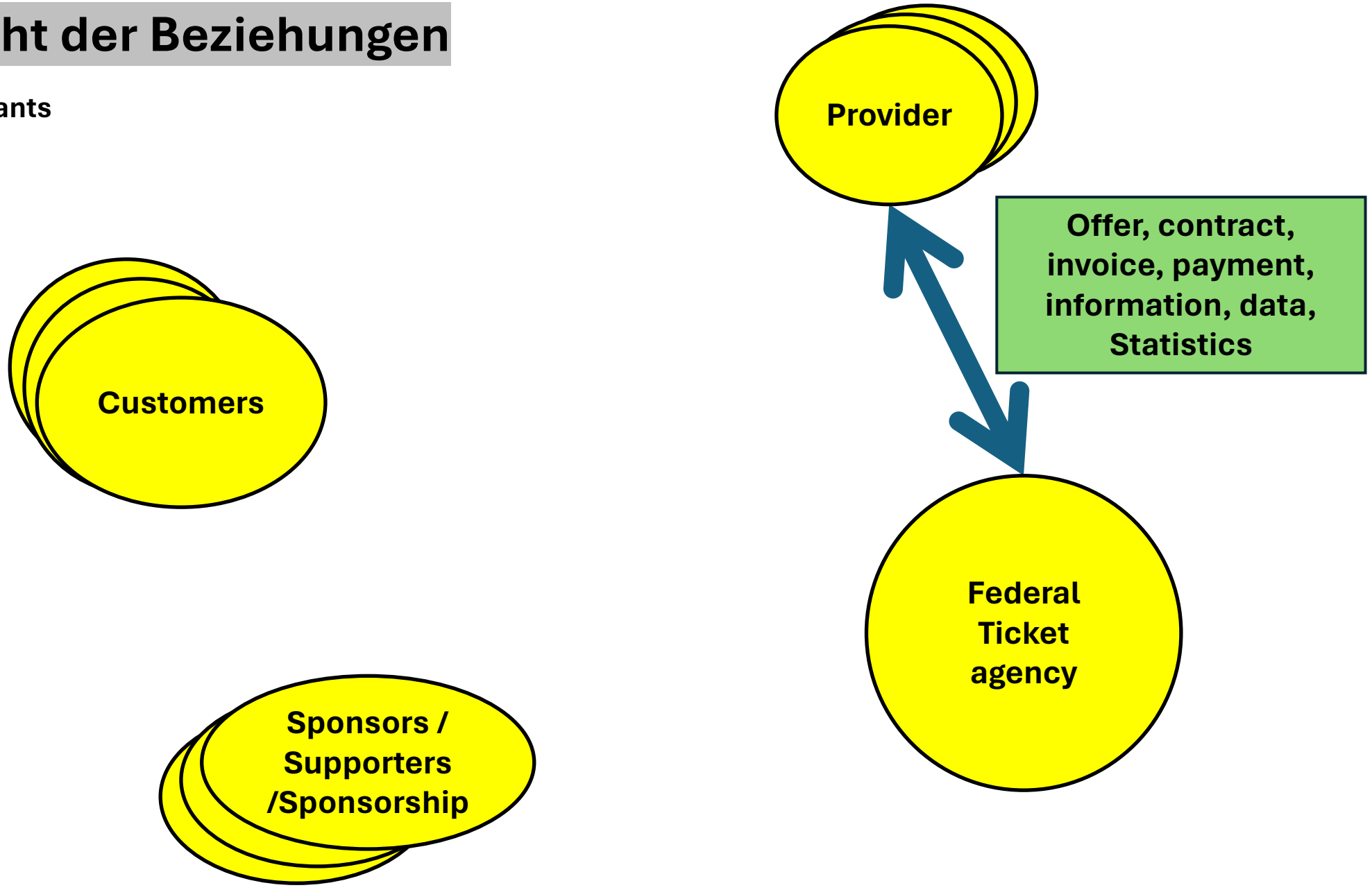
# Overview of relationships

- The 4 participants



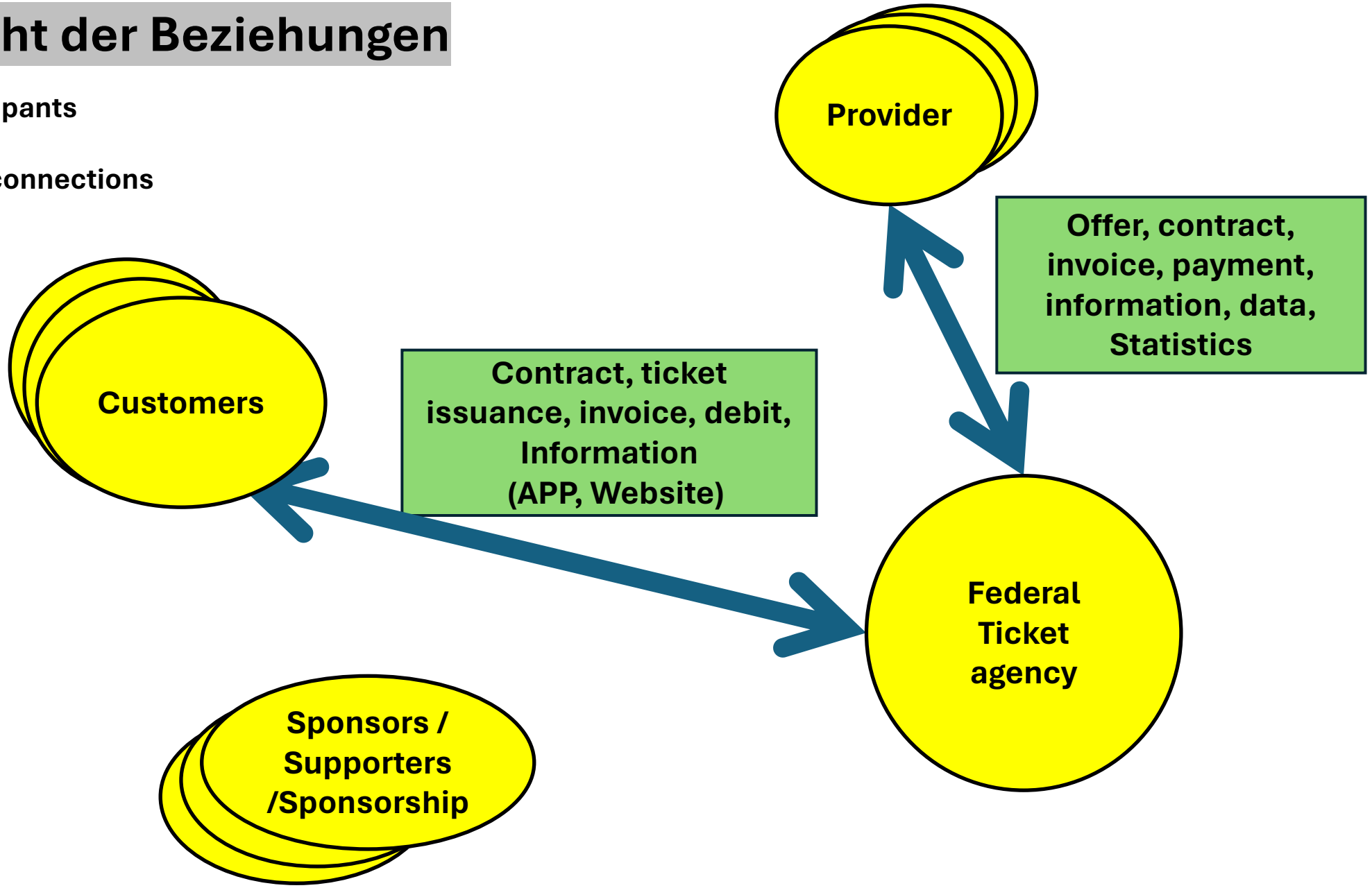
# Übersicht der Beziehungen

- The 4 Participants
