FEDERAL INSTITUTE FOR RISK ASSESSMENT

New KNIME extensions supporting food safety and foodborne outbreak investigations

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Federal Institute for Risk Assessment

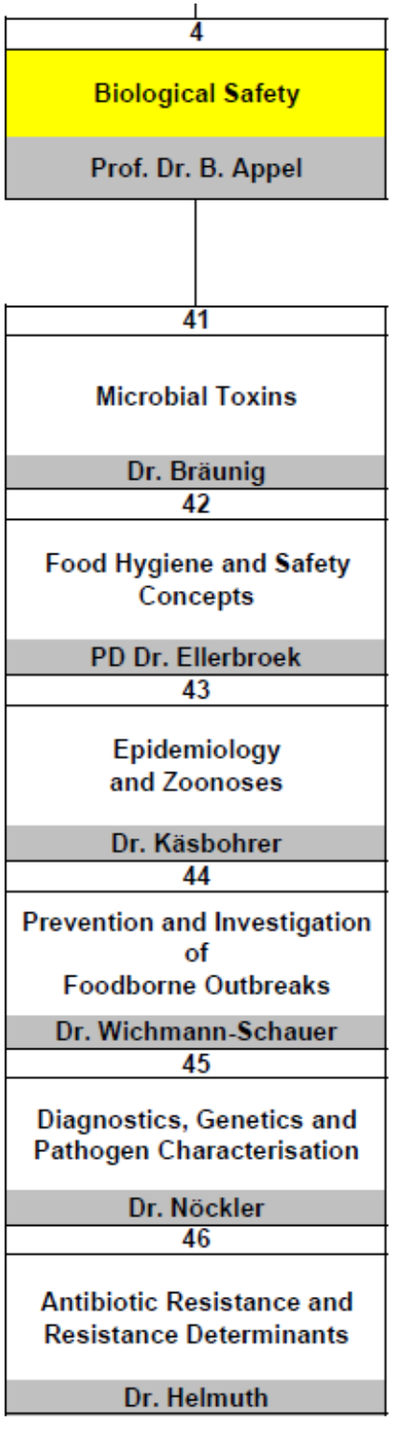
Established	1 November 2002 (its predecessor founded in 1876)
Annual budget:	appr. 65 Mio €
Research budget:	appr. 6 Mio €
BfR staff:	appr. 750 employees (550 working in the scientific field)
Locations:	Berlin (Marienfelde, Jungfernheide)
Main areas of work:	Food Safety Safety of Substances and Preparations Safety of Consumer Products Risk-Communication etc.

Department „Biological Safety“

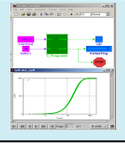
Pathogens in working focus:

Salmonella, E.coli (faecal germs),
Mycobacteria, Brucella, Campylobacter,
Listeria, Yersinia, Staphylococci
various parasites, like Trichinella
or Echinococcus and viruses

10 National Reference Laboratories for
various zoonoses pathogens



BfR capacity building -
Research projects dedicated (in part) to develop software tools



