

Tying up loose ends: How data harmonization and data classification foster interoperability and data sharing

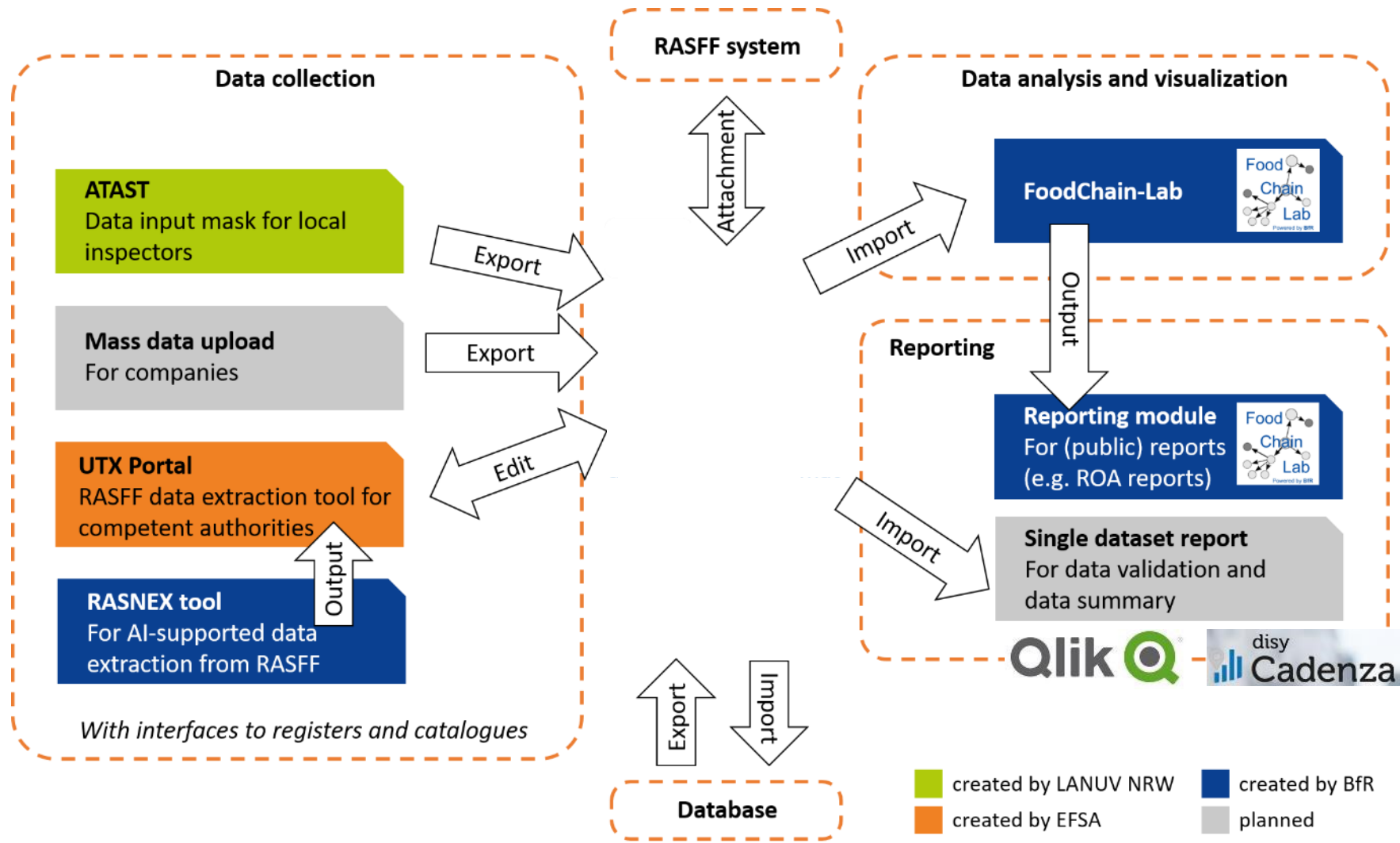
Joint final workshop of the EFSA-BfR traceability projects | 23.01.2025

BfR: Marion Gottschald, Alexander Falenski, Marco Rügen, Latife Salih, Arne Zerndt, Hanna Hauck, Marc Lorenzen, Daria Savvateeva, Matthew Salewski, Bernd-Alois Tenhagen

