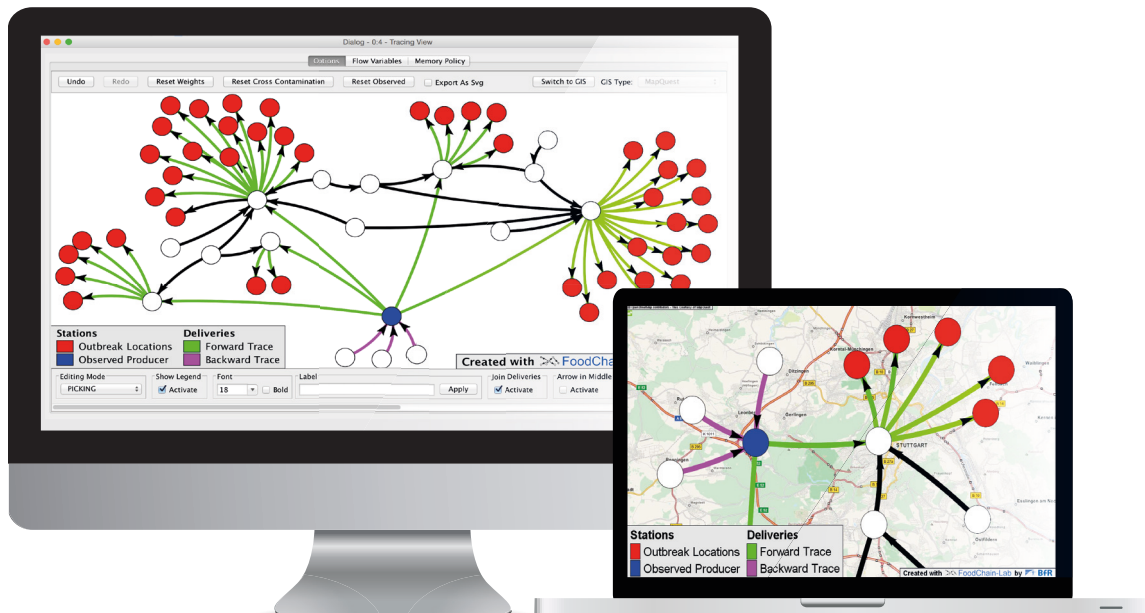


Food may contain hazards (e.g. viruses or bacteria) which can be harmful for humans and lead to foodborne disease outbreaks. These outbreaks and their investigations are becoming increasingly complex due to changing patterns in the global food production and supply chain networks resulting in more and more complex delivery networks. FoodChain-Lab helps you to collect, handle and analyze the huge amounts of food delivery data needed in such an investigation.

- ✓ **It's free and open-source:**  
Can be downloaded from <http://foodrisklabs.bfr.bund.de>. Works on Windows, OS X and Linux.
- ✓ **Assists in data collection and management:**  
FoodChain-Lab comes with an integrated database and Excel templates for data collection.
- ✓ **Helps to get a visual look at your data:**  
FoodChain-Lab provides customizable visualizations of food delivery networks.
- ✓ **Helps to test/generate hypotheses:**  
You can enter your assumptions and directly see the results.
- ✓ **Learning Resources are provided:**  
Tutorials and documentation is available on <http://foodrisklabs.bfr.bund.de>.



*FoodChain-Lab combines analysis of food delivery networks with GIS (geographic information system) tools.  
(Source: OpenStreetMap-Contributors – Tiles Courtesy of MapQuest)*

## Powerful Visualization

Data analysis very often involves the visualization of the data. FoodChain-Lab provides advanced methods to visualize the food delivery network.

Algorithms are used to automatically arrange the graph in a clear way. Almost everything is customizable (colours, labels, sizes), e.g.:

- Set Color of all outbreak locations to red
- Label all deliveries with product name

## User defined Simulations

FoodChain-Lab allows running simulations based on cross contamination during production/processing and weighting for outbreak locations.

Put in your parameter values and scores are automatically computed for all suppliers and products. A score indicates the likelihood, that a certain product/supplier (e.g. a food production facility) is related to the outbreak.

## Geographical Analysis

FoodChain-Lab provides multiple features for an analysis based on geographical parameters. The visualization component allows you to view the delivery network on a geographical map.