Modell-Kontam
„orientation phase“

Modell-Kontam II
„prototype I“

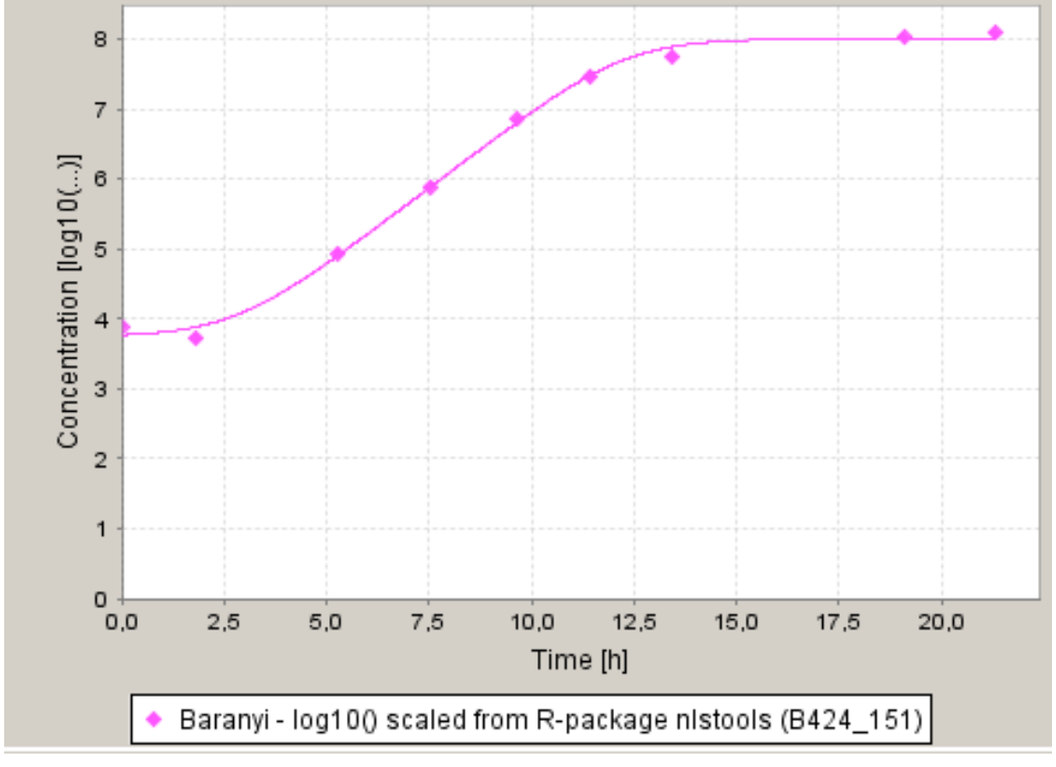
BMBF Project
SiLeBAT
„PMM-Lab demonstrator“