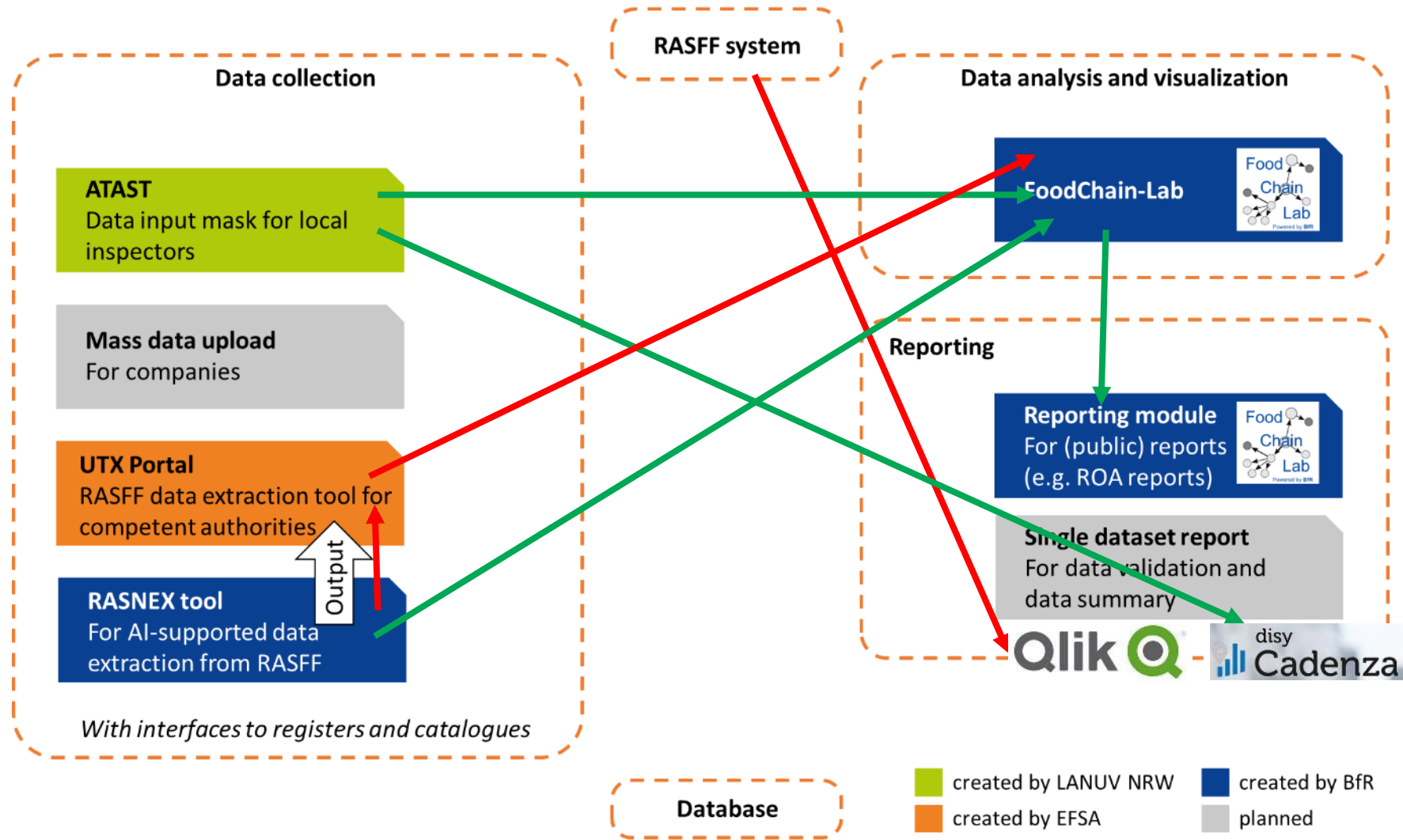
EFSA: Olaf Mosbach-Schulz

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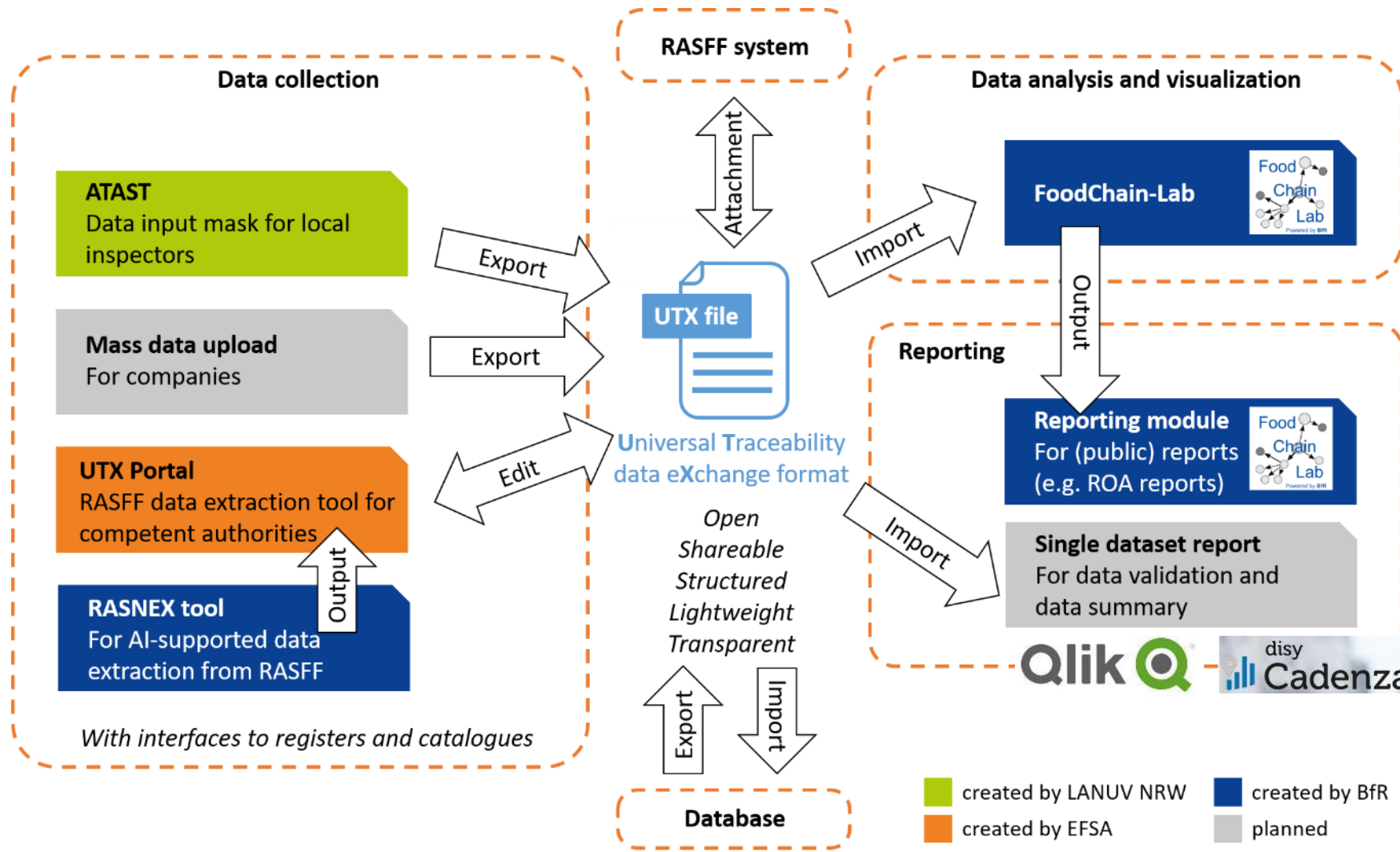
The interoperable multiactor food tracing software ecosystem for Europe



