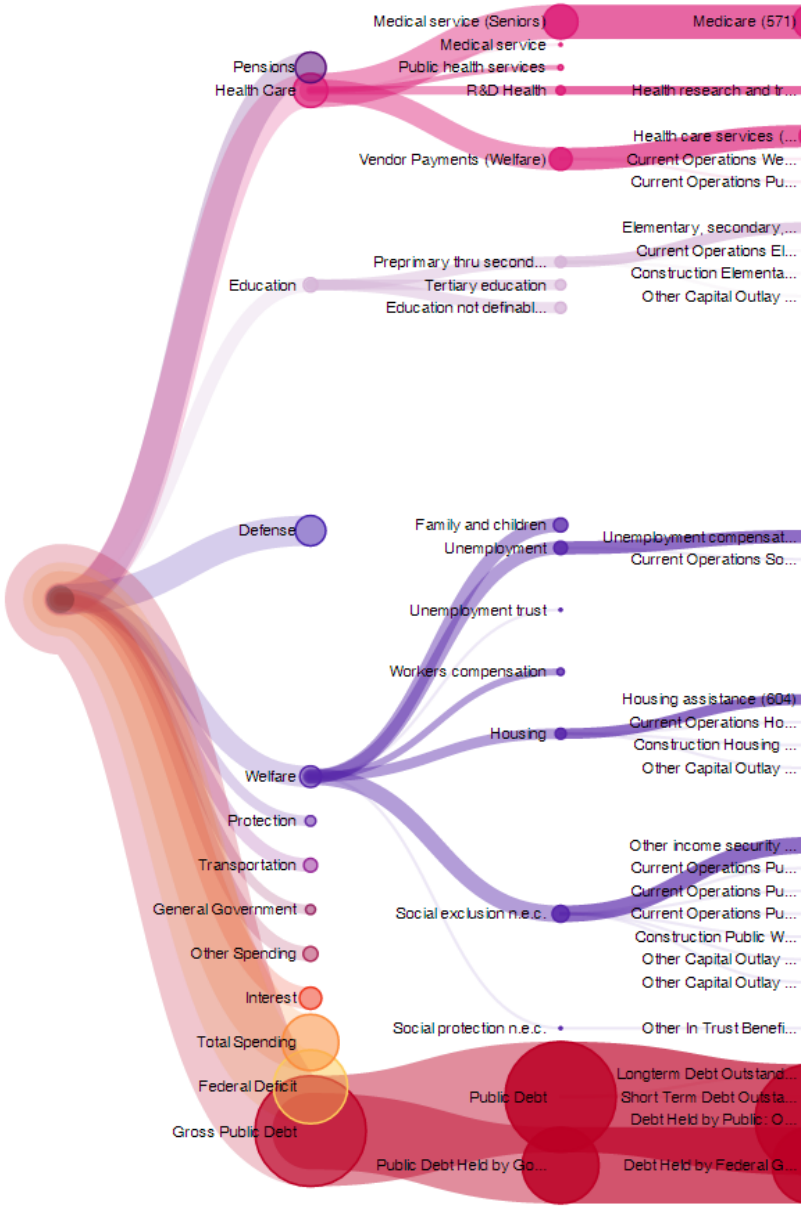
Fakultät für Informatik
Technische Universität München

# A concept for the visual and interactive impact analysis and simulation of data changes to enterprise metrics

## Kickoff Presentation



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- **Example**
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  - Databasis
  - Model
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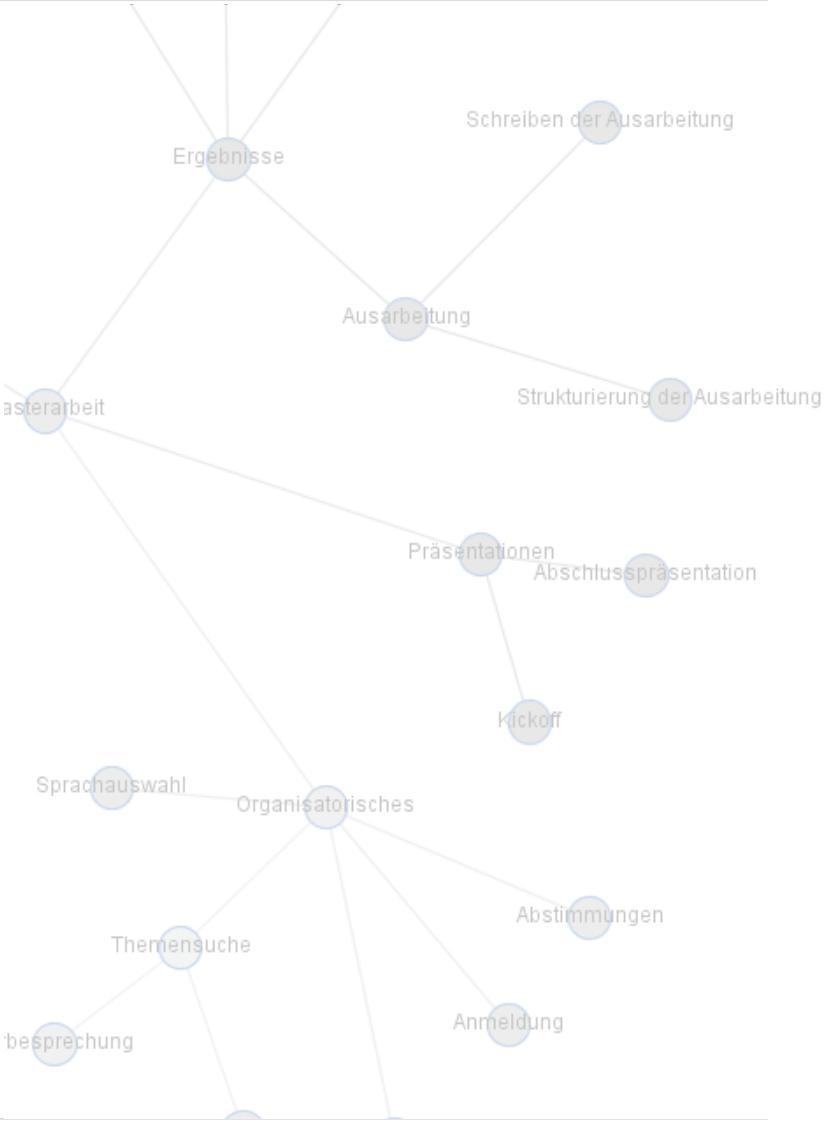
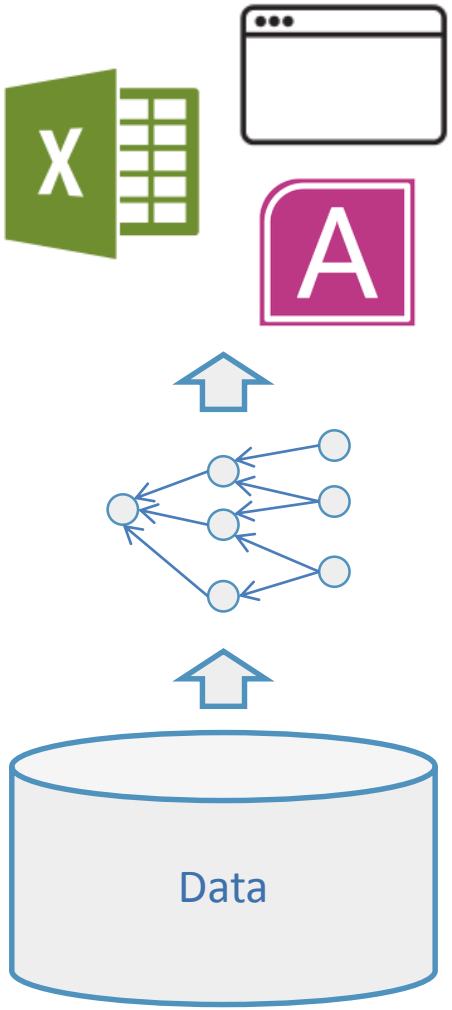


