Dutch logistics chains are responsible for handling one quarter of goods that enter Europe. They generate almost nine percent of the Dutch GDP and provide employment for over 650,000 people. Digitisation and sharing data in the logistics chains is essential for the Netherlands to retain its competitive position among the best in the world. This is why the main objective of the Ministry of Infrastructure and Water Management’s Digital Transport Strategy for Goods Transport is the seamless sharing of data within and full digitisation of multimodal goods transport.
The DTS has three milestones:

1. **Paperless transport**, allowing all legally required information from businesses to the authorities regarding cargo, transport and persons to be digitally received and processed by the authorities.

2. **Improved digital collaboration** between authorities active in goods transport that can mutually share data obtained from paperless transport, allowing them to work more efficiently and provide better services.

3. **A BDI**, allowing authorities, businesses and platforms to share high-quality and high-integrity data in a non-centralised manner within a reliable, open and neutral network environment.

**Set of agreements**

Rather than being a new central data platform, the Basic Data Infrastructure (BDI) is a set of agreements for a non-centrally organised digital infrastructure (also called ‘data space’) for international and national logistics; a network of existing and new platforms for businesses and authorities. The BDI will be based on European developments, standards and agreements regarding the design of ‘data spaces’. Since 2019, work has been underway to develop and implement the BDI with a number of chain partners. The DIL programme is the result of this collaboration and is aimed at accelerating and improving the development and practical implementation of the BDI.

**DIL programme as a means to accelerate development of the BDI**

With assistance from the National Growth Fund, the Digital Infrastructure for Logistics programme will accelerate the development and implementation of the BDI during the period 2022-2026. A broadly set up advisory committee led by the Ministry of Infrastructure and Water Management supervises the performance of four work packages:

1. **Further development of the architecture and the various components of the BDI.**
2. **Application of the BDI in Living Labs where concepts and components are assessed in practice.**
3. **Increasing of ‘digital readiness’, especially with regard to SMEs.**
4. **Programme management.**

For now, the DIL Living Labs in work package 2 are mainly aimed at active logistics chains in the main port to hinterland connections, but the programme has room for a few additional living labs. Outside of the DIL, logistics chains will also get started with the implementation of the BDI. This is being applauded: the more parties gain practical experience in using the BDI, the faster its development and adoption will be.

**Technology: the BDI as a set of agreements to be developed for data exchange within logistics**

The BDI will be designed based on international agreements and concepts, more specifically on the reference architecture being developed in the European FEDeRATED project. The BDI is a set of agreements to be developed that allow participating parties to jointly (federatively) create a specific IT network. This IT network makes it possible for logistics data to be reliably shared and/or retrieved from the source after authorisation.

The BDI mainly focuses on event-driven coordination in the physical world where many parties together need to achieve a result: like in logistics. In logistics everything is about contractual agreements, coordination between many (sub)contractors and service providers, and about demonstrating compliance to government bodies such as Customs. The actions required to maintain the physical flow of goods are the trigger for all kinds of ‘events’ in the network.

Knowing that relevant events are taking place and then being able to check the source is very important to all parties involved.

---

1 More information about the BDI can be found at https://topsectorlogistiek.nl/bdi-en-dil-een-afsprakenstelsel-voor-event-gedreven-coordinatie-in-de-logistiek/
The BDI architecture is very rich as a concept, but not all its parts have equal levels of development. This is why a baseline measurement of the architecture's development is required too much effort. The initial less complex use cases without components will have to be added for sharing network, only the missing development of the BDI.

This creates the basis for interoperability and a migration pathway for further development of the BDI.

The minimum is currently defined as:

**Principles:**
1. Viewing data at the source as much as possible.
2. The Data Owner determines who can access the data (Data Sovereignty), even if it is hosted by a delegated party (Data Holder).

