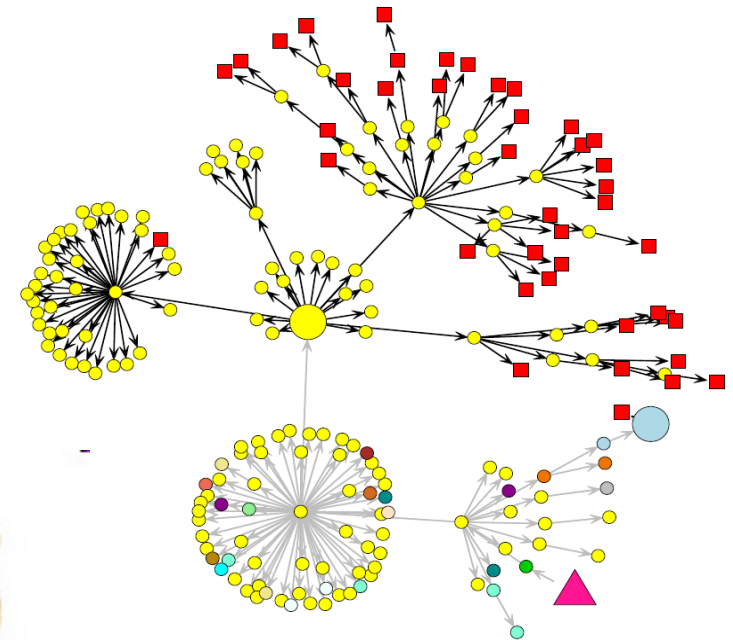


FoodChain-Lab



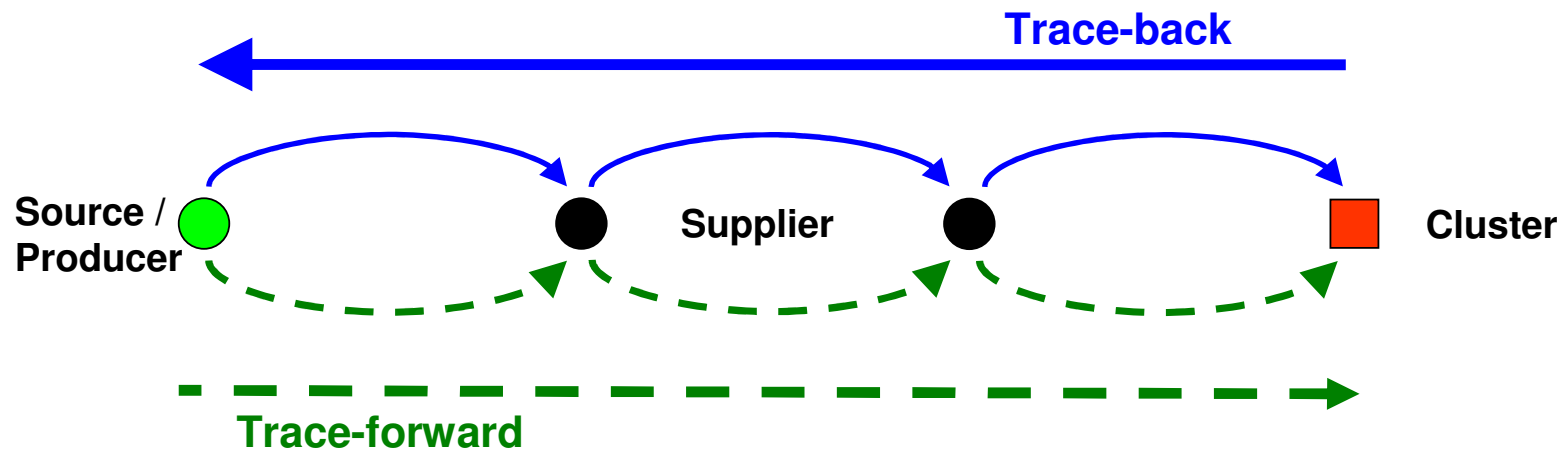
**Armin Weiser, Christian Thöns, Matthias Filter,
Annemarie Käsbohrer, Bernd Appel**

Outline

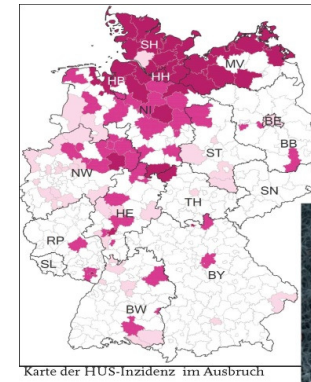
1. Introduction
2. Data Management
3. Analysis
4. Live Demo

Tracing - Methodology

- „Disease-Clusters“ are identified (by public health authorities)
- Supply Chain Analysis:
 - Trace-back is performed in order to identify common nodes of different clusters: Cluster → Source
 - Trace-forward is performed in order to identify further yet unknown or potential clusters: Source → further Clusters
- This strategy is usually followed in the context of an ongoing process involving company audits and local sampling.