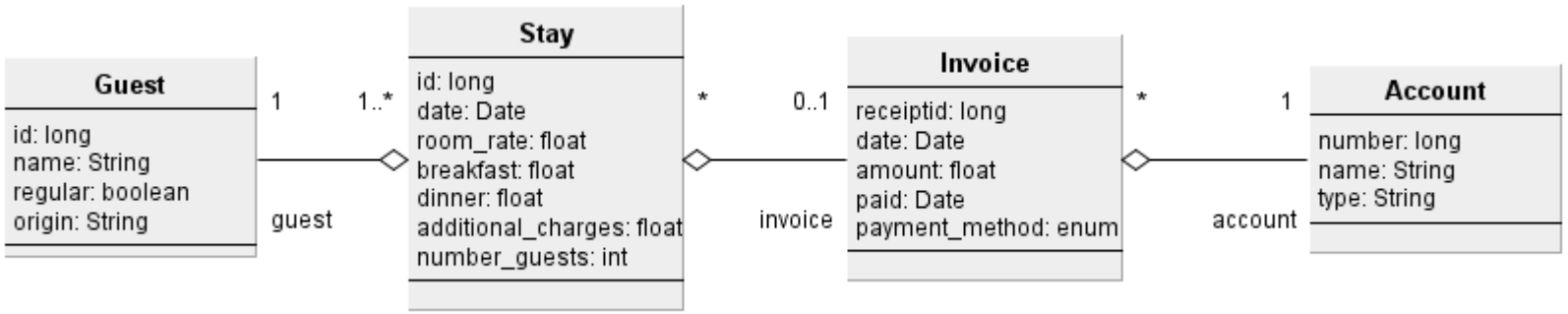
# Example (I): Problem



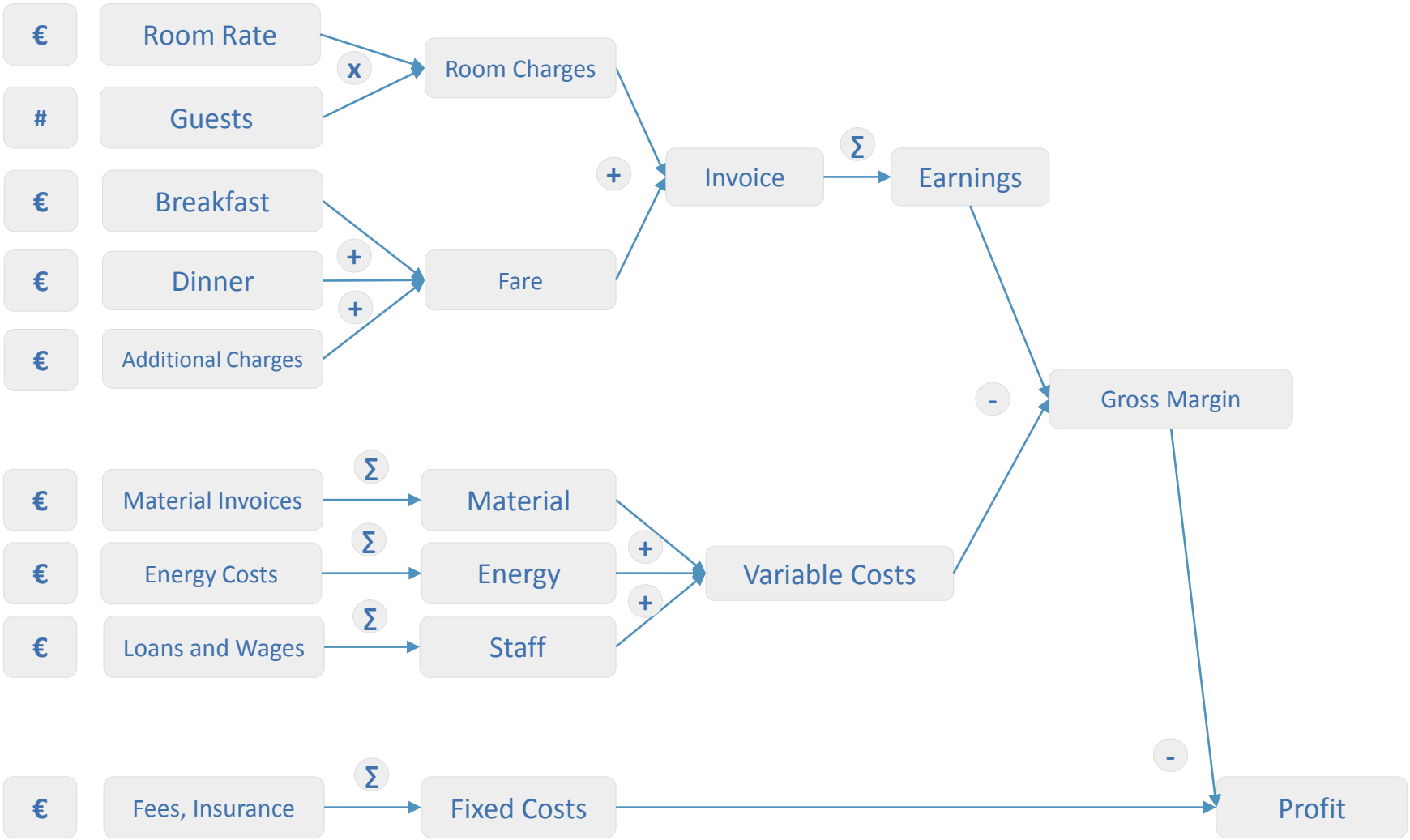

What happens with our KPIs if…
…we increase our sales price?
…the energy costs increase?
…we lower labor costs?