**Agreements:**
3. Applying the agreed semantic model, either explicitly or implicitly, with specific variations and expansions being possible depending on the use case.
4. Applying an API and/or SPARQL end point as an access point for the source.
5. Applying Identity & Authentication in the prescribed manner.
6. Applying Authorisation with permissions in the prescribed manner if the Data Owner requires Authorisation.

To be able to create a functioning data sharing network, only the missing components will have to be added for the initial less complex use cases without requiring too much effort.

Not everyone will initially, or even in the long term, require all the capabilities. The extent to which a group of participants does so is their own choice. This choice depends on what a group of participants want to achieve together, which services are required and how the wishes develop over time.

The further practical implementation inside and outside of the DIL programme is aimed at providing more and more increasingly rich capabilities for the BDI. Lots of lessons will be learned here about how the system can be used to maximise its value. In many cases ‘more capabilities’ will be accompanied by ‘implementing more agreements and more components’.

In exceptional cases, a certain capability will require a certain ‘tech stack’ to be used, as there are only a few alternatives.

This is an application of the BDI principles that immediately interfaces with current operational processes and is scalable.

**Expected unloading time**
Providing expected unloading times of containers in ports in accordance with the conditions set by data owners (terminals, shipping companies) allows hinterland transporters to choose a mode of transport at an early stage. These mode of transport choices will lead to a higher modal shift (from road to water). The first test is with 10 to 20 participants, after which several channels and more participants are expected to be added.

**Chain of trust**
Creating a chain of trust for data is essential for the chain security of goods transport, especially in and around the main ports. The aim of this is to prevent the unauthorised use of data and the undermining of data security, for obvious reasons. The essence is that access to and sharing of sensitive data will then only be possible based on authorised roles. Improving the safety of work processes is the primary objective of this.

**Work package 2: Living Labs**
Six Living Labs were initially selected in the DIL programme for testing components of the BDI in practice and in a network of parties within an application:

- **Customs Goods Tracking application (DGV in Dutch)**
  A Customs Goods Tracking application in the port of Rotterdam allows goods to be easily and digitally transferred from, to and via the port terminals and tracked in various customs procedures. This creates a single truth that market parties can check, providing substantial relief of the burden for businesses, greatly improving ‘ease of doing business’, an insight into the process and making real-time enforcement possible and easier. This greatly improves the competitive position of the Netherlands for maritime flows of goods. The development of a DGV encompassing the port means that data needs to be authorised, made available and brought together from several actors in the chain.

- **Transport tracking**
  Tracking of the cargo and in the meantime optimising transport in the port requires selective ‘need-to-know, when-to-know’ sharing of data between many parties involved, from shippers to transporters. This practice-oriented application will be tested with about 150 parties to arrive at a validated use case in a BDI context, which will then be scalable.
- Multimodal air freight chain
The aim of this is to improve the land-side accessibility for air freight. A multimodal air freight chain will be developed for this based on the BDI principles, to improve the delivery and dispatch of air freight by road.

- Container dossier
The current information system for (sea) containers is mainly geared towards port logistics (shipping companies, terminals) to which operators and forwarders connect in the hinterland. However, the entire container ecosystem consists of several share- and stakeholders (carriers, forwarders, operators (barge, rail, truck), inland terminals, shippers, last-mile operators, warehouses, empty depots). The aim is to create a container dossier in accordance with the BDI architecture to allow authorised access to relevant information about the status of containers. This leads to a broader application of the information, examples of which are corridors, regions and the setting-up of market-specific control towers. The challenge lies in the broader field of stakeholders, the maturity of the IT systems and the extent to which parties are aware of each other’s position in the chain.

The DIL programme has room to support a number of new living labs. An assessment framework has been developed for this. Four times a year, the DIL advisory committee will issue recommendations to the chair about possible support for new living labs as part of the DIL.

**Work package 3: increasing ‘digital readiness’**

At the moment, only ten percent of SMEs are sufficiently digitised to be able to make use of the BDI. In order to scale up the BDI, the digital readiness in particular of SMEs in the logistics sector (shippers and transporters) will have to be increased significantly.