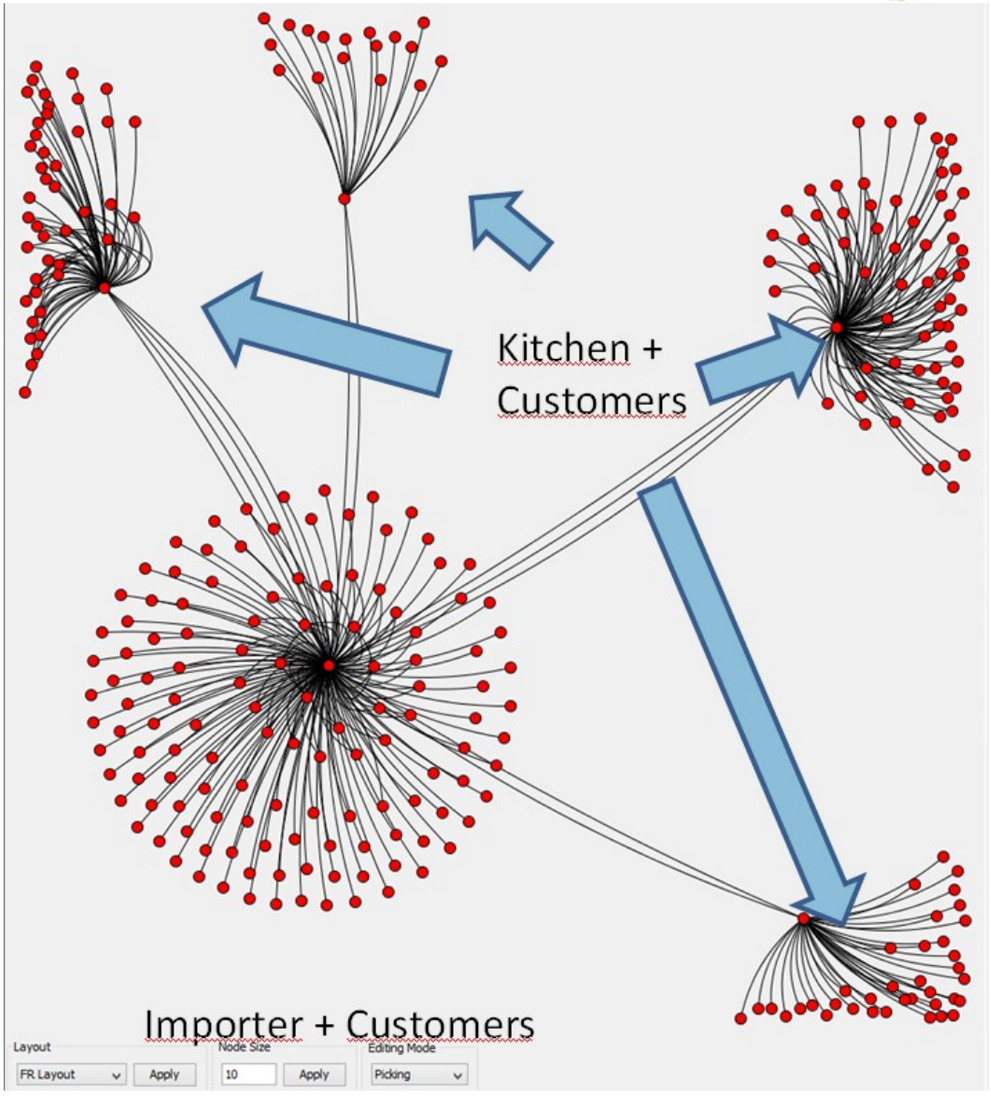
2007 2008 2009 2010 2011 2012

Software Tools

Norovirus Outbreak from Strawberries

Predictive Microbiology

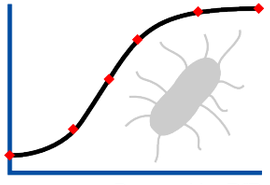




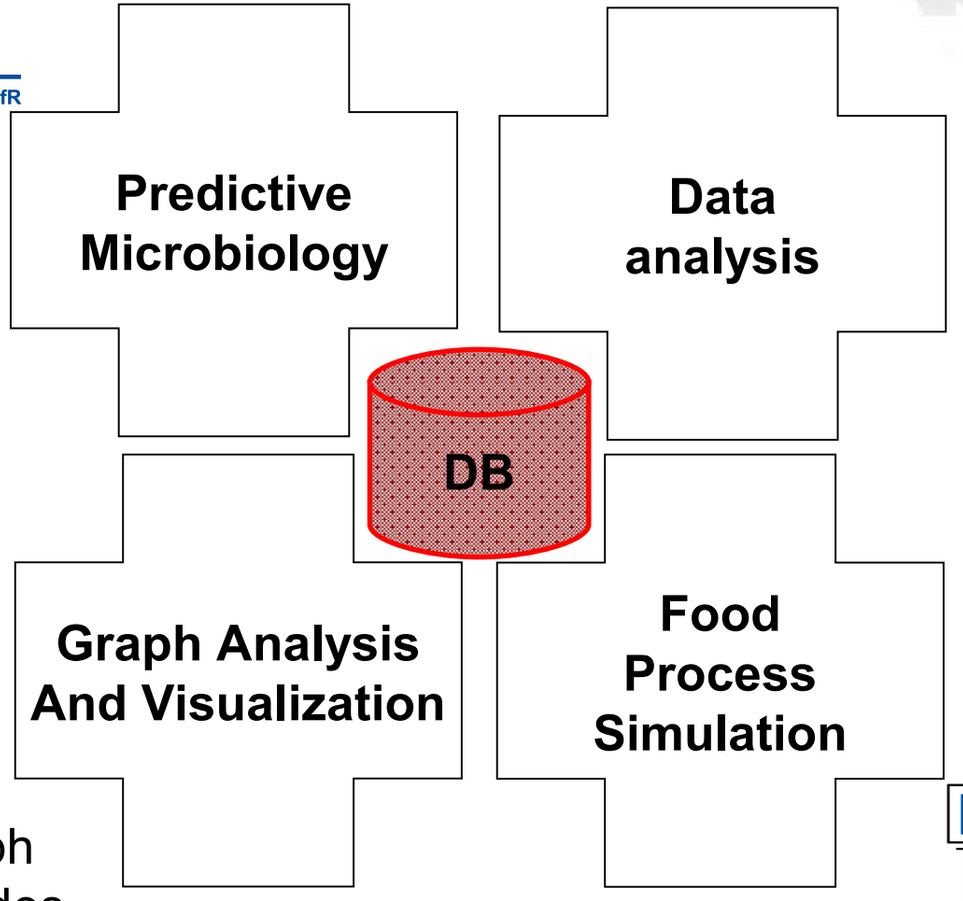
BfR vision -

Integrated community tools for quantitative microbial risk assessments

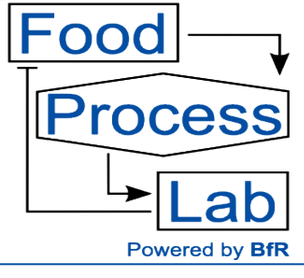
PMM-Lab



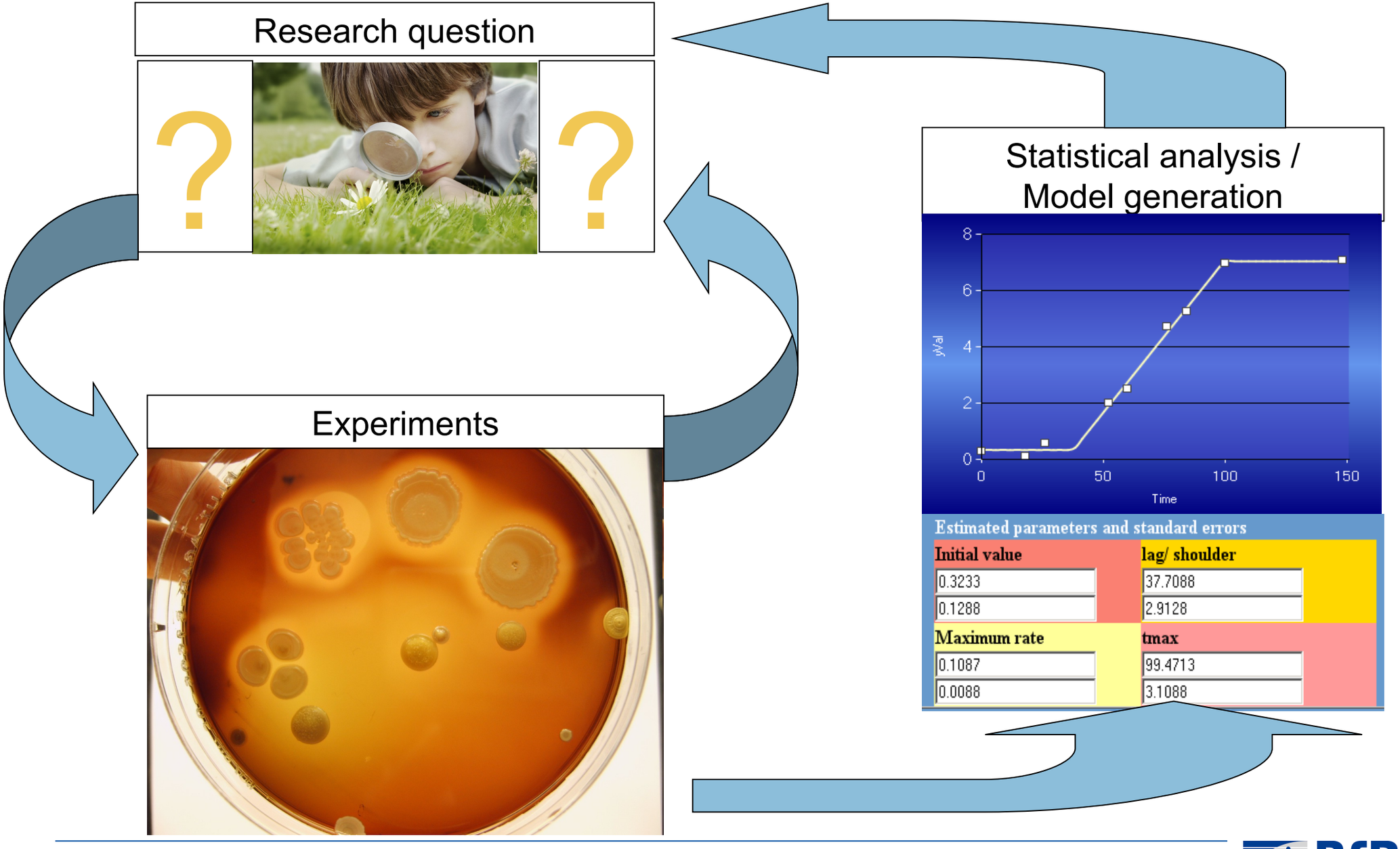
KNIME



KNIME Graph and GIS Nodes



Predictive microbiology



Available Resources - Predictive Microbiology

Online models

- Pathogen Modeling Program