Mr. Smith
Head of Accounting

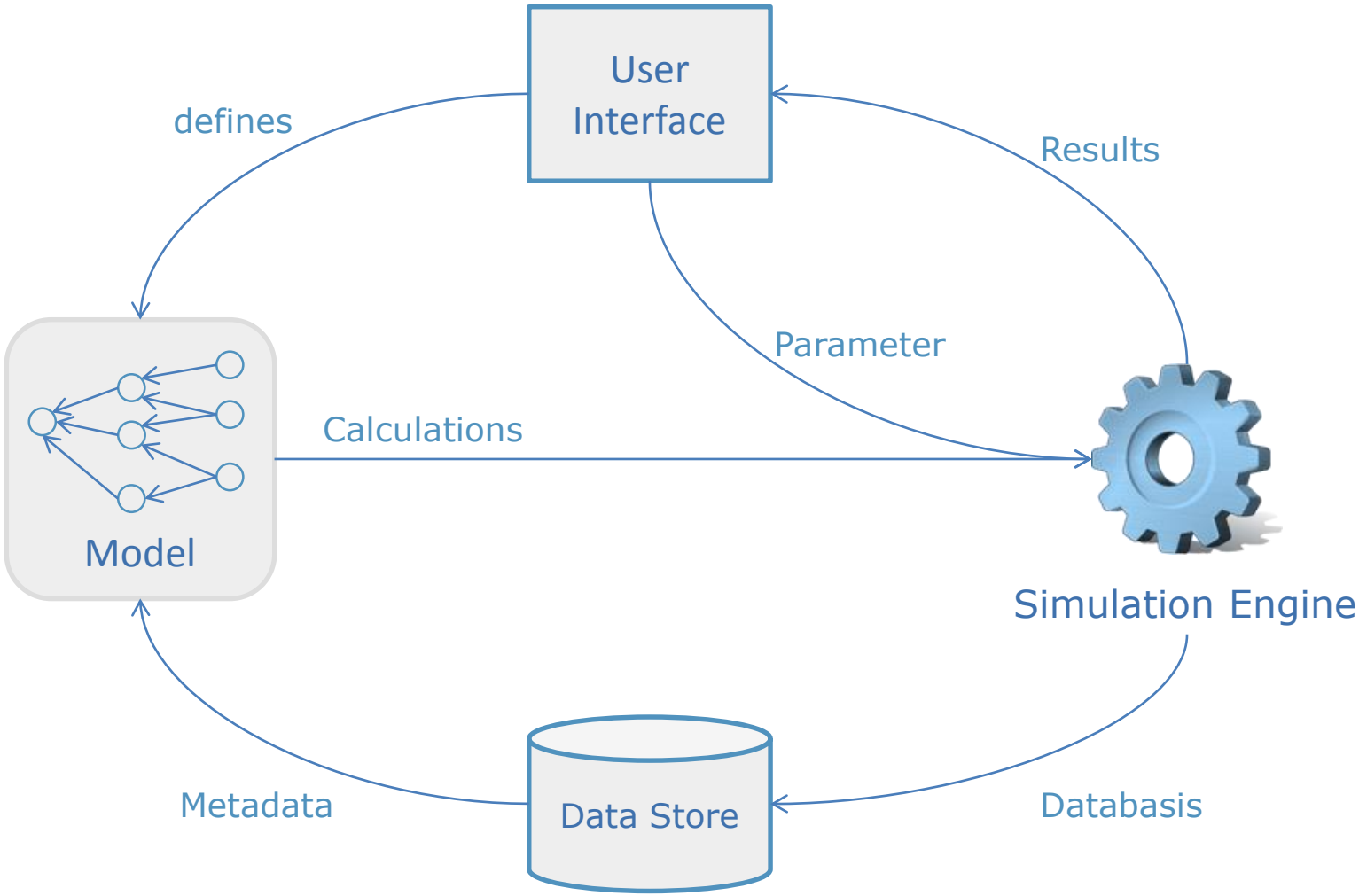
# Example (II): Databasis



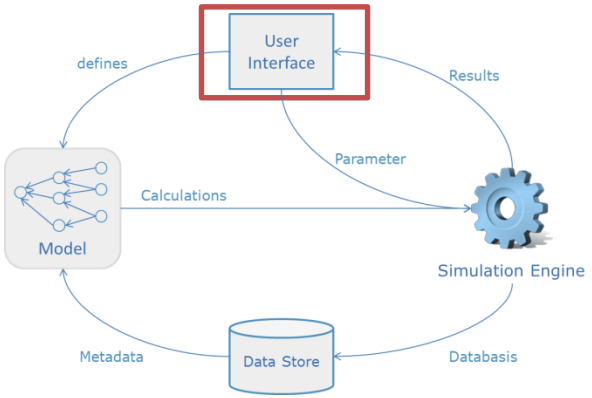
# Example (III): Accounting in Hotel Business