EHEC O104:H4 outbreak



Karte der HUS-Inzidenz im Ausbruch

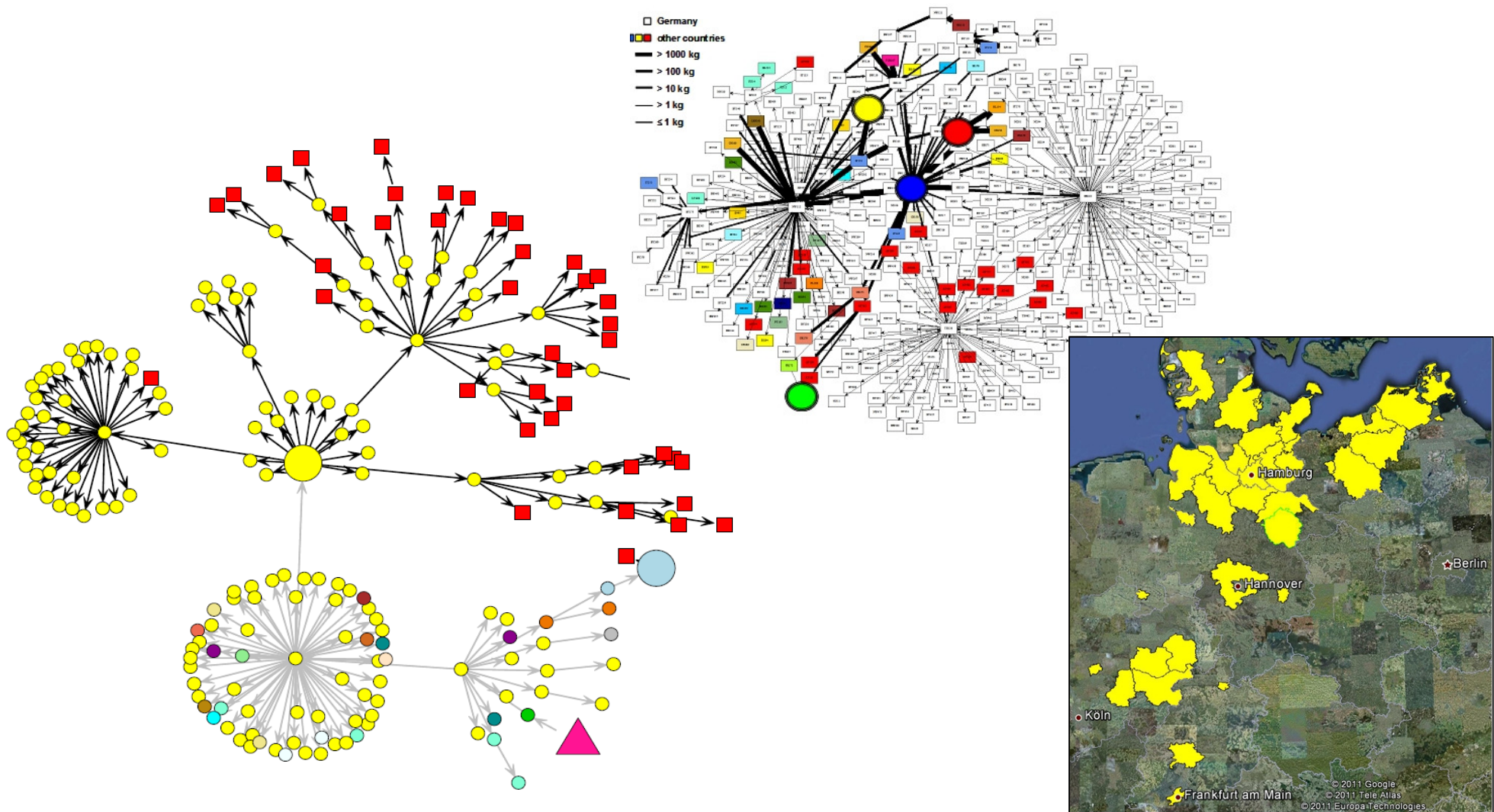


The fatal outbreak from May until July 2011 claimed 53 deaths and about 4000 seriously ill people in Germany, furthermore 75 cases in 12 EU states and 8 worldwide cases.

Suspected causative vehicle: fenugreek sprouts from imported seeds from Egypt.



FoodChain-Lab – ad hoc



Weiser et al., 2013: “Trace-Back and Trace-Forward Tools Developed Ad Hoc and Used During the STEC O104:H4 Outbreak 2011 in Germany and Generic Concepts for Future Outbreak Situations”, **Foodborne Pathog Dis.** 2013.