- Relations



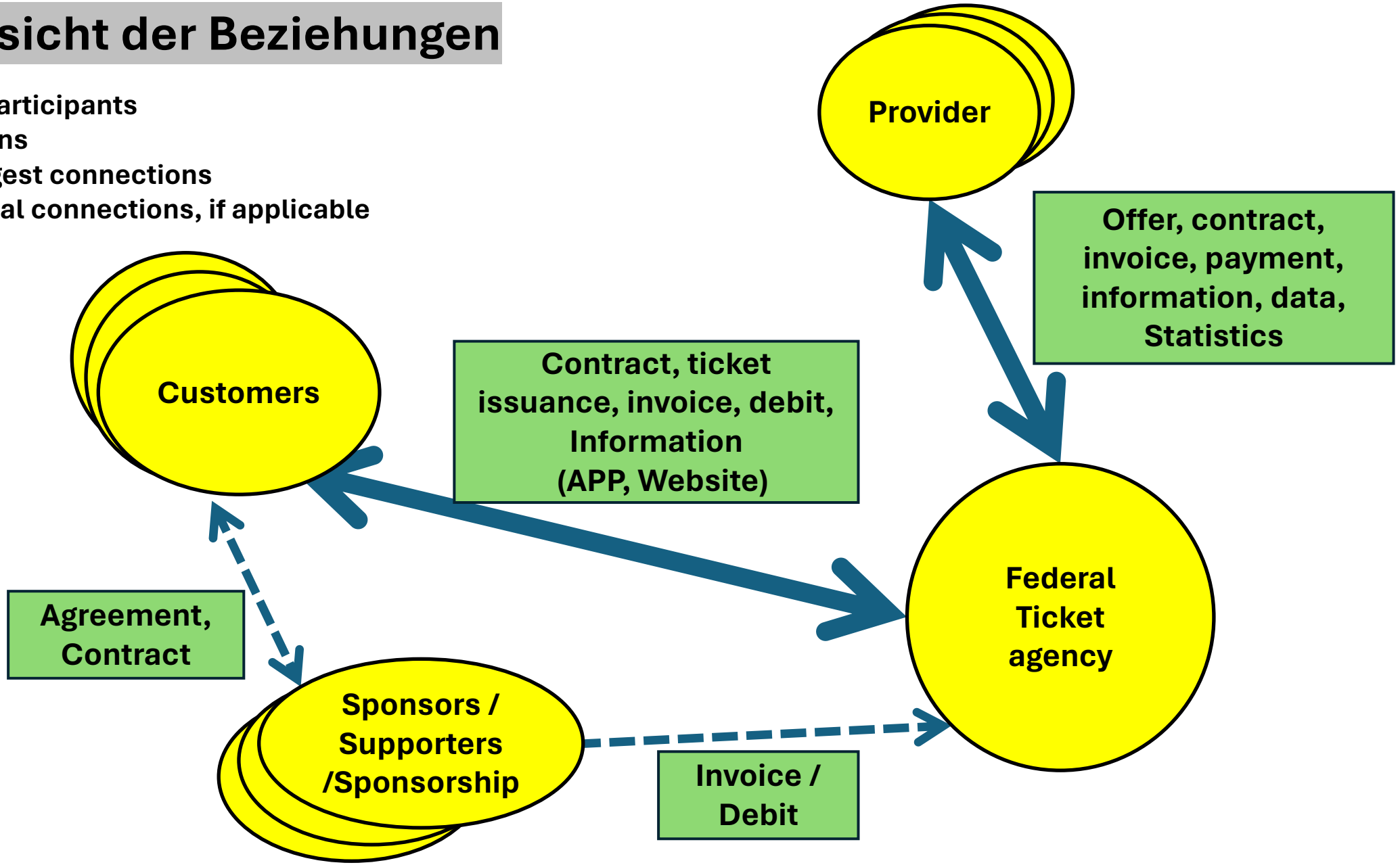
# Übersicht der Beziehungen

- The 4 Participants
- Relations
- the largest connections