# Components and their Dependencies



# Requirements (I): Web UI



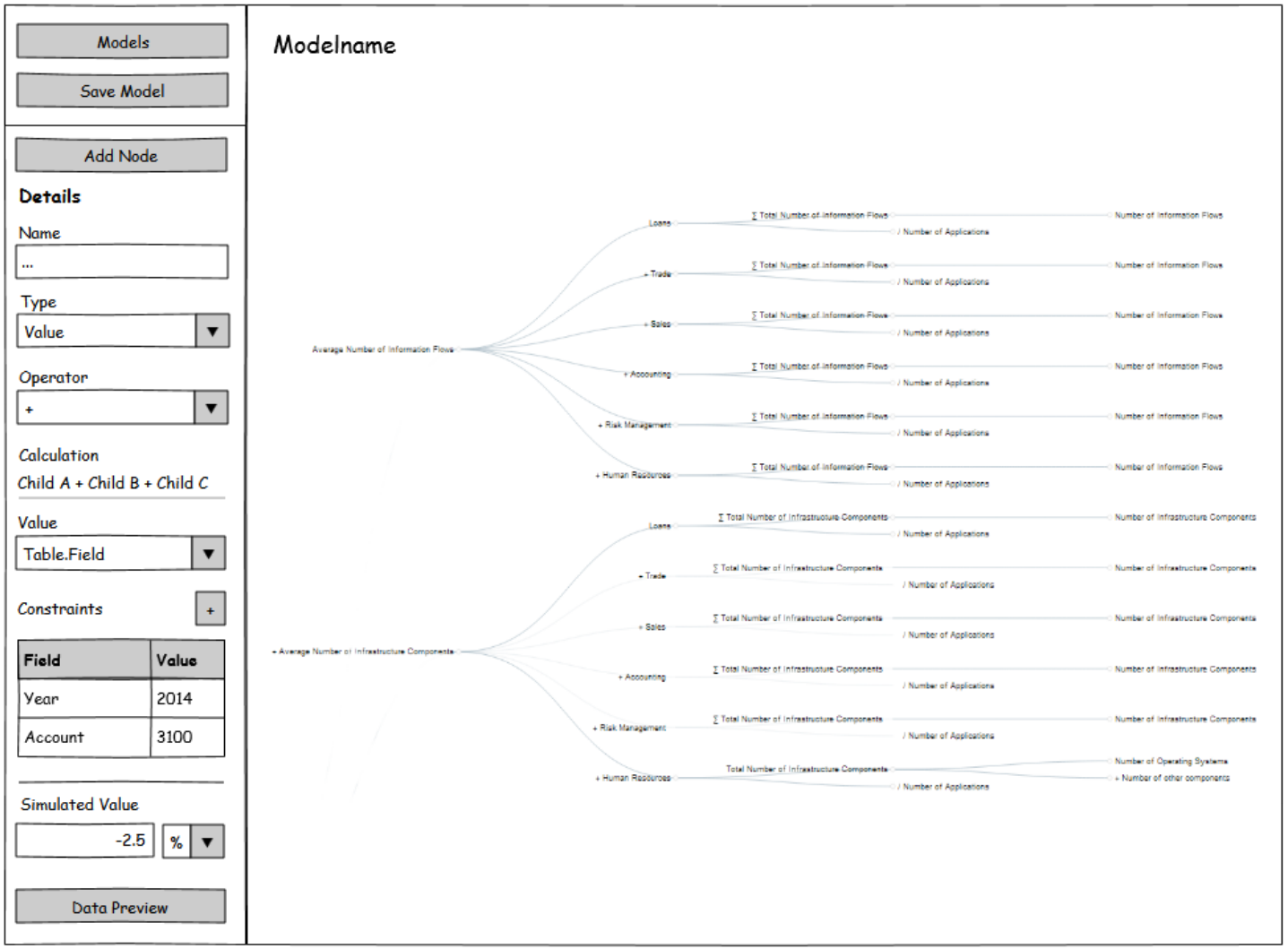

## Functional

- Definition of model
- Interactively changing influencing factors
- Edit data basis for calculation
- Visualization of the results on the model
- Web application running in a browser

## Non-Functional

- Response times allowing user interaction
- Usability

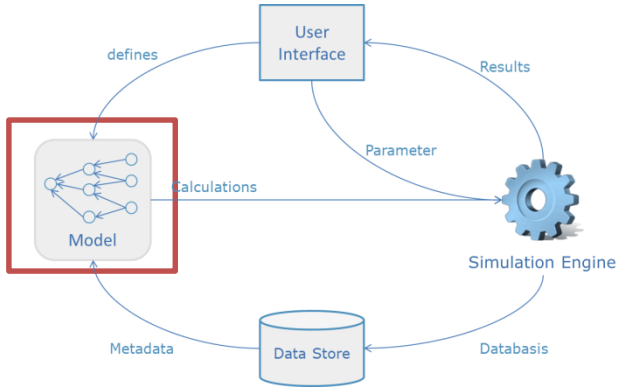
# Web Application Mockup



# Requirements (II): Model

## Functional

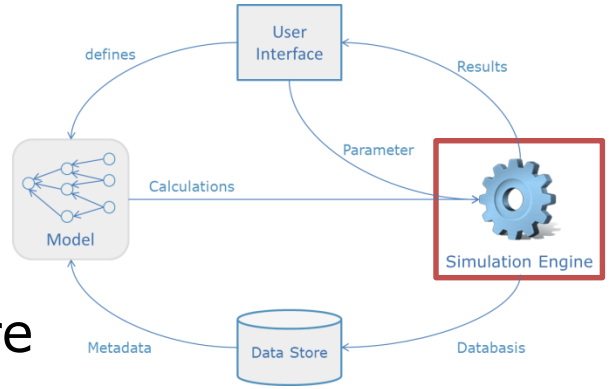
- Define Dependencies
- Define Operations
- Persist model
- Model references metadata




## Non-Functional

- Fast access to model data

# Requirements (III): Simulation Engine




- **Functional**
  - Can run on operational data store
  - Calculations based on model
  - Changed influence factors from UI
  - Returns the results to UI
  - Additional data is regarded
- **Non-Functional**
  - Documented Code
  - Use standards where applicable

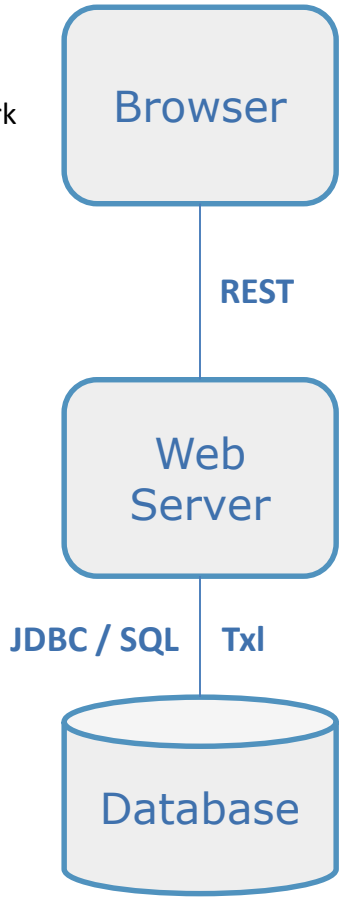
# Technology

INFRASTRUCTURE

**Data-Driven Documents (D3.js)**
Open Source Document Manipulation Framework in JavaScript

**Apache Tomcat**
Open Source Application Server for Java Enterprise Applications

**H2 Database Engine**
Open Source In-Memory Datenbank




**jQuery**
JavaScript Library

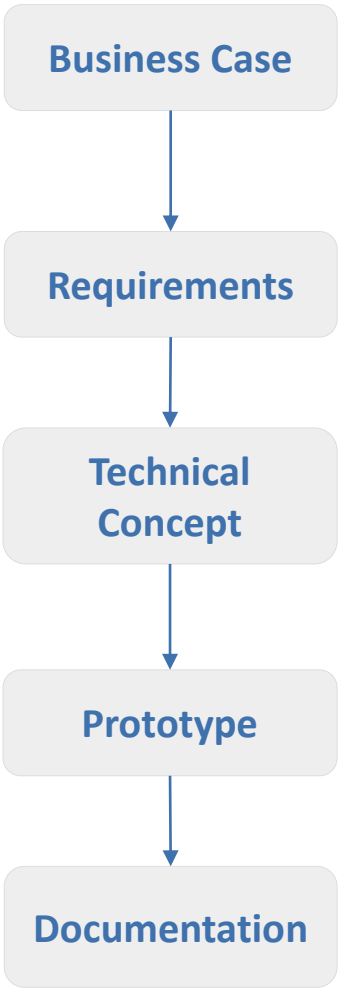
**Tricia**
Hybrid Wiki

# Goals

Interactive simulation of the impact of inflencing factors on metrics

Near realtime visualization of the impact in a graph

# Methodology




- Definition of use cases and possible questions
- Goal to answer the question with the models