The case of the Norovirus outbreak



- A total of **10.950 cases**, averagely 10 years old
- At least **390 affected facilities (cluster)**, almost exclusively schools and kindergartens
- Associated to one main catering company and some minor ones
- Ongoing outbreak was detected and submitted to state authorities on Thursday, Sept. 27th 2012

Foodborne outbreaks in the EU

Year	Number of foodborne Outbreaks	Outbreaks with identified foodstuff
2007	5733	1784
2008	5332	890
2009	5550	977
2010	5262	698
2011	5648	701

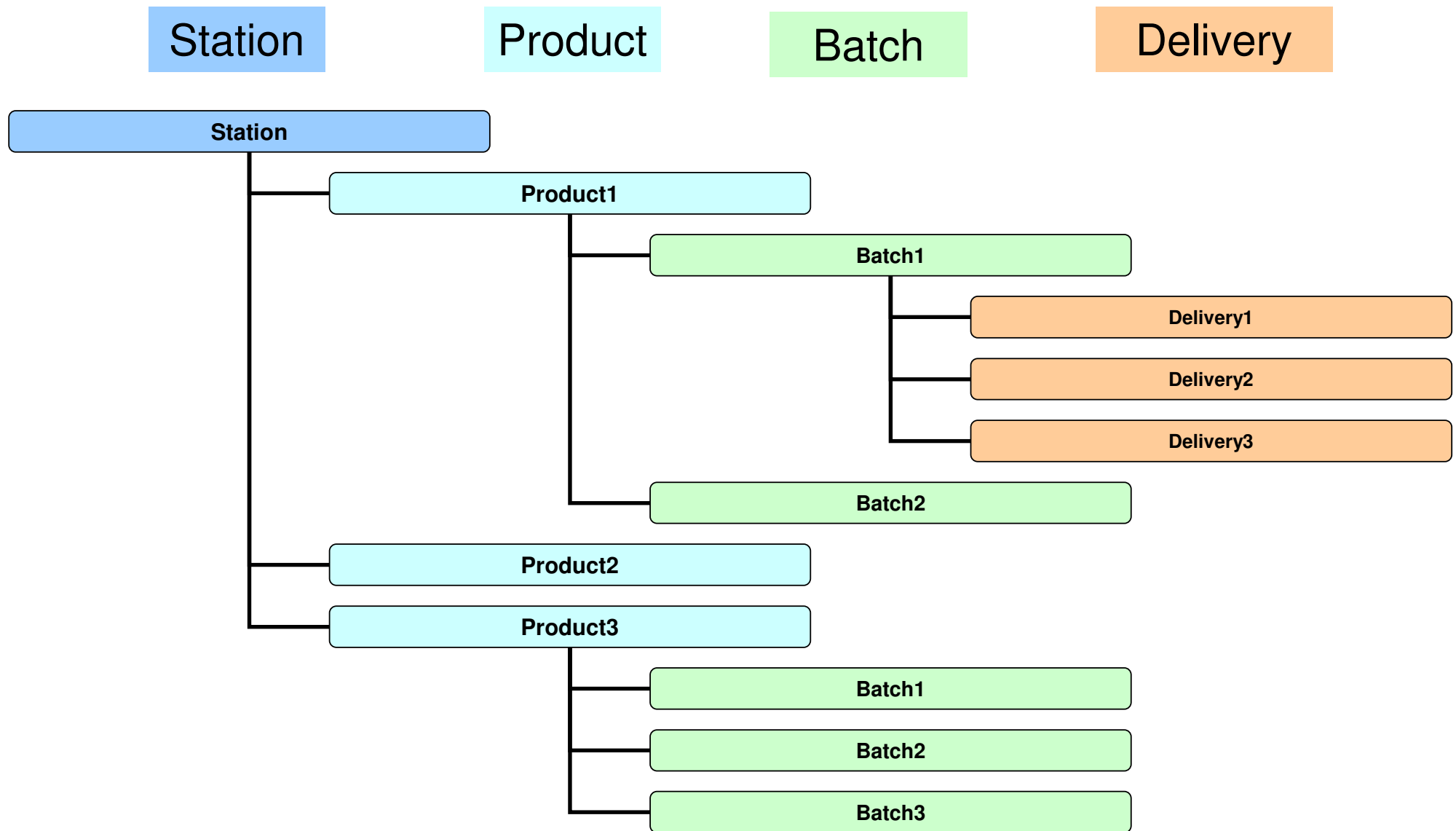
Source: EFSA



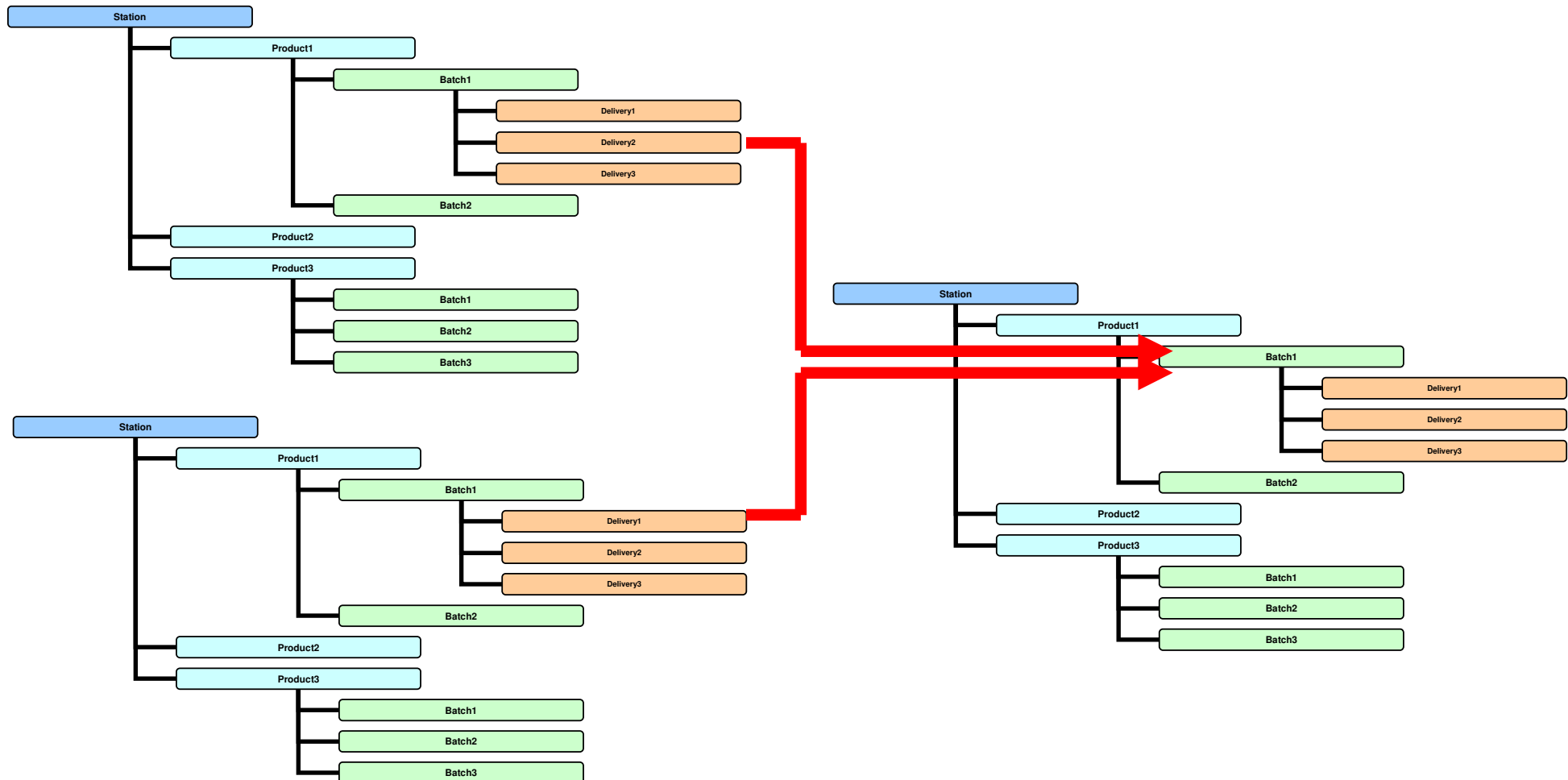
FoodChain-Lab - What is it?

- Database Unit
 - Data Consolidation Unit
 - Calculation Unit
 - Visualization Unit
 - GIS Nodes
- <http://sourceforge.net/p/bfropenlab/wiki/Home/>
christian.thoens@bfr.bund.de