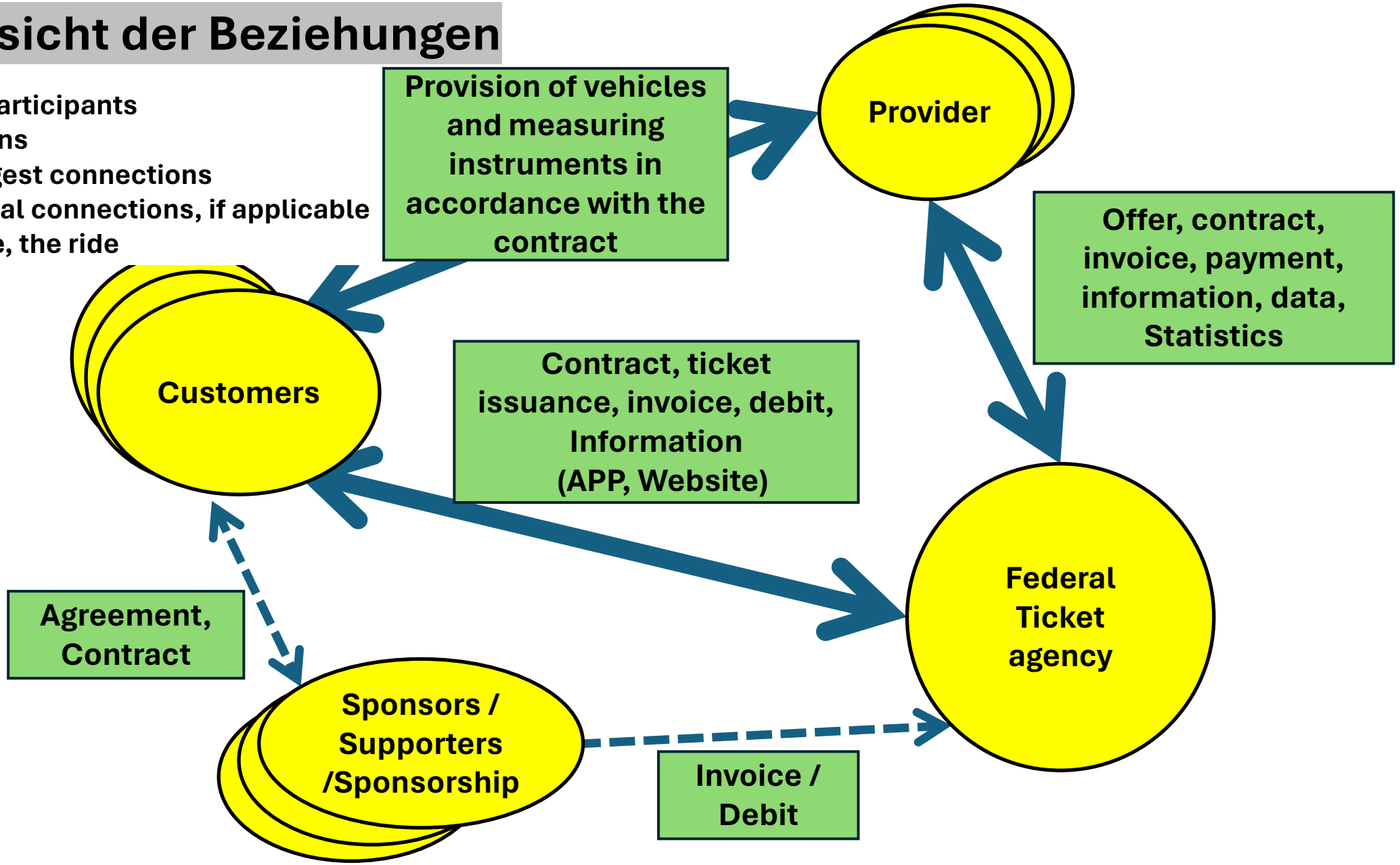
# Übersicht der Beziehungen

- The 4 Participants
- Relations
- the largest connections
- Financial connections, if applicable