Some data exchange already in practice or under development



The interoperable multiactor food tracing software ecosystem for Europe



Benefits:

- Facilitate data exchange
- Avoid double work
- Easy visualisation + analysis

*Your tool?
Feedback on UTX?*

*Please contact
foodrisklabs@bfr.bund.de*

UTX is the container to move all tracing information at once

Successful collaboration needs successful communication!

The UTX format collects, structures and distributes all information. Additional tools in the workflow make the complex information accessible for the users:

- the UTX portal enables actors to collect and extract relevant information
- the tracing data exchange workflow gathers, consolidates, and analyses inputs from multiple actors
- the collaboration tools support specific reporting needs, final documentation, and overarching analysis of the food and feed system.

**„The whole
is greater
than the sum
of its parts.“**

Aristotle

Universal Traceability data eXchange format (UTX)

Interoperable core data
Standardized, structured informationen



non-interoperable flexible data
Additional tool-specific data

UTX core data:

- Thematic data blocks with hierarchical structure
- Relations between data blocks
- Data blocks with clear structure and controlled vocabulary (catalogues, standards)
- Information stored on highest possible level
- Maximal extent of information vs. minimal requirement of information



Universal Traceability
data eXchange format

Open
Shareable
Structured
Lightweight
Transparent

<i>Main data blocks</i>	Stations	Product	Activity	Information
Hierarchical sub-data blocks	Food business operator	Product	Activity	Investigation
	Station	Lot		Information source
		Traceable resource unit		Contact
				Registration schemes (Measurement)

UTX can be shared between actors (e.g. via the RASFF system)

Will be published on Zenodo in the
next days

Universal Traceability data eXchange format (UTX)

Group	Data element	UTX Variable	UTX Type	UTX Constraints	Description	Examples	Value description
Identification	FBO-ID	id	PK: Text	Unique	Automatically assigned identifier		
Surrogate parameters allowing the identification of a FBO, when the FBO-ID is unknown	Description of the food business	description	Text		Short description of the food business, e.g. usual or brand names		Free text, 1000 characters
Surrogate parameters allowing the identification of a FBO, when the FBO-ID is unknown	Name and address of the food business	fboNameAddress	FK: Contact.id		Official food business name and address as registered, see table Contact		Free text, 200 characters
Surrogate parameters allowing the identification of a station, when the Station-ID is unknown	Website of the food business	website	Text		Website of the food business		
Description:	Start of activities of the establishment	activityStart	DateTime		Start of time period, when the food business was active, or time, when establishment started	Date / time	
Description:	End of activities of the establishment	activityEnd	DateTime		End of time period, when the food business was active, or time, when establishment started	Date / time or on-going (missing)	
Sub-table: List of registrations, certifications and alternative identifications	Alternative registration scheme	registrations[i].registrationScheme	FK: RegistrationSchemes.id		Registration of the food or feed business or case identification for consumer; also other registrations, certifications or other identifications of the food business, e.g. the first digits of the Global Trade Item Number (GTIN) identifying the company	Register-ID	Selected from registration list or newly inserted
Sub-table: List of registrations, certifications and alternative identifications	Registration number	registrations[i].registrationNumber	Text		Registration number in the scheme, e.g. the approval number, the GLOBALG.A.P. number etc.; also the Global Location Number (GLN)	Registration number	Text 80 characters
Sub-table: List of registrations, certifications and alternative identifications	Registration type in alternative scheme	registrations[i].registrationType	CV: RegistrationType		Indicator if the registration is done individually or on cooperative level.		Selection list: -Individual -Cooperative
List of contact persons	Name of contact person	personalContacts	FK: Contact.id[]		Contact persons in the food business or responsible authority to contact for retrieval of information		Selected from contact list or newly inserted
Documentation	Order, invoice, bill of lading, delivery note, receiving inspection, product information sheet	informationSources	FK: InformationSource.id[]	Mandatory	Relevant information describing the FBO.	List of information source-IDs	Selected from the information source table or newly inserted
Remarks	Comments	comments	Text		Any comments regarding the activity, mentionable factors, which might have impact on the investigations.		Free text, 1000 characters
Remarks	Investigation	investigations	FK: Investigation.id[]		Investigation, when entry was evaluated and eventually updated	List of Investigation-IDs	Selected from the Investigation table or newly inserted
Remarks	Last evaluation	lastEvaluationAt	DateTime		Date and time of the last evaluation of this entry		Automatic time stamp after explicit confirmation