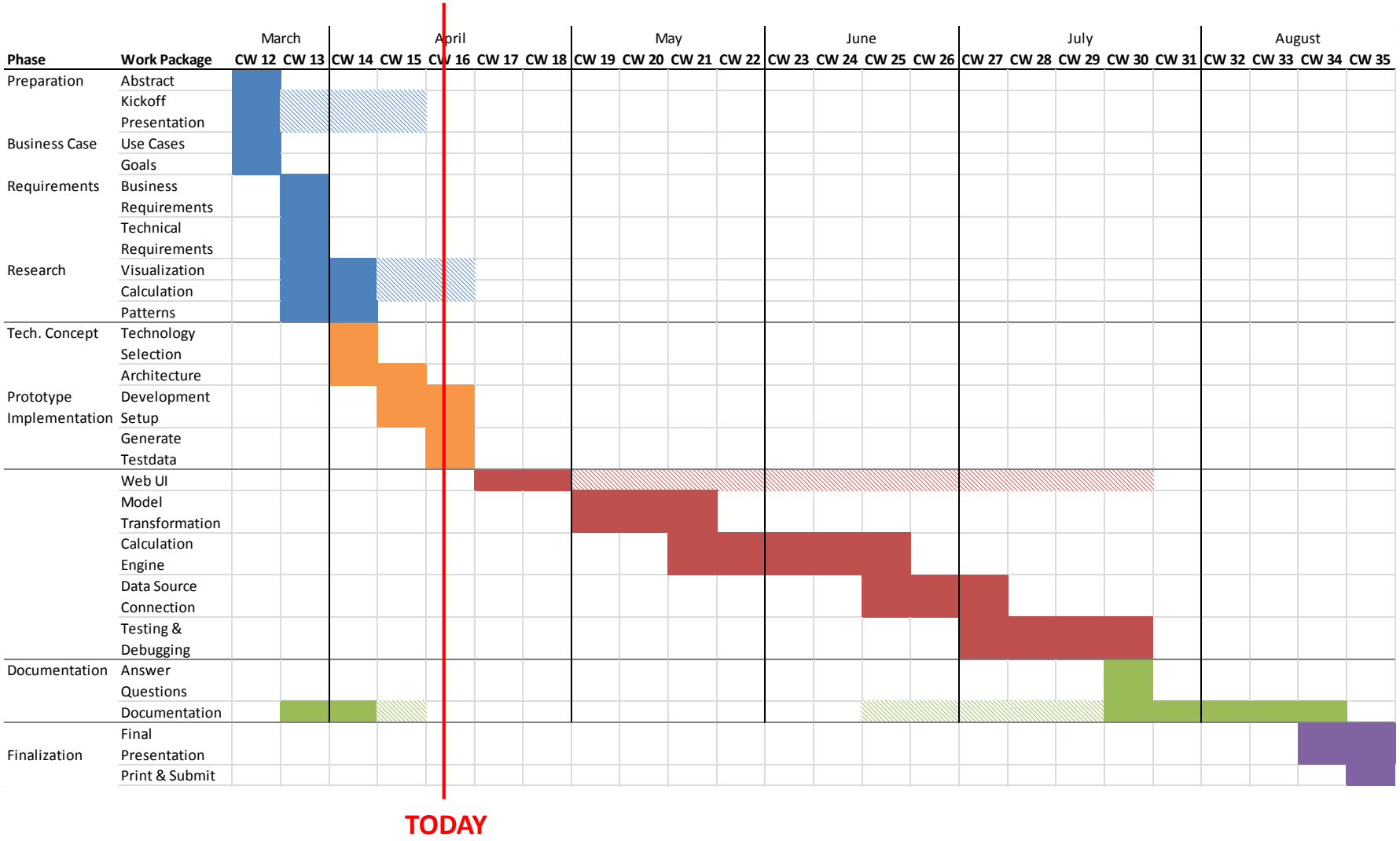
- Business requirements elicitation
- Technical requirements elicitation