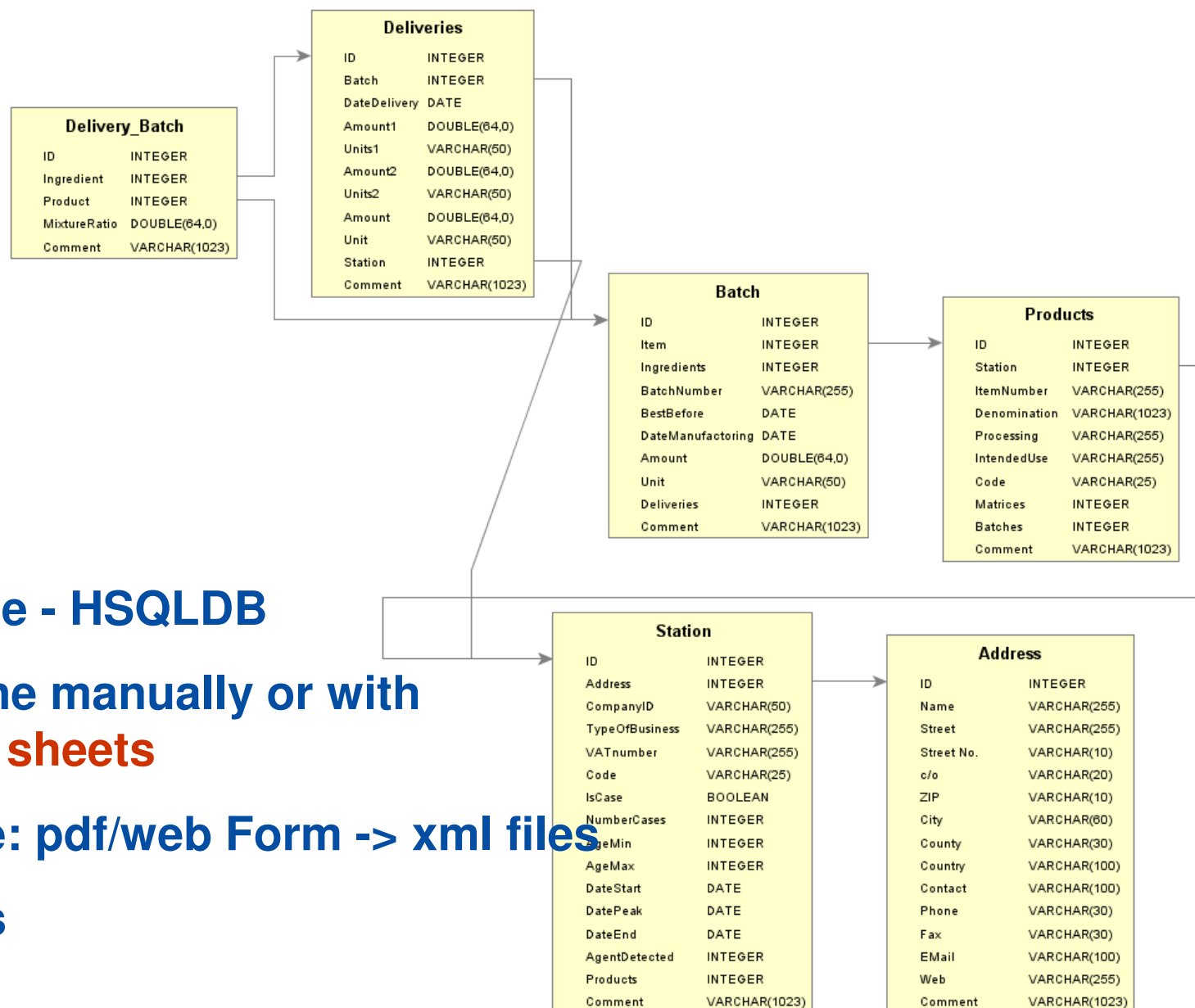
Data Management - Structure



Data Management - Structure

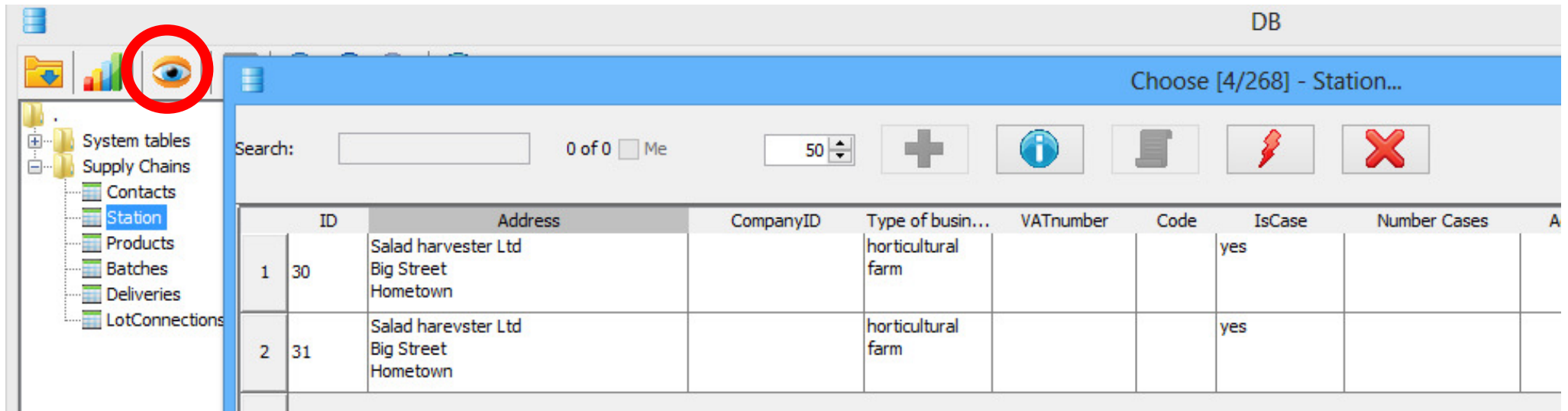


Data Management - Structure



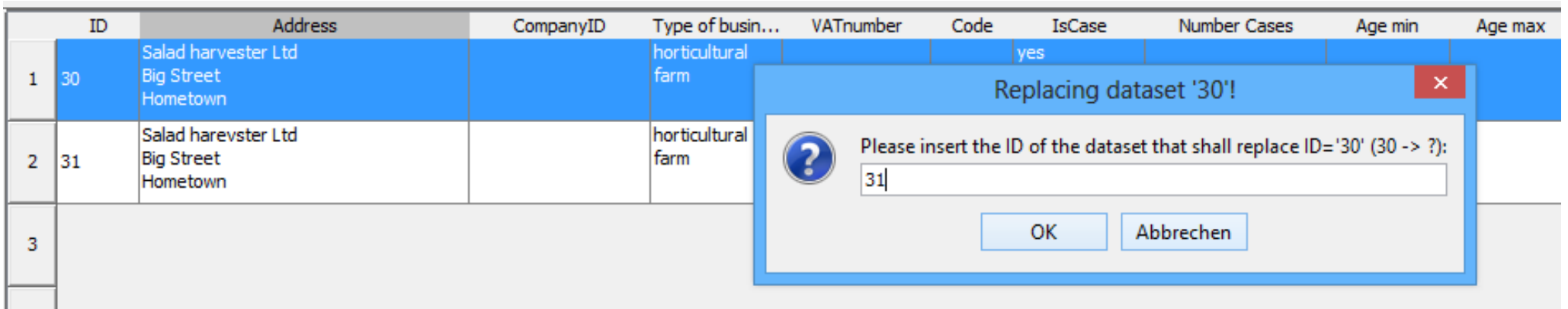
- Relational database - HSQLDB
- Input/Import is done manually or with **well-defined Excel sheets**
- Input/Import future: pdf/web Form -> xml files
- Plausibility checks

Data Management - Similarity Search



The screenshot shows a database management interface with a table of data. A red circle highlights an eye icon in the top left corner. The table has columns: ID, Address, CompanyID, Type of busin..., VATnumber, Code, IsCase, Number Cases, and Age min. The data rows are:

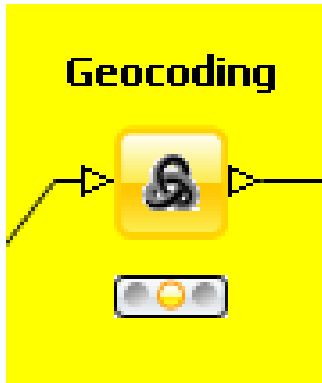
ID	Address	CompanyID	Type of busin...	VATnumber	Code	IsCase	Number Cases	Age min
1 30	Salad harvester Ltd Big Street Hometown		horticultural farm			yes		
2 31	Salad harevster Ltd Big Street Hometown		horticultural farm			yes		



The screenshot shows the same database management interface, but with a dialog box open. The dialog box is titled "Replacing dataset '30'!" and contains the text: "Please insert the ID of the dataset that shall replace ID='30' (30 -> ?):". The input field contains the value "31". The dialog box has "OK" and "Abbrechen" buttons.

ID	Address	CompanyID	Type of busin...	VATnumber	Code	IsCase	Number Cases	Age min	Age max
1 30	Salad harvester Ltd Big Street Hometown		horticultural farm			yes			
2 31	Salad harevster Ltd Big Street Hometown		horticultural farm						
3									

Data Management - Geocoding/Orthography



Google Developers

Google Places API (最新版) X Suchen

Start Produkte Konferenzen Schaulenster Live Gruppen

Google Places API +1 1

Getting Started

Looking to use this service in a JavaScript application? Check out the [Places Library](#) of the Google Maps JavaScript API.

The Google Places API is a service that returns information about Places — defined within this API HTTP requests. Place requests specify locations as latitude/longitude coordinates.