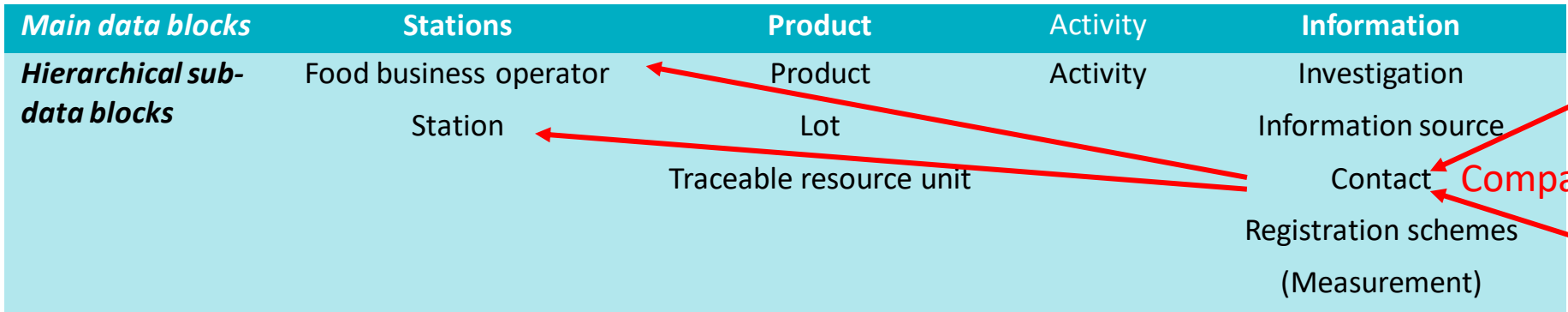
Universal Traceability data eXchange format (UTX)

Group	Data element	UTX Variable	UTX Type	UTX Constraints	Description	Examples	Value description
Identification	Contact-ID	id	PK: Text	Unique			
Surrogate parameters allowing the identification of a station, when the Contact-ID is unknown	Name	name	Text		Name of the responsible contact person or unit for functional contacts; company name if contactType = "Station"		
Surrogate parameters allowing the identification of a station, when the Contact-ID is unknown	Role	role	Text		Short description on responsibilities at FBO, e.g. general contact, contact for specific food sectors, establishments, investigations etc., deputy		
Surrogate parameters allowing the identification of a station, when the Contact-ID is unknown	Contact type	contactType	CV: ContactType		Needed to differentiate a personal contact from a company contact (company address); automatically assigned: "Station" if linked to Station.stationNameAddress, "FBO" if linked to FBO.fboNameAddress, else "Personal"		Hidden list, automatically assigned: -Station; -FBO; -Personal;
Surrogate parameters allowing the identification of a station, when the Contact-ID is unknown	Address: Street	addressStreet	Text		Address to identify the physical location of the establishment; transport: where the transportation mean is regularly checked, cleaned, maintained, supplied; or postal address for sending letters; if FBO: Official postal address of the food business as registered; INSPIRE component: ThoroughfareName	INSPIRE scheme for coding of European addresses	
Surrogate parameters allowing the identification of a station, when the Contact-ID is unknown	Address: House Number	addressNumber	Text		Address to identify the physical location of the establishment; or postal address for sending letters; if FBO: Official postal address of the food business as registered; INSPIRE component: Locator Designator Type 1	INSPIRE scheme for coding of European addresses	
Surrogate parameters allowing the identification of a station, when the Contact-ID is unknown	Address: Other	addressOther	Text	Hidden to user, until he/she states that there are problems to enter all address details; then visible; free text	Anything in addition to the address information; or postal address for sending letters; if FBO: Official postal address of the food business as registered		
Surrogate parameters allowing the identification of a station, when the Contact-ID is unknown	Address: Building	addressBuilding	Text		Address to identify the physical location of the establishment; or postal address for sending letters; if FBO: Official postal address of the food business as registered; INSPIRE component: Locator Name Type 2 + Local Designator Type 5 (building name plus number)	INSPIRE scheme for coding of European addresses	
Surrogate parameters allowing the identification of a station, when the Contact-ID is unknown	Address: ZIP	addressZip	Text		Address to identify the physical location of the establishment; or postal address for sending letters; if FBO: Official postal address of the food business as registered; INSPIRE component: not found	INSPIRE scheme for coding of European addresses	
Surrogate parameters allowing the identification of a station, when the Contact-ID is unknown	Address: City	addressCity	Text		Address to identify the physical location of the establishment; or postal address for sending letters; if FBO: Official postal address of the food business as registered; INSPIRE component:	INSPIRE scheme for coding of European addresses	

Universal Traceability data eXchange format (UTX) – the schema

```
{
  utxCore : {
    fbos : {
      current : [ 9 items ]
      0 : {
        id : bd6022ce-8cfa-4344-b31c-69c3253510bf
        informationSources : [ 1 item ]
        name : La Source des Herbes
        addressCountry : BE
        latitude : 50.807253
        longitude : 4.314988
        addressStreet : Rue de l'Eau - Waterstraat 1
        addressCity : Forest - Vorst
        addressCounty : Brussels-Capital
        addressZip : 1190
        investigations : [ 1 item ]
        registrations : [ 1 item ]
      }
      1 : {
        id : 7213ac0b-8803-4723-aa1c-e85ff62d3627
        informationSources : [ 1 item ]
        name : Exclusive Foxon Trading
        addressCountry : NL
        latitude : 51.9036302
        longitude : 4.3852621
        addressStreet : Nieuwe Waterwegstraat
        addressCity : Schiedam
        addressCounty : South Holland
        addressZip : 3115HE
        investigations : [ 1 item ]
        registrations : [ 1 item ]
      }
    }
  }
}
```