- ComBase Predictor / Perfringens Predictor
- Sym'Previus
- Seafood Spoilage and Safety Predictor
- Refrigeration Index Calculator
- Shelf Stability Predictor
- Microbial Response Viewer
- Literature
- (PMM-Lab)

Modeling tools

- GInaFiT (Geeraerd et al., 2005)
- DMFit (Baranyi et al., 1994)
- The R Project for Statistical Computing
- Commercial modeling software packages (@Risk, Matlab etc.)
- (PMM-Lab)

Data:

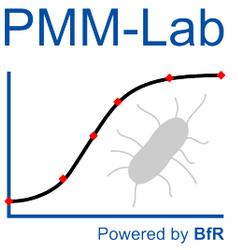
- ComBase DB
- Proprietary (industry) data collections
- Literature
- (PMM-Lab)

Research Objective and Solution

Extending Community Resources in the field of Predictive Microbiology

- Support exploitation of experimental data by **lab scientists ->** Easy to use (easier than R, Matlab)
- Support **transparency** and quality control -> Documentation for all Methods, Formulas are visible
- Support establishment of a community **PMM model database ->** Integrable into proprietary and community resources
- **free of charge** AND **open source**

PMM-Lab



- Extends KNIME (www.knime.org)
- Hosted on Sourceforge (https://sourceforge.net/projects/pmmlab)