[Introducing the API](#)
[Authentication](#)
[Places API Enterprise Customers](#)
[Requirements and Usage Limits](#)

Introducing the API

The following Place requests are available:

- [Place Searches](#) return a list of Places based on a user's location or search string.
- [Place Details](#) requests return more detailed information about a specific Place, including user ratings and reviews.
- [Place Actions](#) allow you to supplement the data in Google's Places Database with data from Place rankings from user activity with [Place Bumps](#).
- [Place Photos](#) gives you access to the millions of Place related photos stored in Google's Photos.
- [Places Autocomplete](#) can be used to provide autocomplete functionality for text-based geocoding.
- [Query Autocomplete](#) can be used to provide a query prediction service for text-based geocoding.

Each of the services is accessed as an HTTP request, and returns either an JSON or XML response a key and a sensor parameter.

Google Developers

Google Maps API X Suchen

Start Produkte Konferenzen Schaulenster Live Gruppen

Google Maps API-Webdienste +1 3

Einführung

Directions API

Distance Matrix API

Elevation API

Geocoding API

Blog

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Häufig gestellte Fragen

Google Geocoding API

[Was ist Geocodierung?](#)

[Zielgruppe](#)

[Nutzungsbegrenzungen](#)

[Geocodierungsanfragen](#)

[Geocodierungsantworten](#)

[JSON-Ausgabeformate](#)

[XML-Ausgabeformate](#)

[Statuscodes](#)

[Ergebnisse](#)

[Adresskomponententypen](#)

[Umgekehrte Geocodierung](#)

[Gewichtung des Darstellungsbereichs](#)

[Regionengewichtung](#)

[Komponentenfilterung](#)

Im vorliegenden Dokument wird die neueste Version des Geocoding APIs (Version 3) erörtert. Beachten Sie, dass das alte [Geocoding API Version 2](#) nicht mehr unterstützt wird. Nutzer dieses Diensts sollten ein Upgrade auf diese Version ausführen.