# Übersicht der Beziehungen

- The 4 Participants
- Relations
- the largest connections
- Financial connections, if applicable
- The use, the ride



# The new barrier-free ticket systems:

**There are uniform lifetime tickets (for a small fee),**

**free choice of tickets, even several, (limitless)**

**L = Mobile phone app with all the comforts you need to travel,**

**automatic: check in – check out,**
**autonomous detection in vehicles,**
**always online for personal, individual up-to-date information,**

**M = Electronic card, without mobile phone,**

**automatic: check in – check out,**
**autonomous detection in vehicles,**
**no ongoing personal information while driving,**

**S = Simple card for readers,**

**for anonymous driving, check in check out with reader,**
**no ongoing personal information while driving,**

# The new barrier-free ticket systems:

## System L (mobile phone):

**The customer searches for his ride and receives various individual offers.**
**He decides and is supported accordingly for this trip with navigation system, reservations,**

**etc. (Similar to e.g. Jelbi in Berlin)**

- **The customer gets on / off, automatic check in and check out,**
- **Billing can be viewed online and will be debited according to agreement. (daily, monthly, etc.)**
- **Transfers are displayed, arrival time is updated continuously,**
- **Additions such as bicycles, wheelchairs, strollers, luggage, parking spaces, etc. can be easily booked via the APP.**

# The new barrier-free ticket systems:

## System M (Digital Card) without mobile phone:

**The customer searches for his trip on his PC or mobile phone but receives from the Ticket system does not provide individual assistance or information during the journey.**

- **The customer gets on / off, automatic check in and check out,**
- **Billing can be viewed online and will be debited according to agreement. (daily, monthly, etc.)**
- **Accessories such as bicycles, wheelchairs, strollers, luggage, parking spaces, etc. can be easily booked via PC or with the vehicle's readers,**

# The new barrier-free ticket systems:

## System S (single card) without mobile phone:

**The customer searches for his trip on his PC or mobile phone and does not receive any support or individual information during the journey. The customer knows where he's going.**

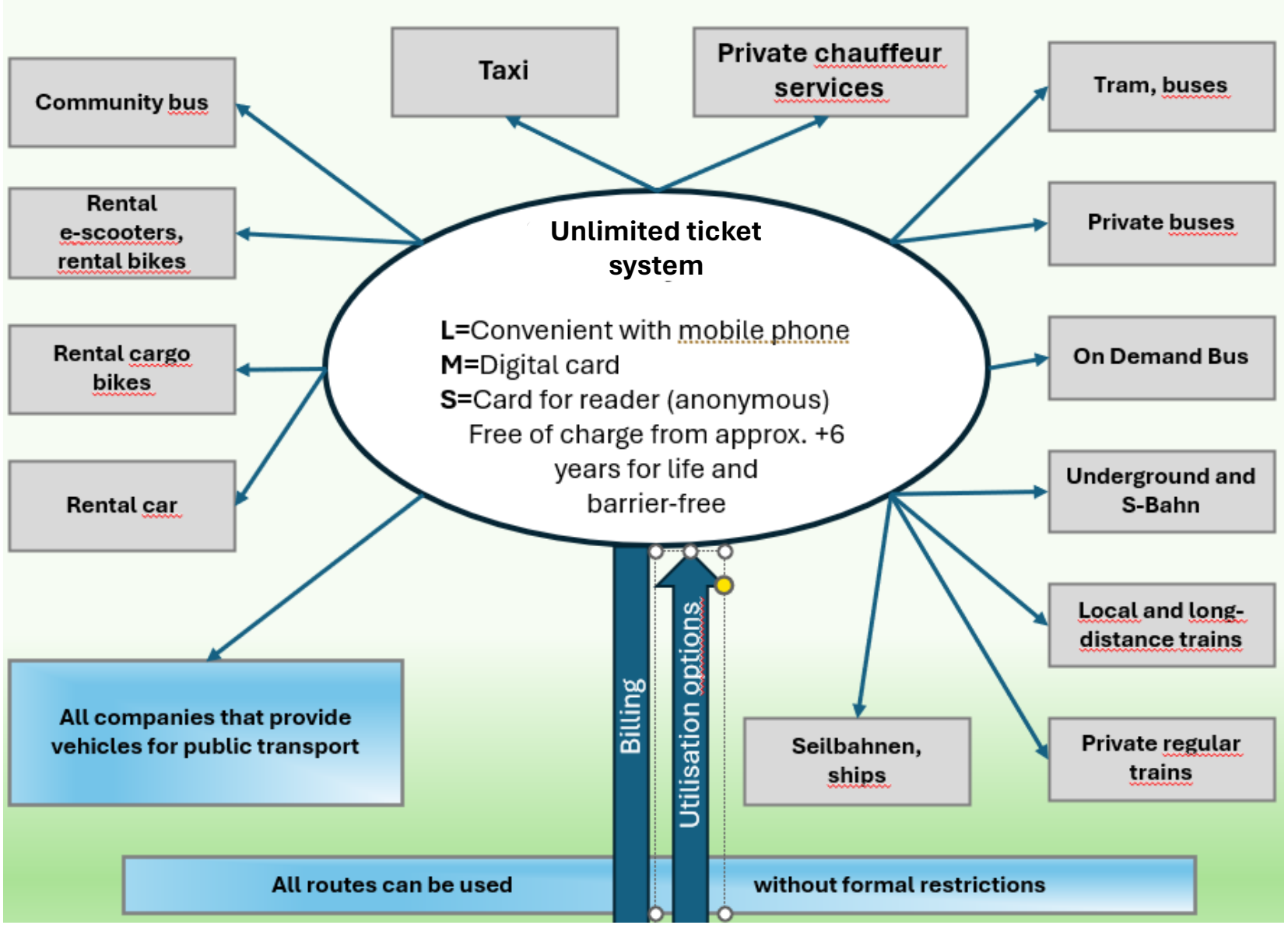
- **The customer enters and has to hold his card up to the reader at check-in and check-out. In case of forgetting, there are readers at the stops, or AI-controlled protection via the "Passenger Counting Systems" system,**
- **Billing can be viewed online on the PC until the agreed debit (daily, monthly, etc.), deletion of the data takes place (in accordance with legal rules and the agreement)**
- **Accessories such as bicycles, wheelchairs, strollers, luggage, parking spaces, etc. are easy to book via PC or with the vehicle's readers,**