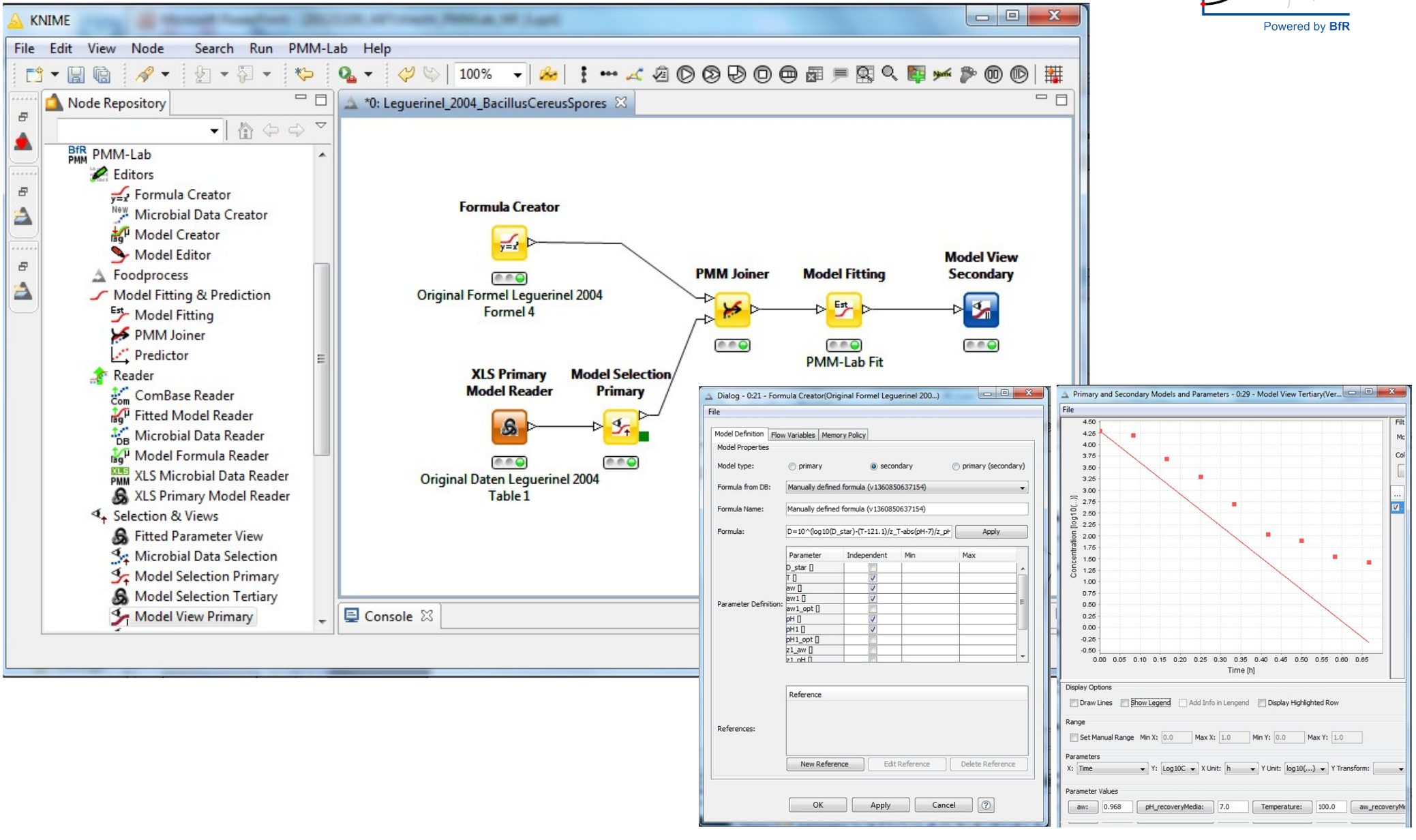
Uses:

- Java
- HSQL database engine (www.hsqldb.org)
- JFreeChart (www.jfree.org/jfreechart)
- JEP Math Expression Parser (www.singularsys.com/jep)

PMM-Lab –
How does it look like?