- Technology selection
- Solution/Prototype Architecture

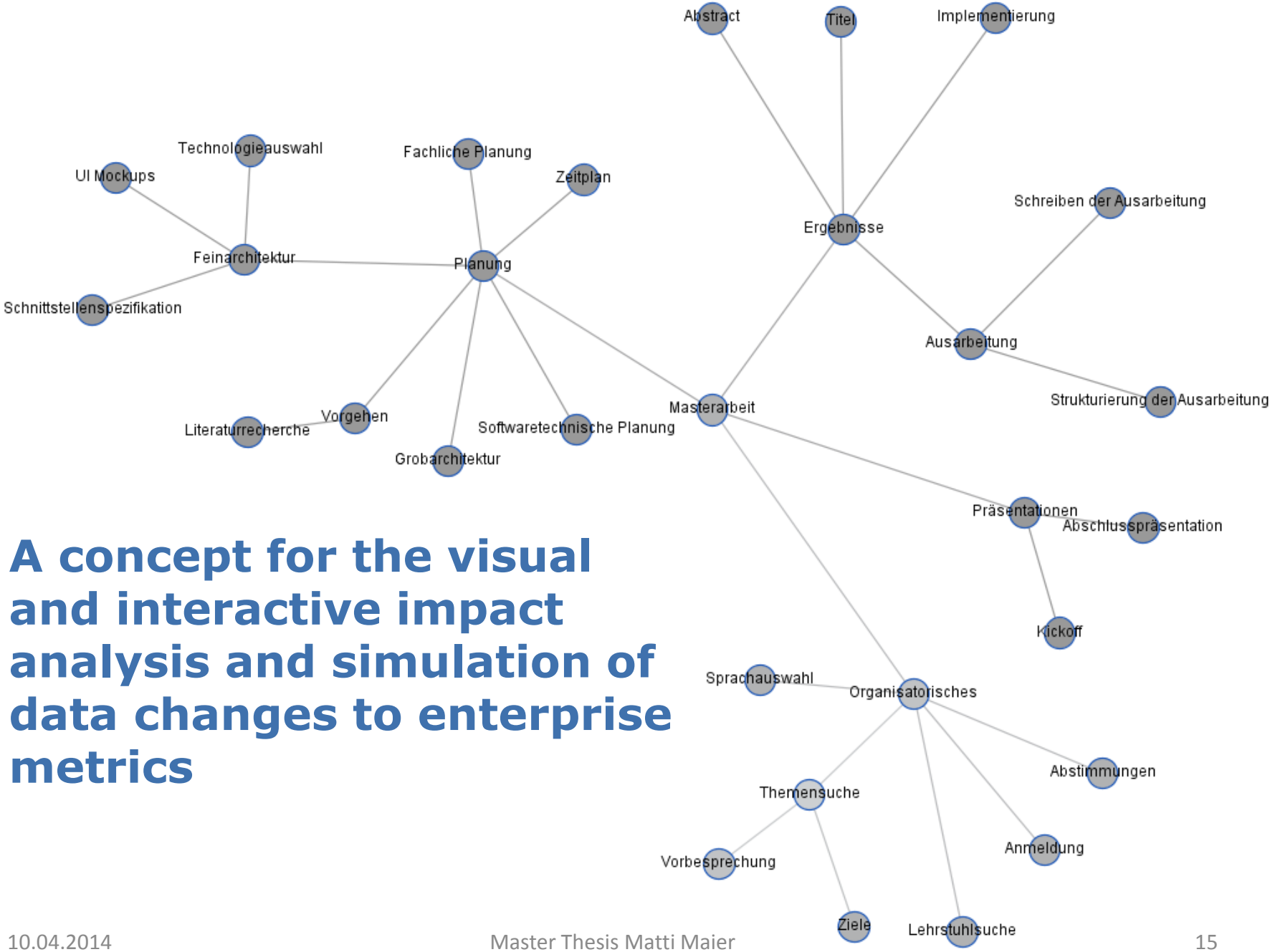
- Implementation of the prototype

- Answering the questions
- Documentation of the results

# Roadmap

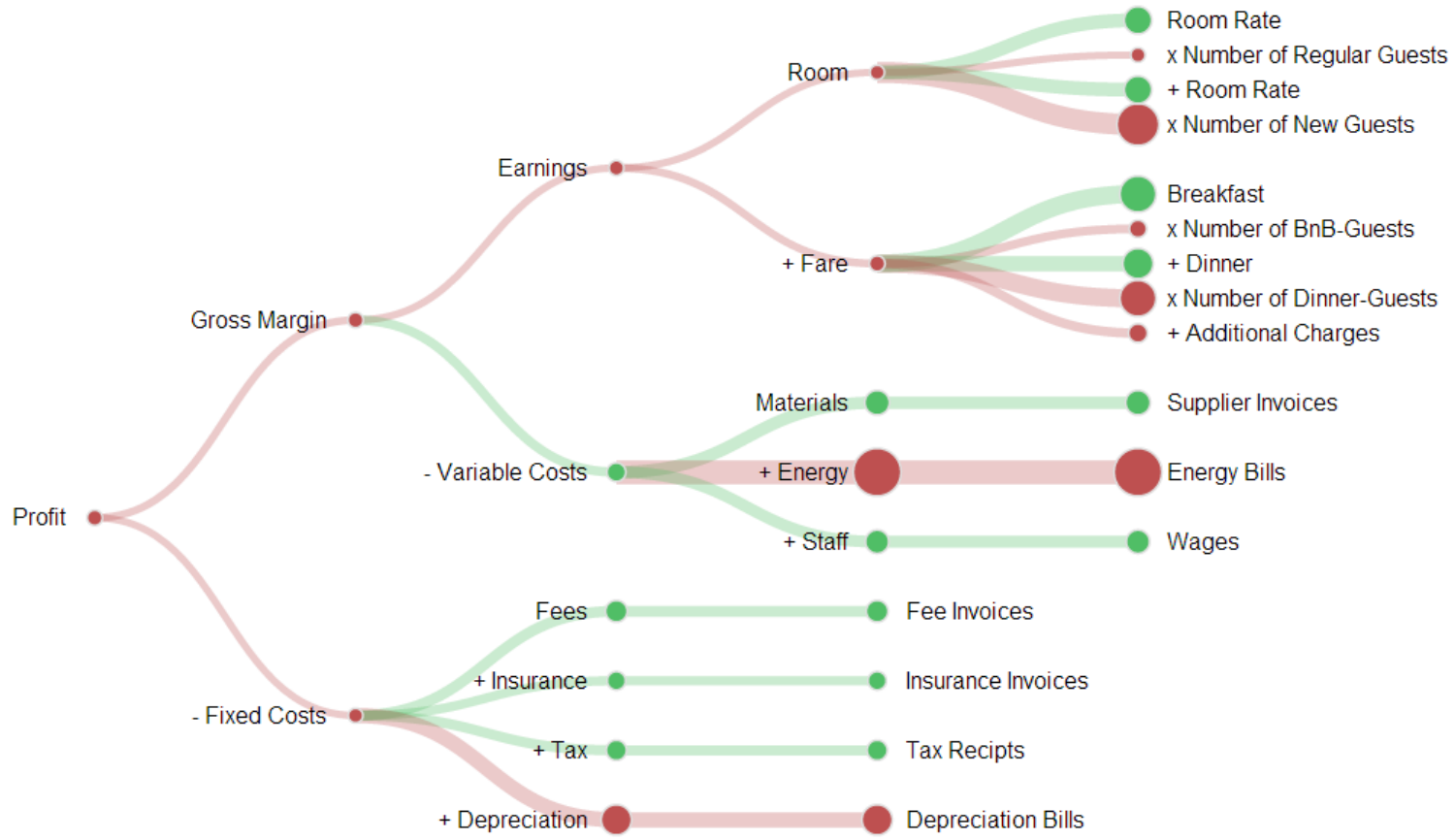

March
April
May
June
July
August
Phase
Work Package
CW 12 CW 13 CW 14 CW 15 CW 16 CW 17 CW 18 CW 19 CW 20 CW 21 CW 22 CW 23 CW 24 CW 25 CW 26 CW 27 CW 28 CW 29 CW 30 CW 31 CW 32 CW 33 CW 34 CW 35
Preparation
Abstract
Kickoff
Presentation
Business Case
Use Cases
Goals
Requirements
Business Requirements
Technical Requirements
Research
Visualization
Calculation
Patterns
Tech. Concept
Technology Selection
Architecture
Prototype Implementation
Development Setup
Generate Testdata
Web UI
Model Transformation
Calculation Engine
Data Source Connection
Testing & Debugging
Documentation
Answer Questions
Documentation
Finalization
Final Presentation
Print & Submit
TODAY