# Billing of services or uses

**It is always paid after use,**
**Exact to the kilometers.**

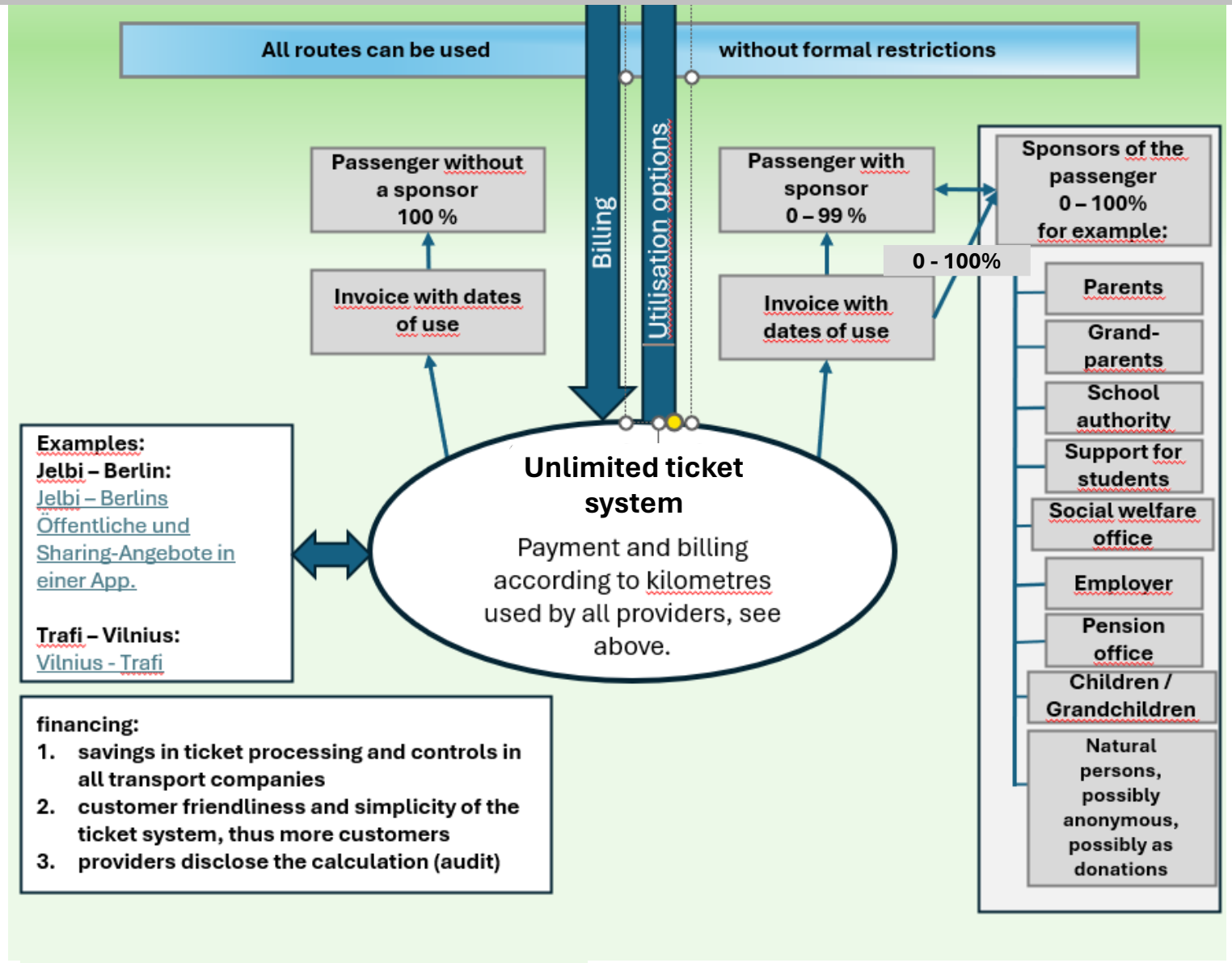
**In my opinion, the accounting of the kilometers actually used is more honest,**
**especially for the providers, not the crow flies.**