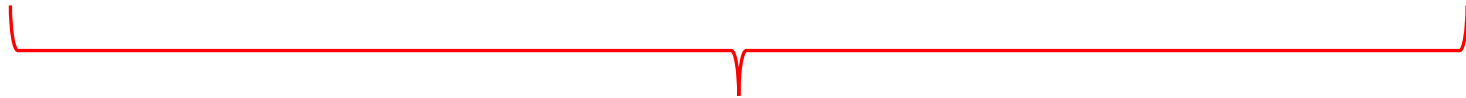
Supporting tools to fill UTX



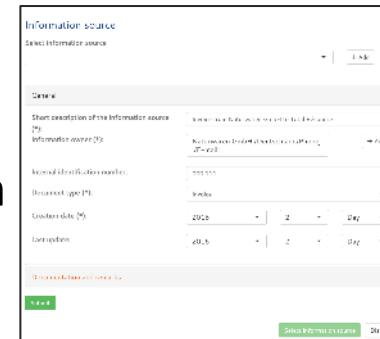
RASFF NT FBO data base

Company names + addresses

RASNEX dashboard for AI supported automated data extraction from RASFF notifications

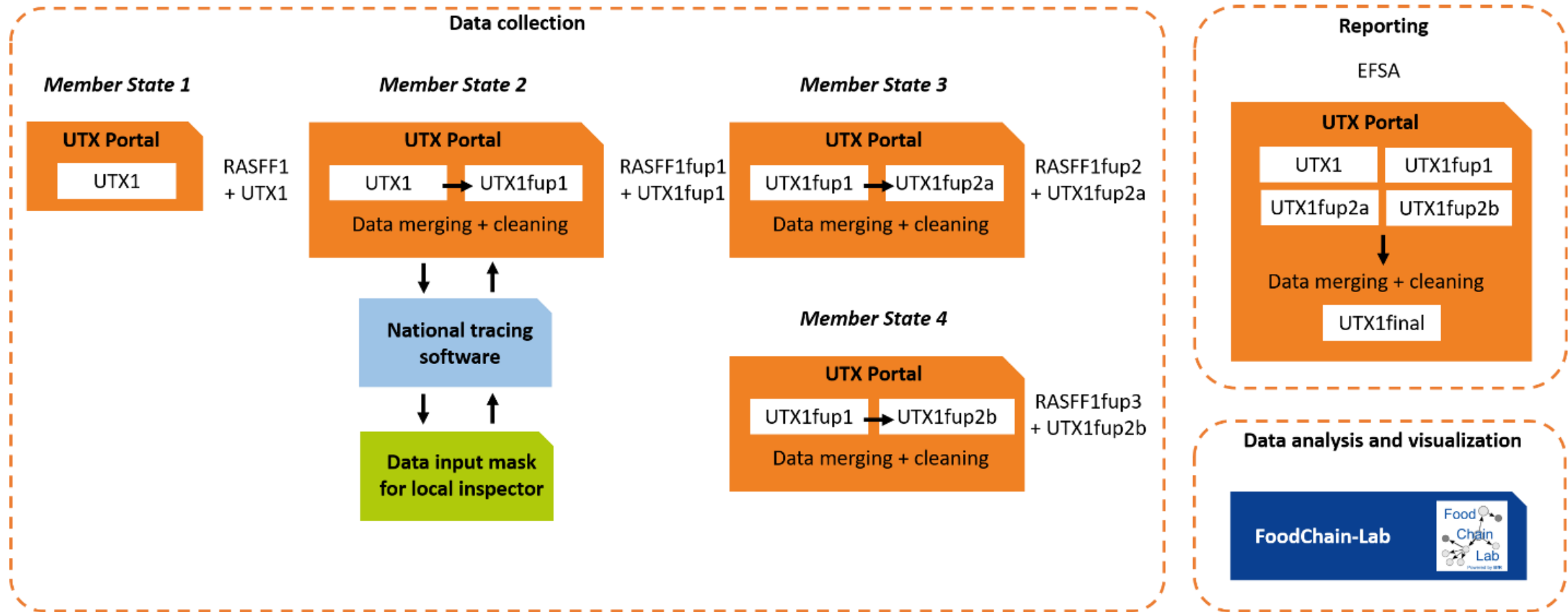


UTX Portal
Guided and structured manual data extraction



Potential workflow for data exchange using UTX

- uses the RASFF system for exchange
- communicates via UTX files
- exchanges structured information