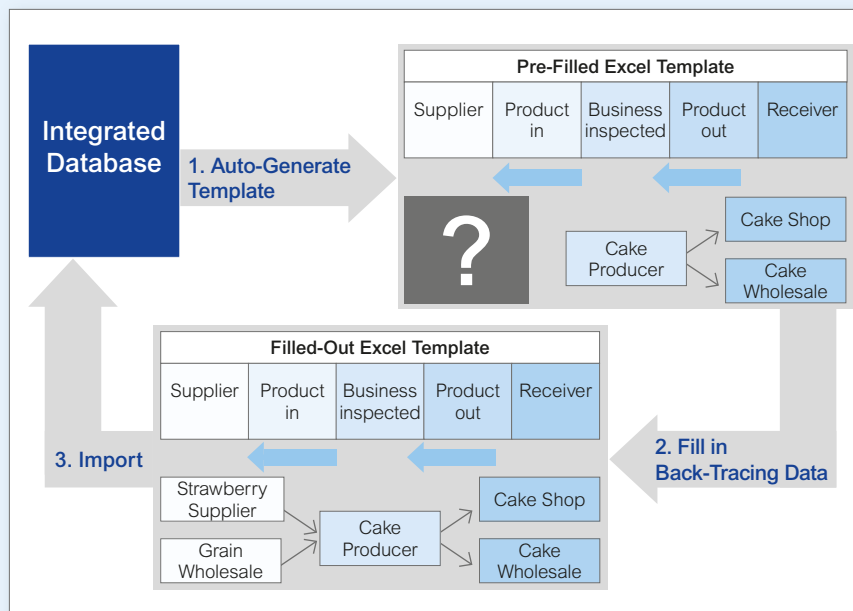
Suppliers can be clustered geographically based on their latitude and longitude. This might help during investigation if an environmental contamination is assumed.

## Data Collection

Usually, public health authorities instruct local authorities to collect and transmit food related trace back information via Excel-based templates.

FoodChain-Lab therefore provides adaptable algorithms allowing users to import this information into the internal database. Excel templates for “back tracing”, “forward tracing” and “importing whole food networks” can be downloaded from our website.

After importing the templates in the database FoodChain-Lab can automatically generate additional backward and forward tracing templates for all stations where some data is still missing. This simplifies the data collection process.



FoodChain-Lab data collection process via auto-generated templates  
(Example: one step back from cake producer)

## Data Management

The integrated database has been specifically designed to meet the requirements of food/feed-related food chain networks. The database enables the user to store all relevant information in a structured way on the basis of four main entities: Station, Product, Lot and Delivery.

A station represents all kinds of food receivers and deliverers including final recipients, e.g. places where affected peoples prepared their meals or where contaminated food has been served or the case itself.

For each product (e.g. food consumed or ingredient) precise information on the preparation (lot) and transport (delivery) is collected.

## Data Validation/Enrichment

In order to perform meaningful analysis of food tracing network data it is crucial that the highest possible data quality is ensured, which is a major challenge in most outbreak situations.

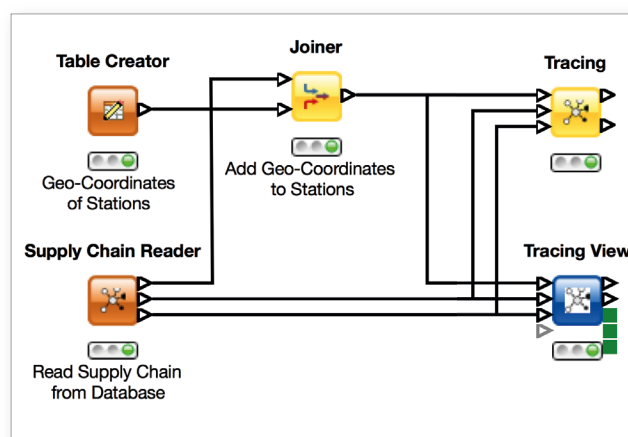
FoodChain-Lab supports this task by performing plausibility checks on any collected data ensuring that information is consistently integrated into the database. The stations (deliverer and receiver) of a product (characterized by lot and delivery) are clearly identified and linked for each delivery.

FoodChain-Lab also provides the enrichment of stations with geographical information by using geocoding services, that acquire latitude and longitude from address data.

## Integration to the KNIME Analytics Platform

FoodChain-Lab has been implemented as a modular extension to the open source data analytics platform KNIME ([www.knime.org](http://www.knime.org)). KNIME enables visual assembly of data analysis workflows. These workflows (as seen on the right) consist of so-called nodes and edges. Each node is able to perform a specific data processing task while edges define how information flow is directed between nodes.

A major advantage of using the KNIME platform is the multitude of existing data analysis features. These features can be used in combination with FoodChain-Lab for complex analysis tasks.



Learn more about FoodChain-Lab at <http://foodrisklabs.bfr.bund.de>

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