# Overview of possible providers (unlimited)




Boundless ticket system
Creator: Dipl. Jürgen Mülders, Initiative-SIV

# Overview of possible customers / sponsors (unlimited)



# The Federal Ticket Agency (BTA) (example is the Federal Network Agency)

## One task of the BTA is the central data processing, e.g:

1. tickets,
2. the data of customers, sponsors, providers, etc.
3. all contracts and contract data,
4. service costs, travel costs of providers and special offers, etc.
5. current usage data and invoices, etc,
6. the statistics and occupancy and utilisation data of the routes for providers,
7. Provision of all necessary information for customers (APP/website)
8. Current timetables and provision and utilisation times,
9. Offers for alternative journeys (sorted by cost or time, etc.)
10. Navigation from door to door via the APP in person or online anonymously.
11. Offer of alternatives in the event of cancellations,

(for L on mobile phone, M, S to e-mail address and on the Internet page)

# The vehicle providers :

## Vehicle suppliers deliver to the BTA e.g:

1. **The data of the vehicles** (with technically required data, such as accessibility, bicycle space, etc.)
2. **The timetable data,**
3. **The current data of the vehicle locations,**
4. **Your calculations, special offers, etc,**
5. **The anonymised billing data per customer (QR code or similar)** (The providers generally have no customer data, no tickets, etc.)
6. **The data of the neutral person recognition,** Occupancy data: Number of people, wheelchairs, pushchairs, bicycles, etc. in the vehicle (without facial recognition)
7. **The functionality of the agreed vehicles and detection devices,**
8. **A solution offer for the customer's onward journey in the event of vehicle failure, accidents, strikes or similar, in cooperation with the other providers in the area.**

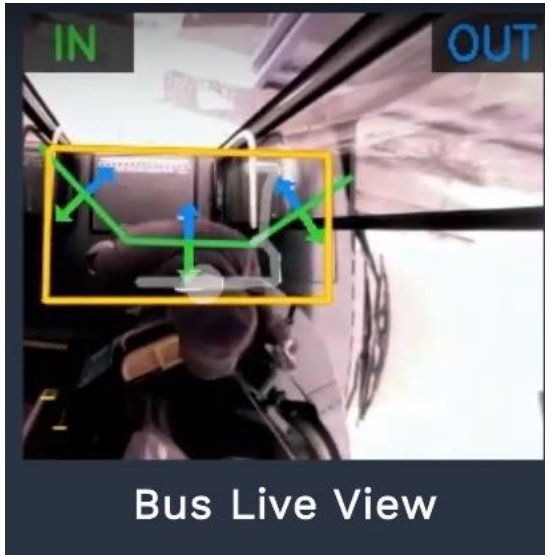
# The vehicle providers

Größte Hürde für autonome Fahrzeuge: der Mensch – DW – 19.02.2021

## Technical examples of passenger detection

**There are technologies and devices that can detect the presence of a mobile phone, even if it is in a pocket or other container.**
**People are currently recognised by the computer as rectangles. Known, for example, from passenger counting systems, without facial recognition.**

Automatische Fahrgastzählsysteme (AFZ) in Bussen | Isarsoft




Personenzählung System | Personenzähler | FootfallCam

**Camera on the ceiling above the bus door**

# The vehicle providers

## Special offers (Page 1)

1. **The rule also applies to special offers: payment is only made after use, there are no advance payments,**
2. **All providers can pass on special offers to customers via the BTA, for time limits, route limits, or certain vehicles, quantity discounts, upper limits, etc., the principle also applies here: no limits, (e.g. public transport is free in Luxembourg)**
3. **Bookings of these special offers are possible in advance, but without prepayment, unused bookings will not be charged, but will be released quickly,**

# The vehicle providers

# Special offers (Page 2)

4. **Double parallel bookings (tricks) in advance for special offers are excluded**

   **(e.g. in order to secure the favourable price in case of own delay),**

5. **If the customer does not accept the booked service, the reservation / use is immediately released for other customers,**

   **(according to the example of the railway: a seat reservation on long-distance services (IC, ICE, EC) expires 15 minutes after departure of the train).**

6. **Vouchers from providers etc. can be given to customers via the BTA.**

# Advertising by vehicle suppliers

1. The app has an "Advertising" selection, where customers can manage adverts by provider, route, area, etc.
2. All special offers that the providers have reported to the BTA are displayed in this selection.
3. The customer can include these offers in their planning,
4. General offers are always billed for everyone; customers who have not seen the offer cannot be excluded,
5. Advertisements in other ways such as newspapers, flyers etc. are possible, but can only be booked if they are available to the BTA,

# Customer and sponsors

1. Customers receive a ticket valid for life in the L, M, S variants (see above), free of charge if applicable,
2. Customers can conclude a contract or an agreement or similar with Paten and inform the BTA of this,
3. There are no advance payments,
4. Bookings are made via the APP, BTA website,
5. After completion, the customer / sponsor receives the invoice and pays by direct debit or bank transfer.