Similar developments on EU level: iRASFF NT

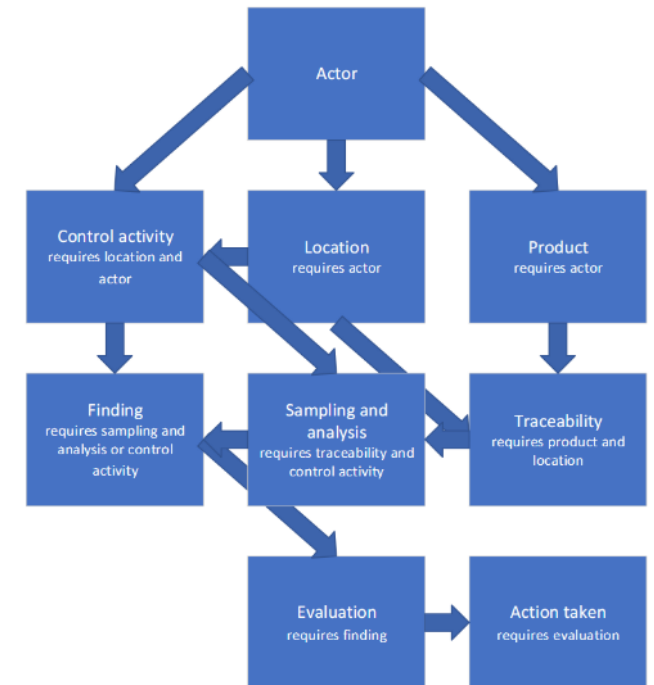
All figures by Jan Baele: https://foodrisklabs.bfr.bund.de/wp-content/uploads/2023/12/EC-presentation_traceability-workshop.pdf

Renewal of RASFF system

The screenshot displays the iRASFF NT web interface. It is divided into two main sections: 'General information' and 'Risk'. The 'General information' section includes fields for 'Reference' (A001RASFF number 504059), 'Current Status' (New), 'Notification type', 'Notification basis', 'Notification classification', 'Notifying country' (European Commission), 'Notifying organization' (European Commission), 'Date of notification' (05/08/2022), and 'Subject'. There are also checkboxes for 'INFOSAN (to be) informed', 'Reason INFOSAN', 'eCommerce related', and 'Mutual recognition'. The 'Risk' section includes 'Risk decision' and 'Impact on' dropdown menus, a 'Motivate risk decision' text area, 'Number of persons affected', 'Type of illness/symptoms', 'Hazards observed', and 'EU legislation' with 'Reference' and 'Title' fields. At the top right, there are buttons for 'Check', 'Validate', 'Delete', 'Close', and 'Save'.

iRASFF → iRASFF NT

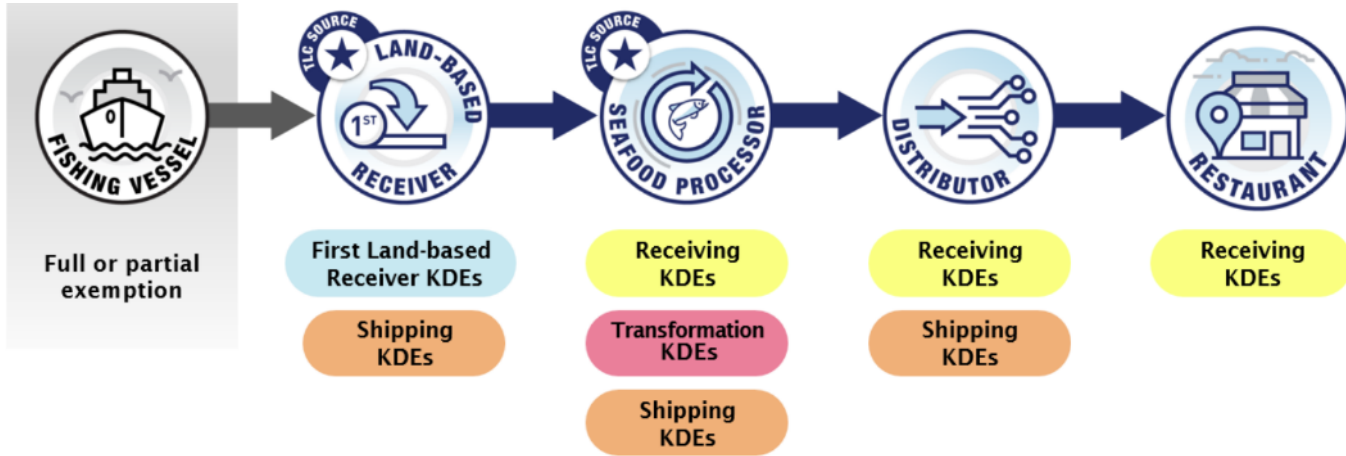
- Relying on data blocks with relations
- Use of standards (FoodEx2, SSD2)
- Focus on interoperability with other systems (TRACES)