# A concept for the visual and interactive impact analysis and simulation of data changes to enterprise metrics

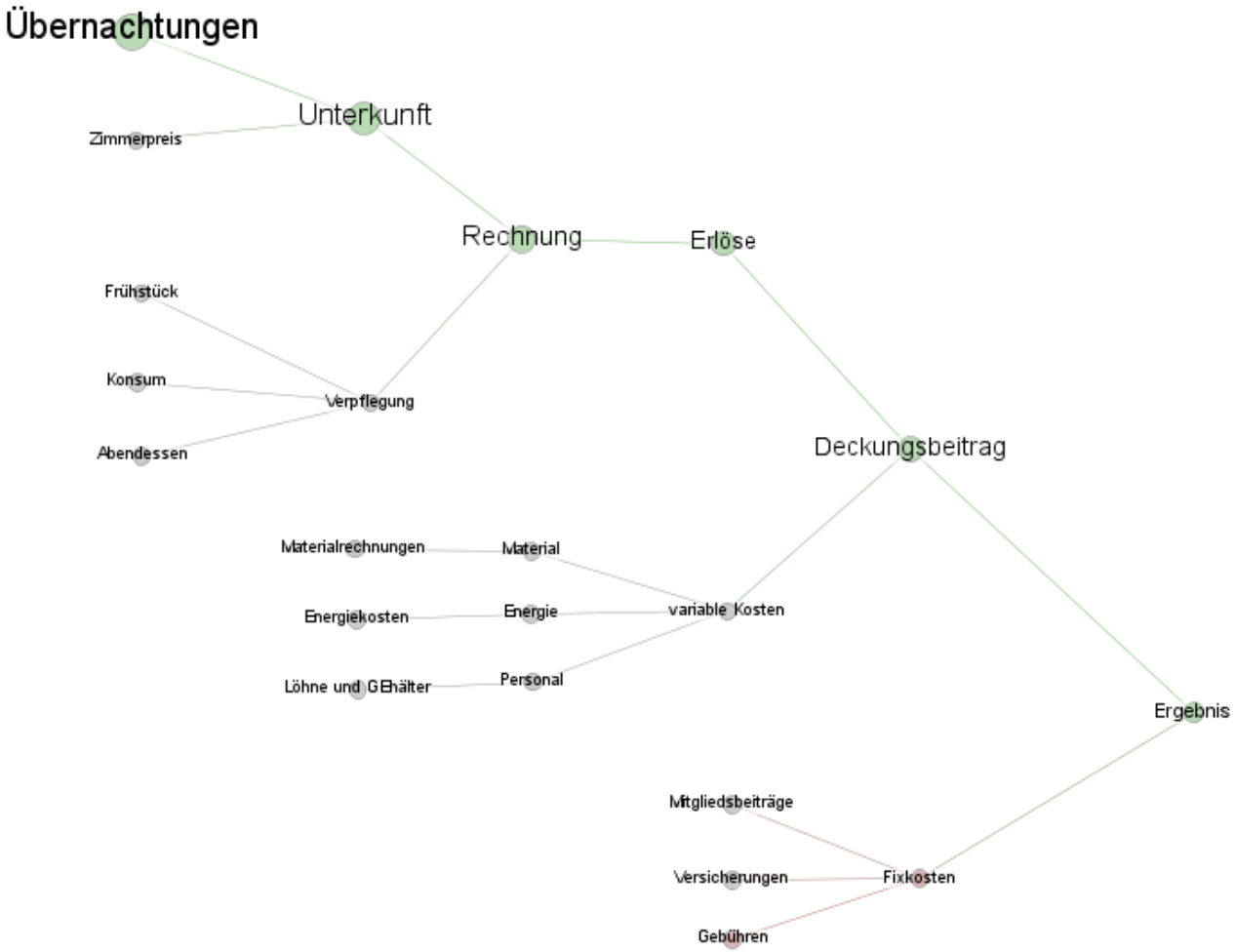


# BACKUP

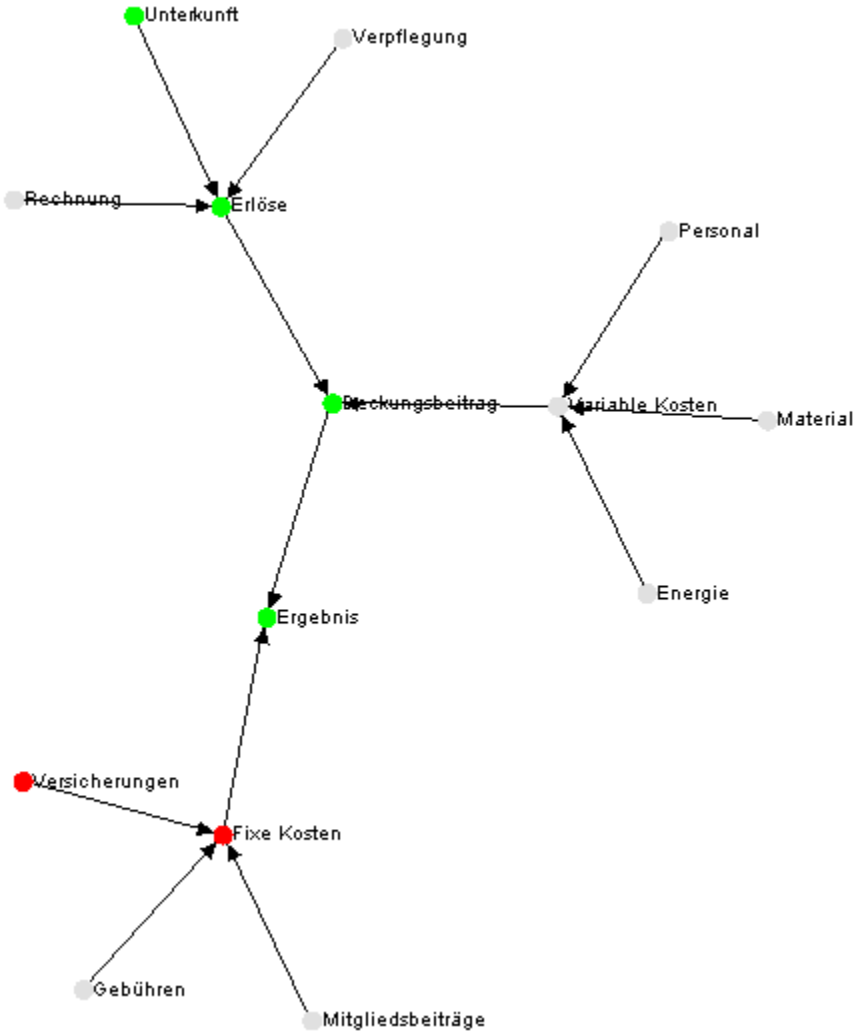
# Visualization in D3js



# Visualization Gephi



# Visualization GraphStream



# Hotel Business: Datasize Approximation

| No. Rooms | Occupation | Stays | Receipts |
|---|---|---|---|
| 50 | 70% | 21.718 | 7.239 |
| 100 | 70% | 43.435 | 14.478 |
| 250 | 65% | 100.831 | 33.610 |
| 500 | 60% | 186.150 | 62.050 |
| 1000 | 60% | 372.300 | 124.100 |
| 1500 | 60% | 558.450 | 186.150 |

Time: 1 year = 365 days
Receipts / Stay: 3
Beds / Room 1.7

# Other Technologies

**SAP Stack**

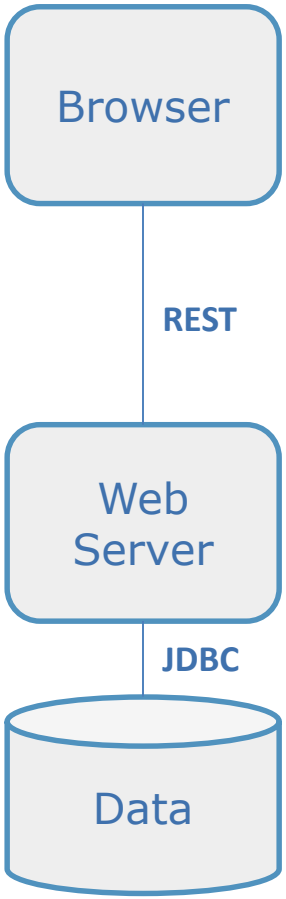
**SAP OpenUI 5**
Open Source UI-Framework