# What has changed compared to today: (Page 1)

1. Everyone has or receives the BTA ticket(s) with lifelong validity,
2. There are no advance payments, no season tickets, etc. This means that paid services do not expire,
3. Only the service used is charged and paid for by direct debit or similar,
4. Cash payment with the ticket is not possible, as the route costs used are not available in advance,
5. Sharing of costs between customers and sponsors:
    a. All variants are permitted here, across all journey costs and splits,
    b. e.g. journeys to work are covered by the AG, all other journeys are not,
    c. As e.g. also for pupils, students, trainees etc.
    d. Further possibilities are unlimited,

continue page 2

# What has changed compared to today: (Page 2)

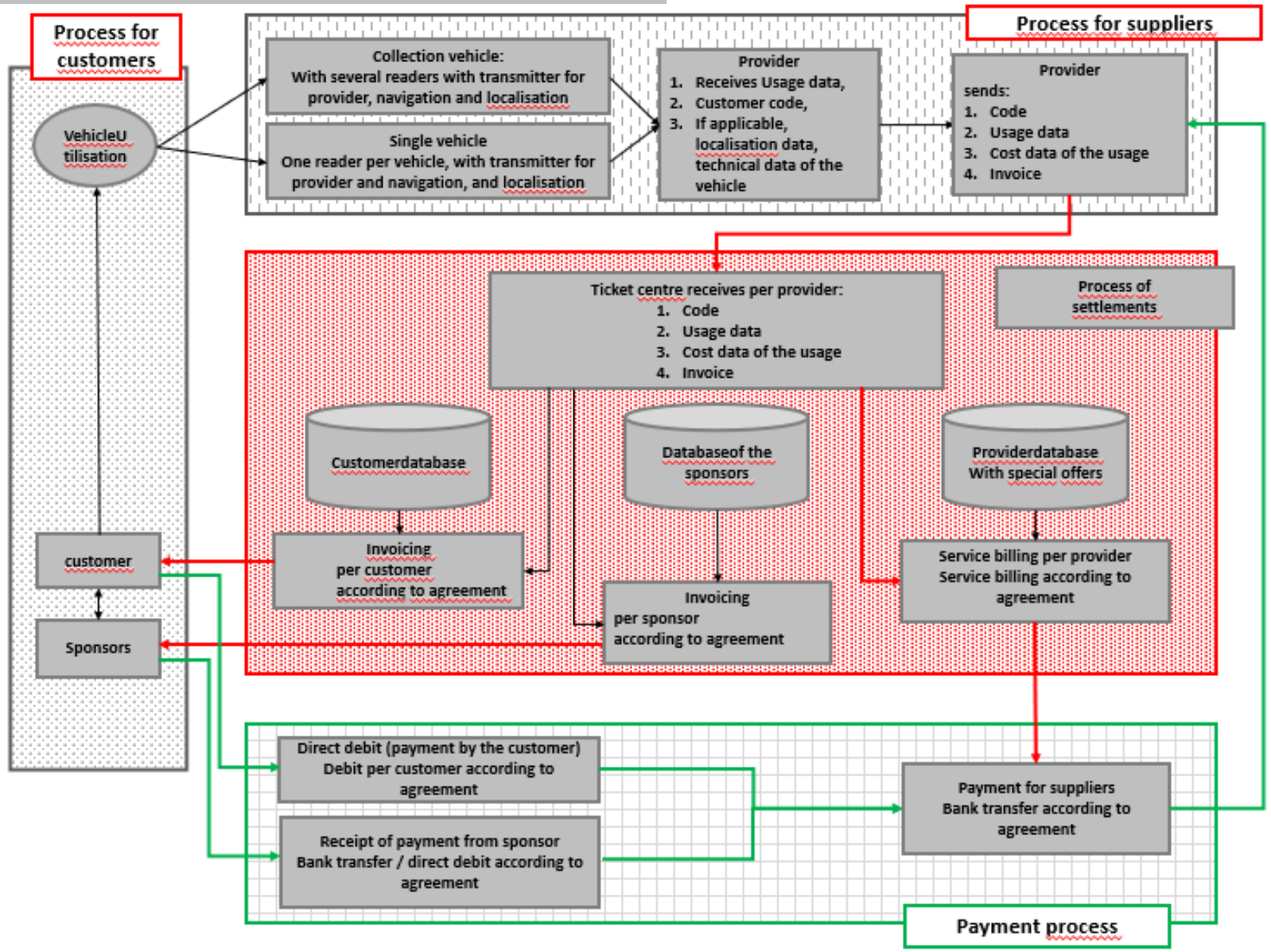
6. Anyone can simply get in and set off,
7. From e-scooters to ICEs, all vehicles on offer can be used, including those from private providers,
8. Journeys from door to door are easy to plan, like a satnav, and can be adjusted at any time during the journey,
9. If an offer (vehicle) is cancelled, the customer automatically receives an offer for a solution to the destination,
10. Collective journeys, family journeys and group journeys can be combined in the system. Then everyone in this group always receives the same information and can exchange information and look for each other if they have lost each other. It is taken into account for seat reservations or vehicle reservations (only for Ticket L)

Continue on page 3

# What has changed compared to today: (Page 3)

11. Credits due to delays in accordance with EU regulations are automatically deducted from the BTA for the customer and provider. Applications for refunds will be cancelled,
12. Reservations with seat bookings will probably become standard (e.g. ICE etc.), but at the same time there will be faster release for other customers if not used (today the DB APP already knows whether the customer will reach the train or not. Furthermore, several reservations of a seat are made possible at different times)
13. Contracts with providers always run via the BTA, which can lead to new concepts,
14. The providers remain independent,
15. It is difficult to estimate the cost development in operation, but it should lead to the sponsors moving towards cost recovery,
16. the watering can principle will be abolished.