UTX should not put double work on MS!
Digital data formats can be translated

Similar development: FDA's New Era of Smarter Food Safety

„Food Traceability Rule“ for harmonized data and data sharing



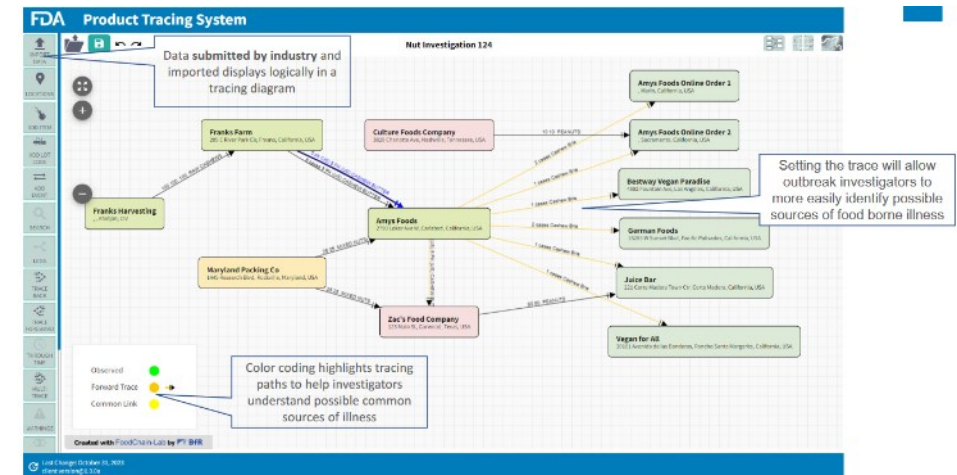
Demo video of PTS + FCL in action

<https://www.fda.gov/food/new-era-smarter-food-safety/product-tracing-system>



Product Tracing System

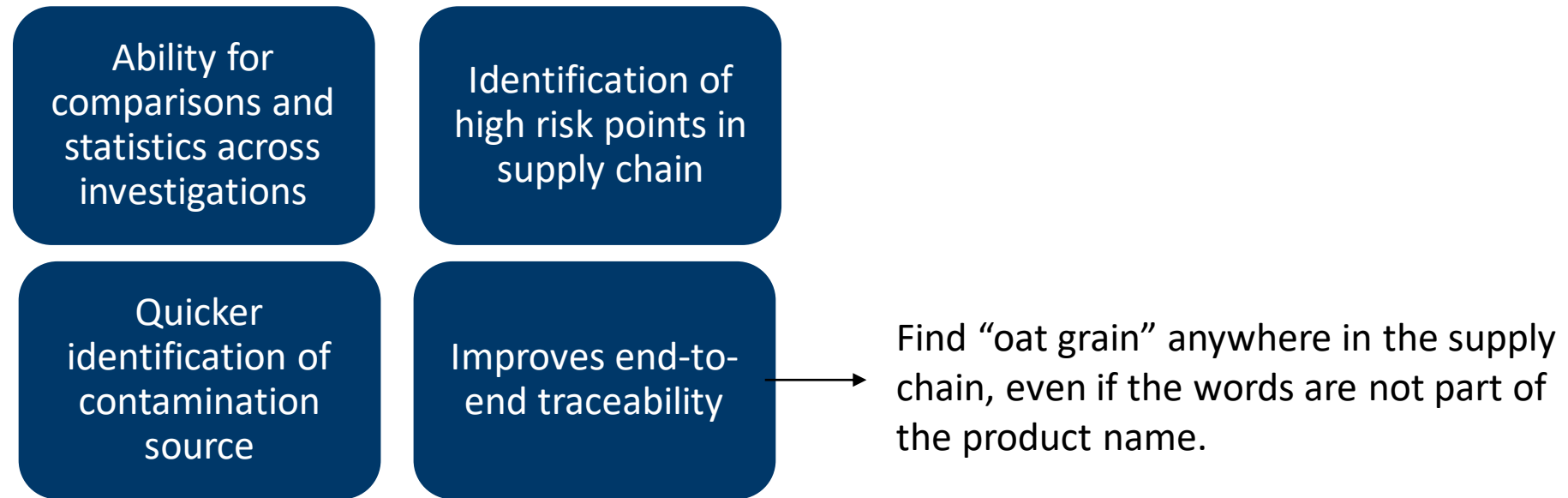
- Receive, process and visualize traceability data
- Improve traceback and traceforward analysis
- Government and industry collaboration
- FCL integrated in FDA system



Collaboration between FDA and BfR

Digging deeper: from data format to data classification

Going from harmonization of data items (e.g. type of business) to harmonization of used vocabulary at those data points (producer, processor)



Literature review on classification systems used for tracing

A taxonomy for classification of foods in supply chains?

Ontologies

- Highest level of harmonization through semantic relations between entries + controlled vocabulary
- Not widely used by MS
- Currently not applicable for tracing

→ **Not usable**

FoodEx2

- Comprehensive food classification and description system
- Widely used by EFSA and the EU Member States
- Designed for particular steps in the supply chain, like processed food or raw material