Möchten Sie diesen Dienst in einer JavaScript-Anwendung verwenden? Sehen Sie sich die Klasse [Geocoder](#) des Google Maps APIs Version 3 an.

Was ist Geocodierung?

Die Geocodierung ist der Vorgang der Konvertierung von Adressen (z. B. "1600 Amphitheatre Parkway, Mountain View, CA") in geografische Koordinaten (z. B. geografische Breite 37.423021 und geografische Länge -122.083739), die Sie verwenden können, um Markierungen zu setzen oder die Karte zu positionieren. Das Google Geocoding API bietet eine direkte Möglichkeit, über eine HTTP-Anfrage auf einen Geocodierer zuzugreifen. Zusätzlich können Sie mit dem Dienst den Umkehrprozess (die Umwandlung von Koordinaten in Adressen) ausführen. Dieser Prozess wird als "umgekehrte Geocodierung" bezeichnet.

DEMO

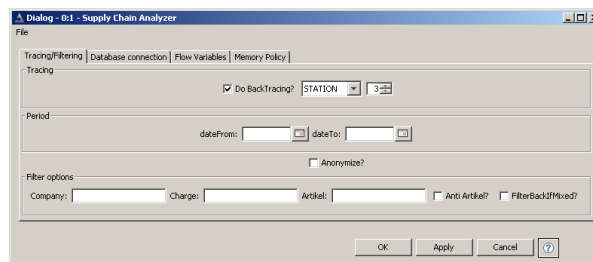
FoodChain-Lab

Tracing back

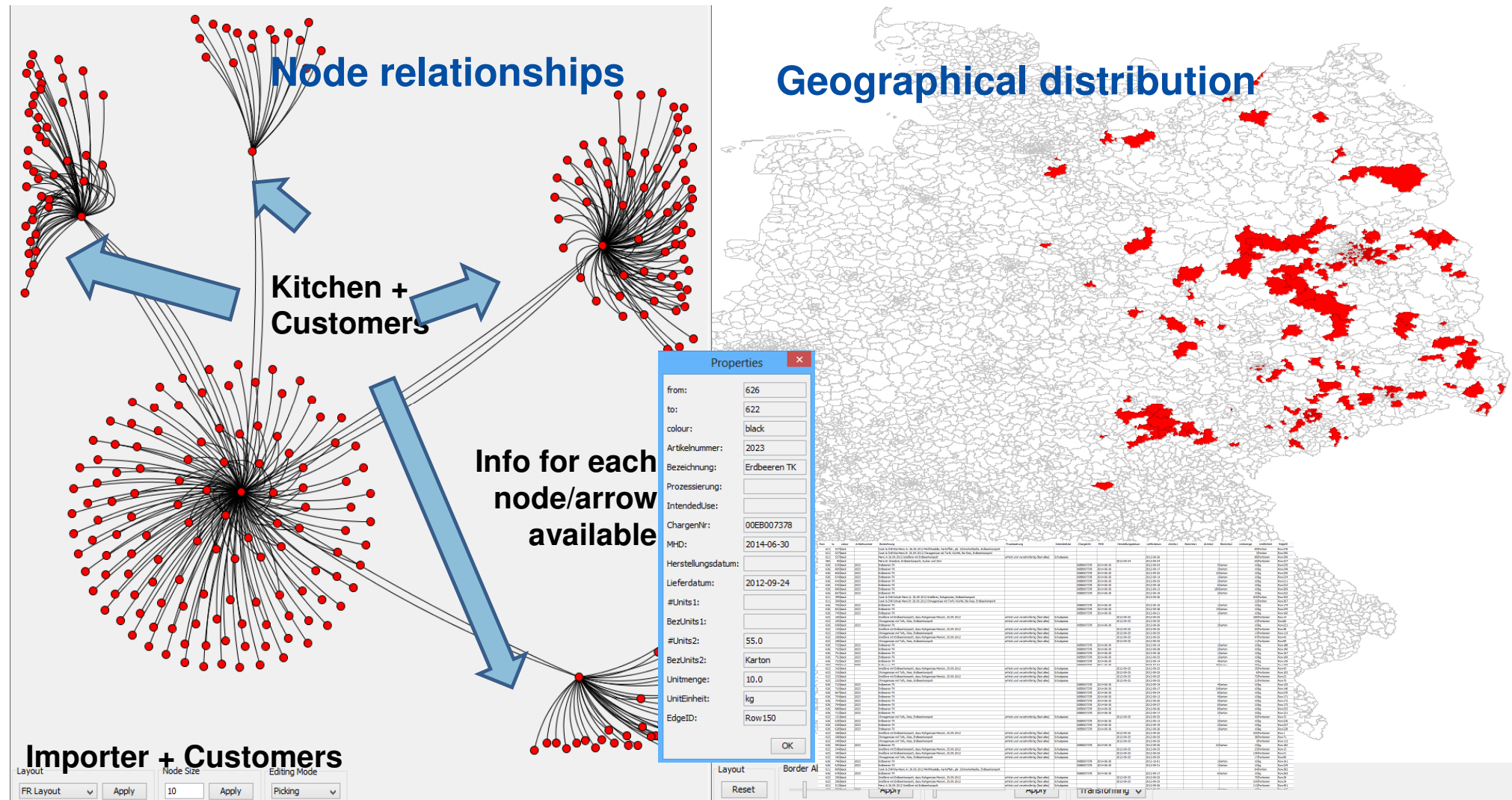
Starting points for all analyses are predefined outbreak clusters