Digitisation is generally not an objective in itself for market parties; there needs to be a practical importance. It is therefore often only addressed as an ad-hoc measure if it can make the work faster, cheaper or easier; this usually involves incremental changes.

Further digitisation based on BDI chain considerations will involve all kinds of hard and soft barriers. Understanding and responding to the experiences of entrepreneurs is therefore essential for convincing market parties to start using data and to make them participate in the DIL.

Once that conviction is there, entrepreneurs will also be open to the various incentive schemes from the government that already exist, but of which the vast majority of businesses are not aware.

This requires specific insight by making use of target group segmenting and measuring/monitoring of the effects, e.g. regarding the following indicators:
1. Digital strategy is permanent part of company strategy
2. Paperless working
3. Digital connections are leading
4. Being able to make connections regardless of IT supplier
5. Data accessible (internally and externally)
6. No shadow registrations, everything processed in digital data and systems
7. Data is more important than hard- or software
8. Digitally skilled employees

Having an insight into how businesses handle these indicators makes it possible to adopt a more targeted approach to entrepreneurs and authorities, remove barriers and convince market parties to advance their level of digitisation. A sound network that provides trust based on personal relationships plays a key role in this.

One of the first focus areas within the third DIL work package is improving the understanding of the various groups of entrepreneurs, their status and motivations, preparing a suitable approach through various channels and being able to measure the status and effects of actions. Use will be made here of the knowledge gained at the Ministry of Infrastructure and Water Management (Behavioural Insight Team) and the Logistics Top Sector about influencing the behaviour of SMEs. The next step will be to initiate actions that should result in increased digital readiness and to measure the effects of these actions. One of the general actions is to launch an awareness campaign.

At the end of the programme, all the efforts in DIL work package 3 should result in:
- An increase in the percentage of SME logistics chain parties at level 23 of ‘digital maturity’ or higher from 10% to 50%, in other words, from 7,000 to 35,000 businesses.
- An additional 1,750 participating businesses at level 2 or higher in the DIL Living Lab applications.

One of the key results of the third work package is further inspiring logistics chain partners inside and outside of the primary DIL core target group by means of an integrated marketing/communication campaign, leading to an additional 10 to 15% of businesses independently accelerating their digital transition.

---

Management and support
The DIL programme will contribute greatly to making the BDI tangible and practically applicable. There will be a wide variety of results, from open source software, semantic models, specifications, application guidelines, testing tools, sample implementations to toolkits that make it easier to implement the BDI.

These will initially be managed as part of the programme, and once they are more widely applicable they will be openly provided in Dutch and English: logistics chains and the BDI are international, so the results will also be disseminated internationally. The Logistics Top Sector is setting up a helpdesk for software developers: they will support developers that also want to apply the minimum components and agreements. The plan is for this helpdesk to remain operational during the entire lifespan of the DIL.

Another recipient of the results is the EU: the aim is to actively feed the developments in the EU in the field of data spaces with everything being learned and developed in the Netherlands.

More information?
Please contact
Sjoerd Boot, Ministry of Infrastructure and Water Management responsible for the DIL Programme.

Mail
sjoerd.boot@minienw.nl
Telephone
+31 (0) 6 25 20 28 33
September 2022

Basis data infrastructure
- Open and neutral set of agreements for a digital network with many participants.
- Designed for event-driven coordination in the physical world of freight transport and logistics.
- By accessing data at the source (Data Owner), machine-to-machine.
- Based on a common semantic model (conceptual definitions).
- While the Data Owner controls access (who, what, when) to the source data.

Work package 4: programme management
The DIL programme manager reports to a DIL advisory committee, which issues recommendations to its chair (the Ministry) about:
- programming
- prioritisation and
- budgeting
for all activities required to achieve its objective.

A project office handles the resources and issues the assignments on behalf of the Ministry. With WP3 being responsible for communication to the ‘digital readiness’ target group in the Netherlands, the programme management will handle the communication about the DIL programme and the developments to all national and international stakeholders.