→ **Usable**

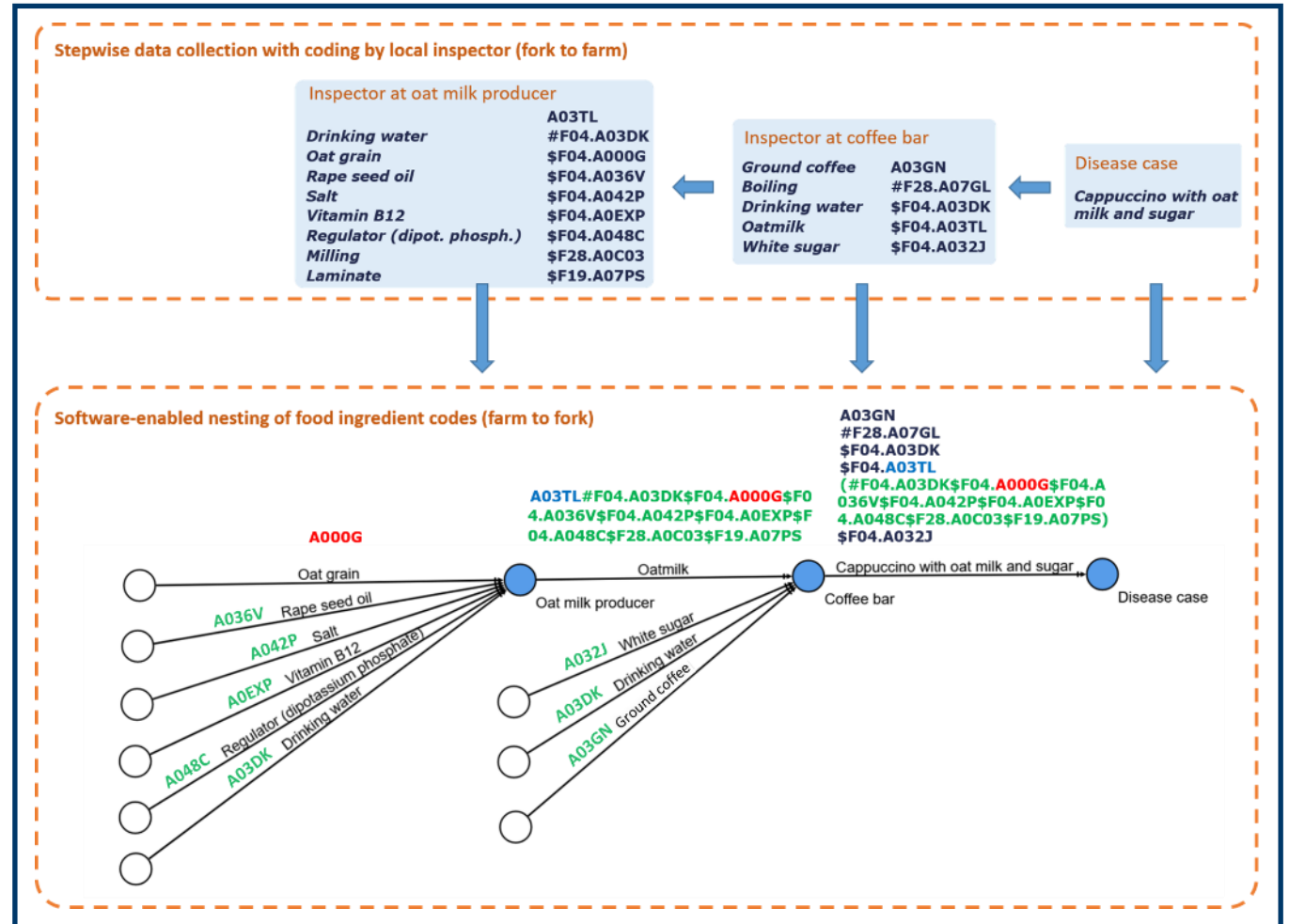
Coding strategy for products and ingredients

Concept

- Import the tracing data into software tools (e.g. FCL)
- FoodEx2 Smart Coding Application plus manual matching attaches FoodEx2 names and codes to the products / ingredients
- Software creates a growing chain of codes in a nested approach
- The search text “oat grain” would be translated into the FoodEx2 code by the software in the background. Then all “code chains” containing this code would be highlighted in the graph.

Result

Find “oat grain” anywhere in the supply chain, even if the words are not part of the product name.



Understanding UTX – A moodle course



Startseite Dashboard Meine Kurse Website-Administration

Mastering the Universal Traceability data eXchange (UTX) format

Kurs Einstellungen Teilnehmer/innen Bewertungen Berichte Mehr v

> Course description

Alles einklappen

Overview & course objectives



This course is designed to provide you with a comprehensive understanding of the Universal Traceability data eXchange (UTX) format. Rather than focusing on the technical intricacies, we will emphasize the key concepts of the UTX format – what it is, how it is structured, and its significance in the food traceability ecosystem. You will explore UTX's role in achieving interoperability between tracing software tools, and its contribution to efficient data exchange.

The course will be delivered through a combination of lectures, readings, videos, and quizzes, ensuring that you gain a thorough understanding of UTX and its impact.

Course objectives

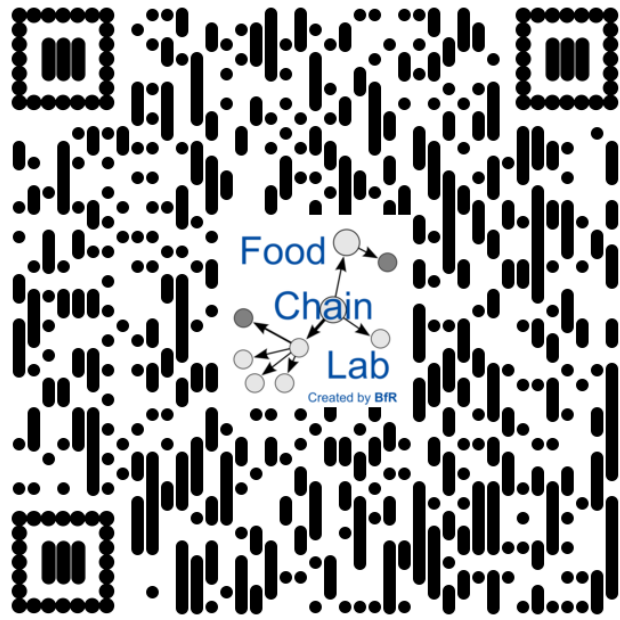
- Understand the principles and importance of the Universal Traceability data eXchange (UTX) format
- Explore the structure and key components of the UTX format
- Understand how UTX enhances traceability and data interoperability

The course clarifies...

- Why the data format is needed for the exchange of tracing data
- The concept behind the new data format
- The properties of the data file

Course material

- Slides, pictures, a video
- Quizzes
- A forum for questions and answers



Marion Gottschald

**German Federal Institute for
Risk Assessment**

Tel. +49 30 - 184 12 - 88888
foodrisklabs@bfr.bund.de
<https://foodrisklabs.bfr.bund.de>

Thank you for your attention! 

German Federal Institute for Risk Assessment

EFSA-BfR tracing team

BfR: Marion Gottschald, Alexander Falenski, Matthew Salewski, Daria Savvateeva,
Marc Lorenzen, Latife Salih, Marco Rügen, not in picture: Arne Zerndt + Hanna Hauck
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