4 Levels of analysis:

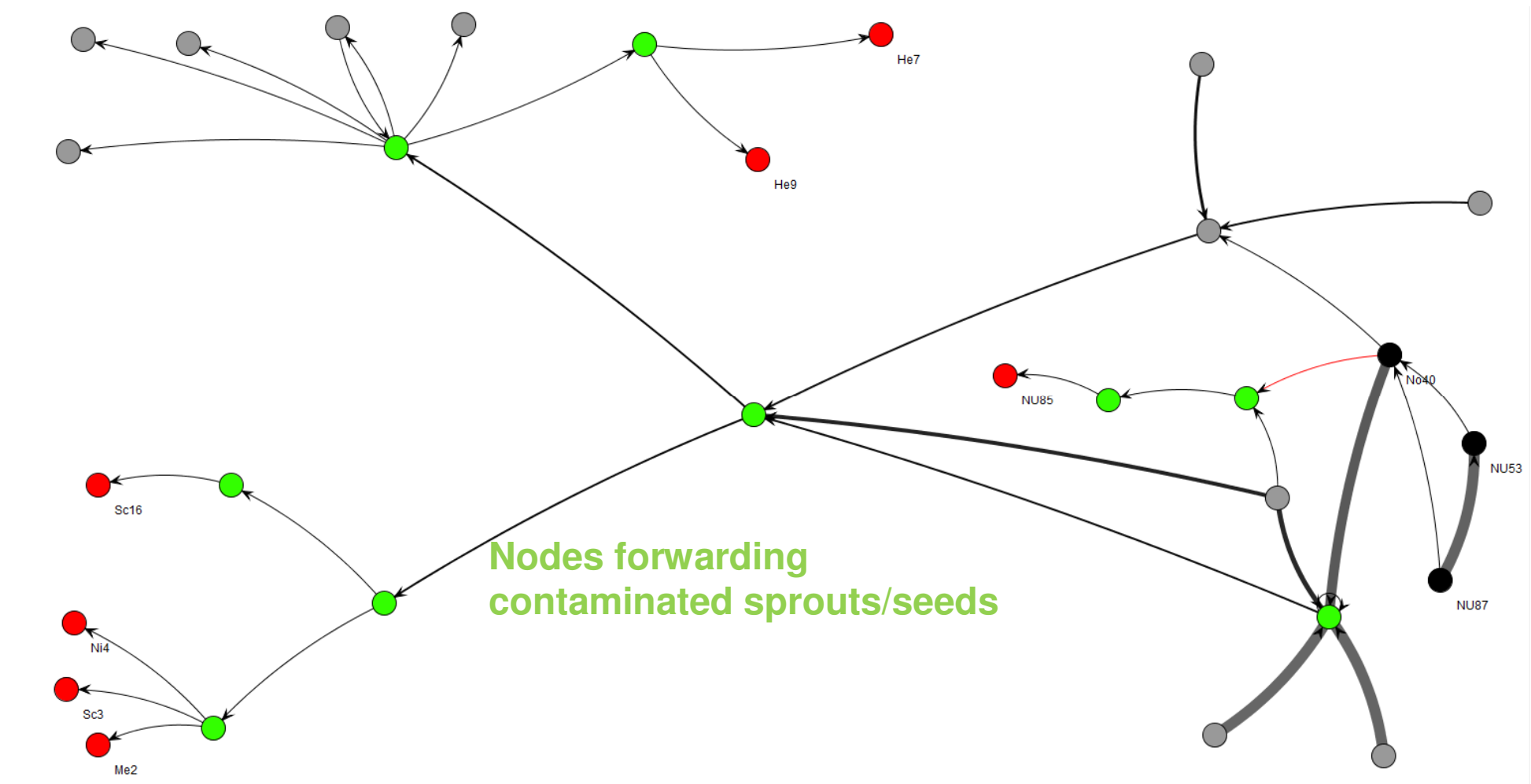
- Station: search for a common distributor/producer
 - Article: search for a common product of a distributor/producer
 - Charge: search for a common charge of a product
 - Delivery: search for a common delivery of a charge
-
- Tracing unsuccessful?
 - Reduction of the number of outbreak clusters
 - Re-Definition of Clusters
 - Analysis and Visualization are quick and highly customizable



Strawberry distribution Map



The case of the EHEC outbreak – node relationships



Outbreak Cluster

Sources of the outbreak



Thank you for your attention

Armin Weiser

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