PMM-Lab

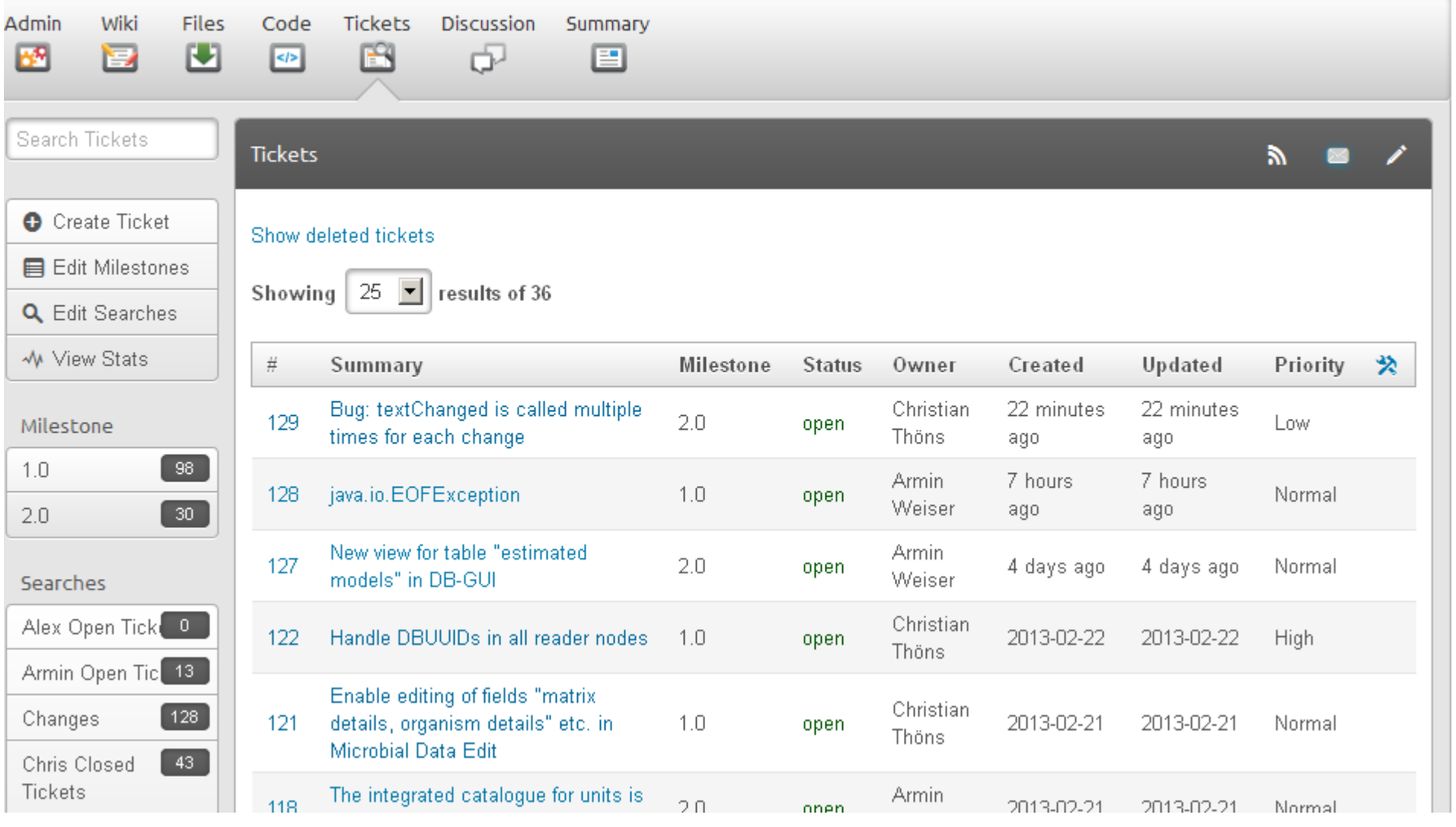
Powered by BfR



PMM-Lab –
Sourceforge Ticket System (Bugtracker)

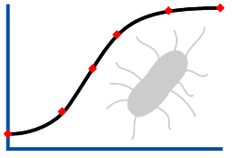
PMM-Lab

Powered by BfR



PMM-Lab – live demo

PMM-Lab



Embrace and support community solutions !