# Draft overview of the new processes

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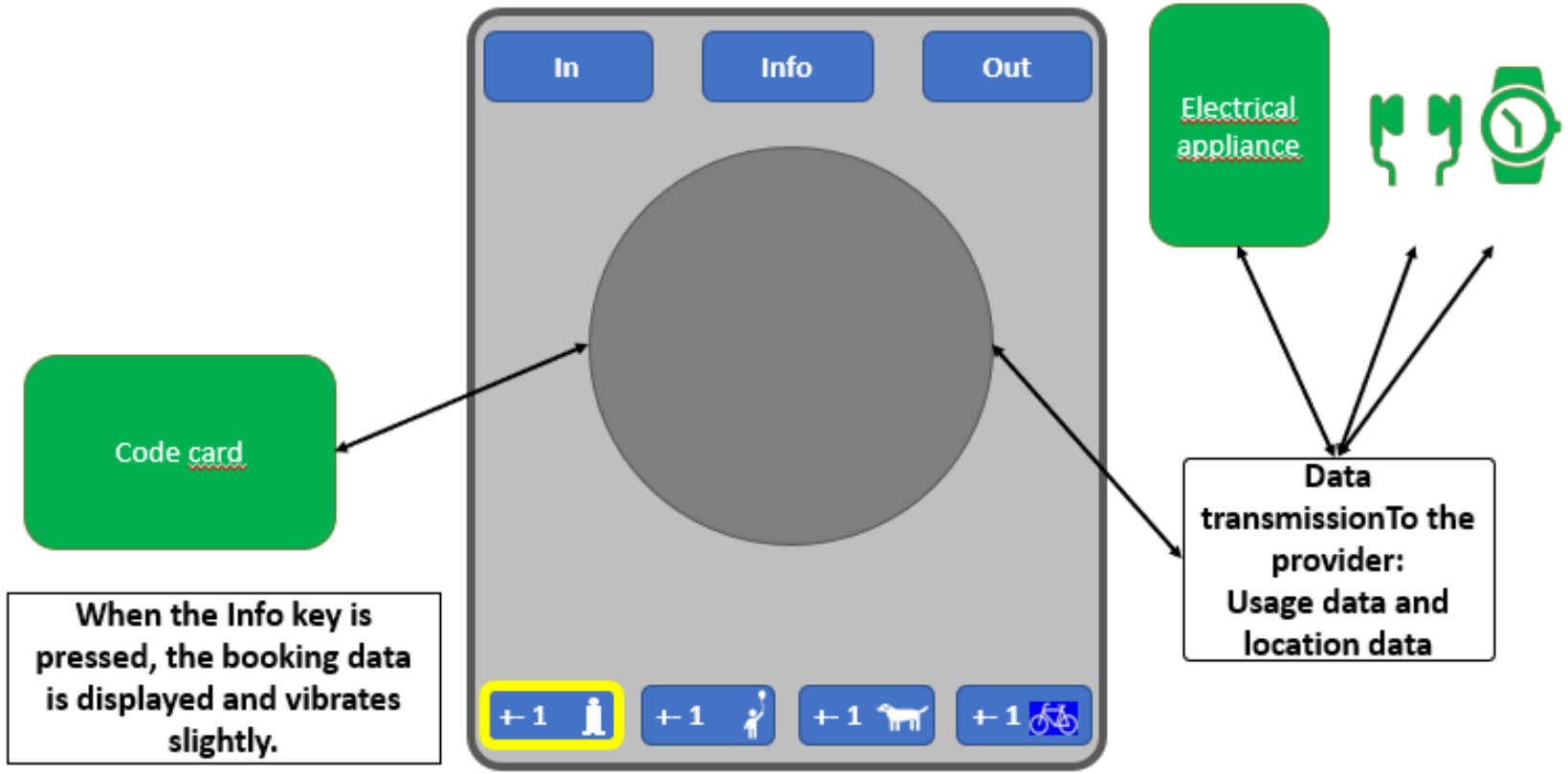
# An example of a standardised reader in or on vehicles



# The structure of the ticket system:

1. Development of the BTA partly from MA of individual providers,
2. Collecting and improving experience from existing projects, e.g. (Jelbi Berlin, Fairtiq, D-Ticket etc.)
3. Start of the project with one city and expansion in the area,
4. Subsequent adaptations and extensions are standard,
5. Step by step, current services of the providers can be omitted, e.g. tickets, customer database with billing, etc.

There is always a danger between complete control and a perfect perfect service with perfect information.

# An important technical problem

**The required localisation system**
**of the borderless ticket app**

**must be able to use the GPS sensors to determine**
**The of the mobile phone manufacturer.**

**The current system, e.g. with Fairtiq**
**consumes too much energy from the mobile phone.**

**(environmental impact)**

# Thank you for your attention

**Dipl. Ing. Jürgen Mülders**

**Initiative Schienen Individual Verkehr (SIV)**
**(Rail Individual Transport Initiative)**
www.initiative-siv.de