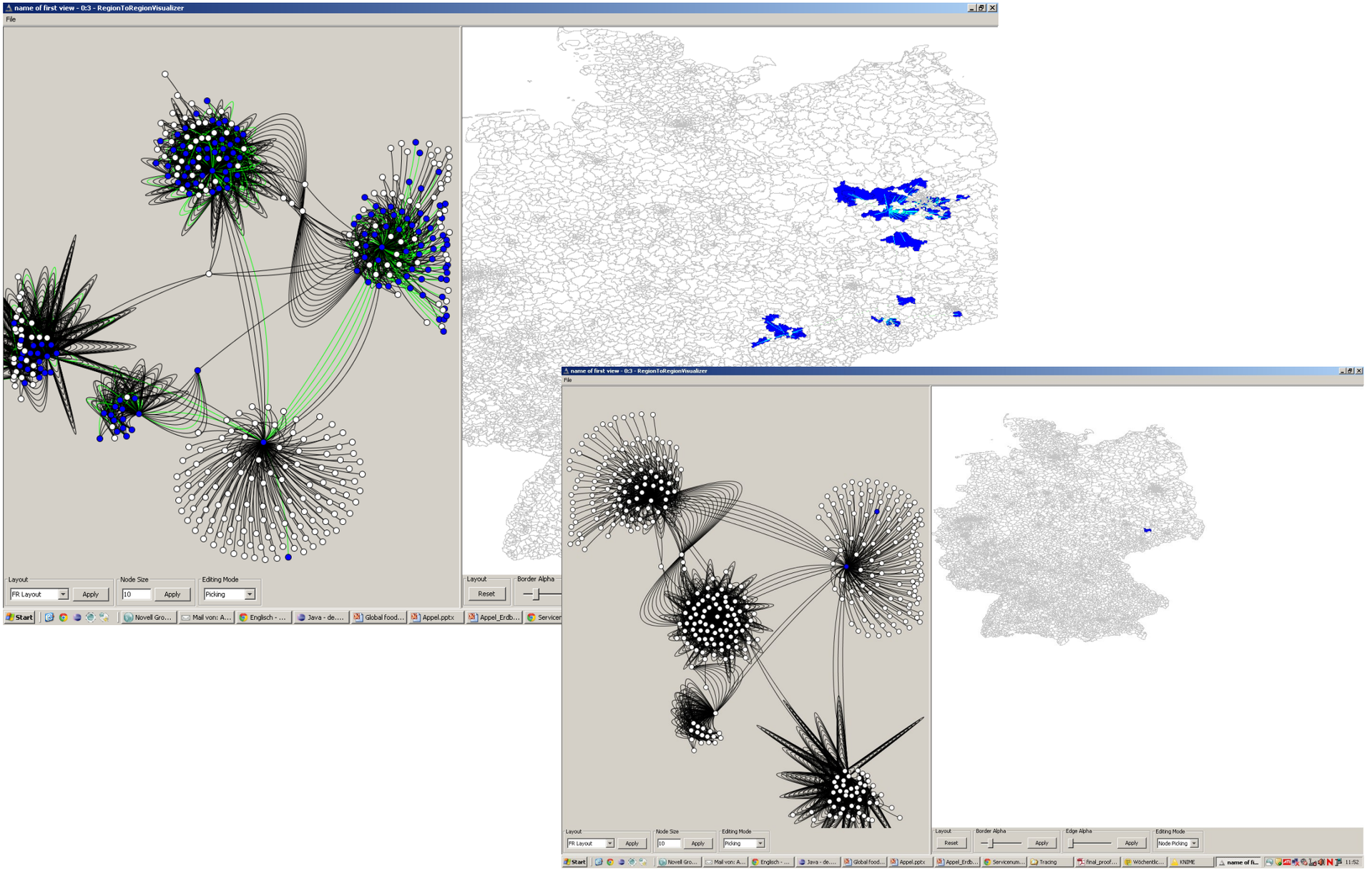
Work together on standardized data exchange formats !

Graph and GIS Nodes

Graph Analysis and Visualization to Identify Source In Food-Related Outbreaks

- Backtracing Algorithms based on certain Articles, Charges, …
- Powerful Visualization tools to easily find outbreak clusters
- GIS Visualization of the Graph
- Visualization Graph nodes might be published to KNIME Community Repository

Graph and GIS Nodes - How does it look like?



Graph and GIS Nodes – live demo

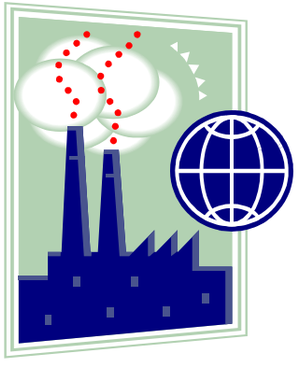
“Business model”

Free and Open Community Resources
(e.g. licensed under GPL)

PMM-Lab
Powered by BfR

ComBase

Food Process Lab
Powered by BfR



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domain experts
authorities
universities
research institutes
food safety consultants
software companies
…

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Thank you for your attention

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