**Data-Driven Documents (D3.js)**
Open Source Document Manipulation Framework in JavaScript

**SAP AS Java**
Proprietärer Application Server for Java Enterprise Applications

**SAP HANA**
In-Memory Database

**INFRASTRUCTURE**




**Java Stack**

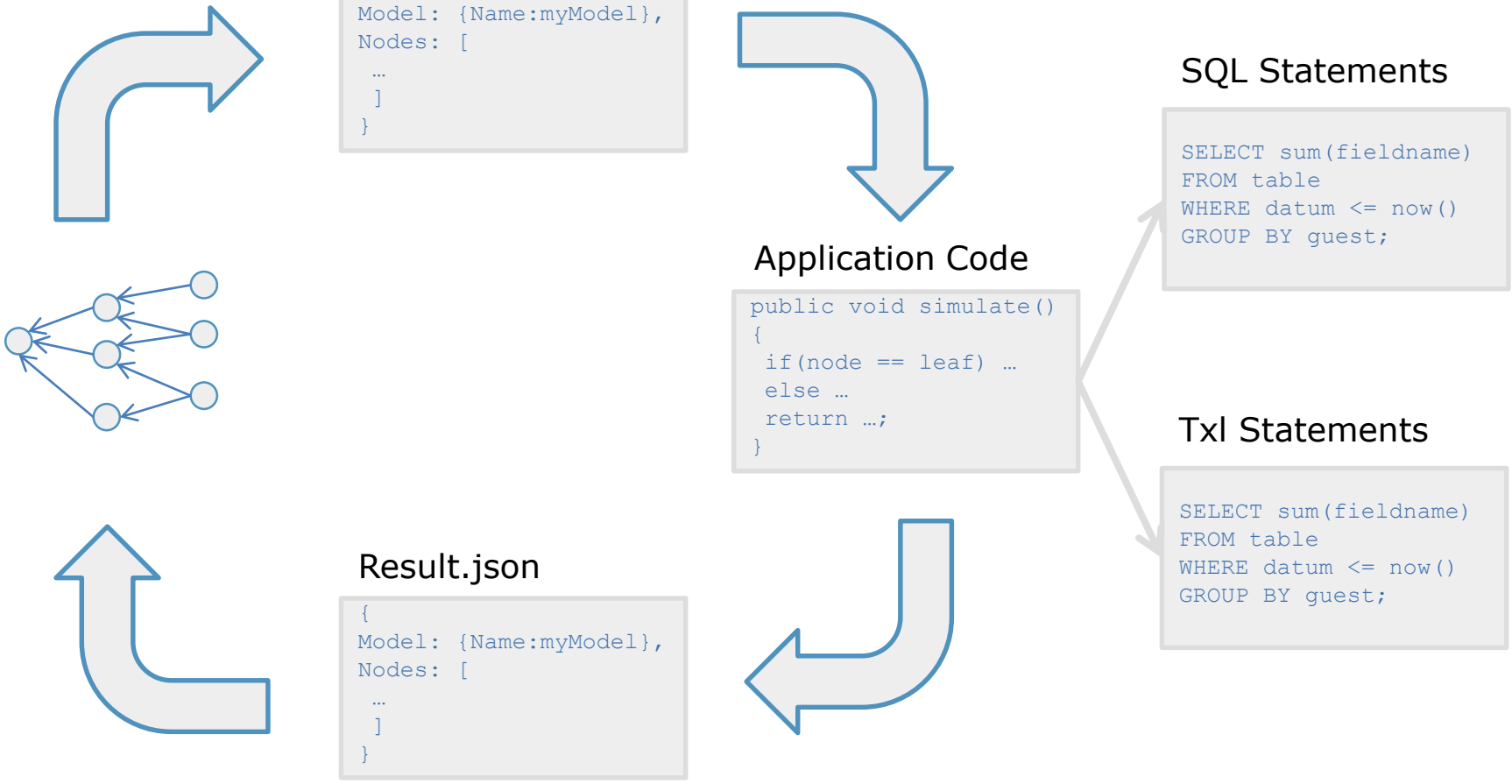
**Vaadin**
Open Source Webanwendungs-Framework for Rich Internet Applications (RIA)

**GraphStream**
Open Source Java Graph Library

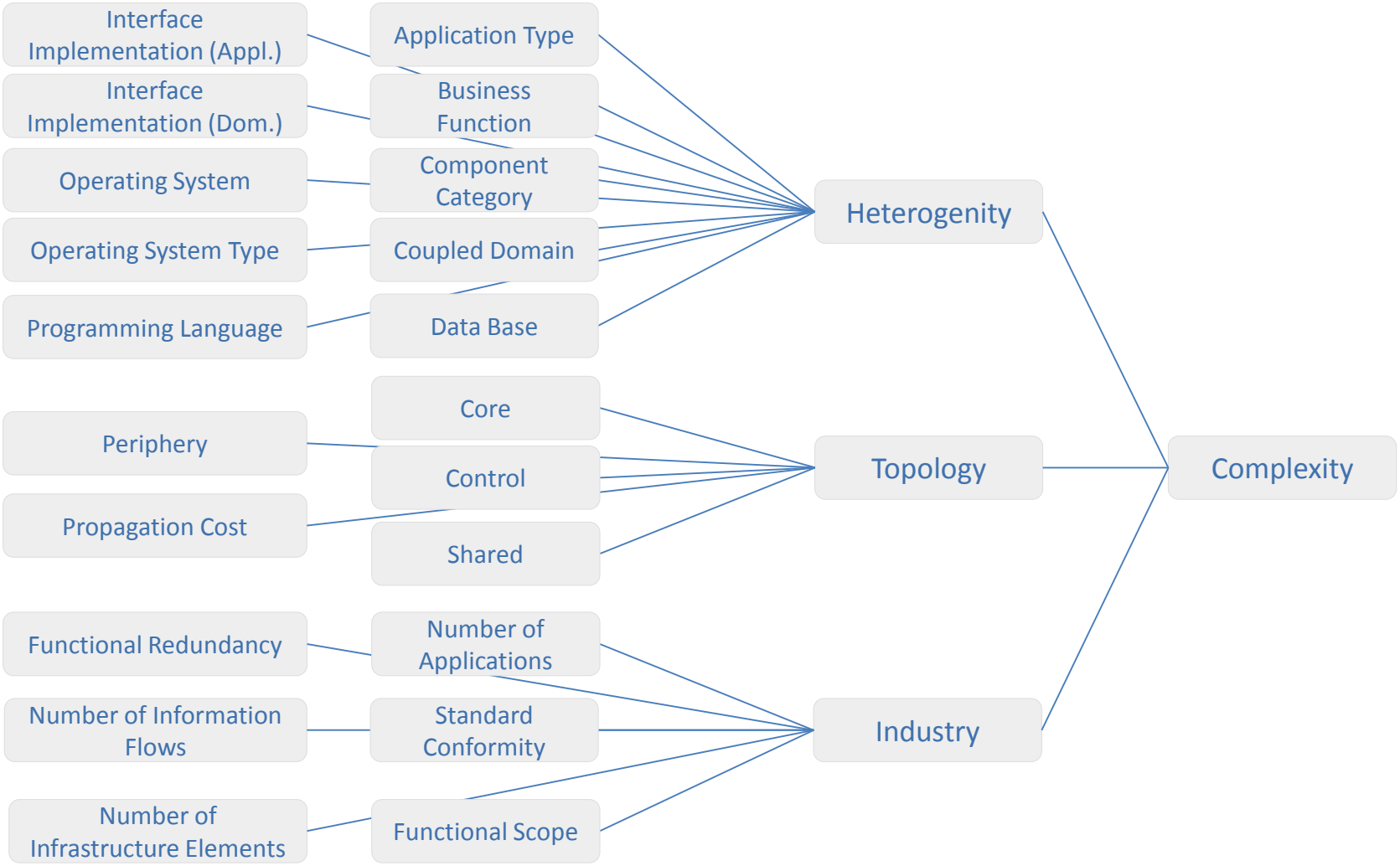
**Apache Tomcat**
Open Source Application Server for Java Enterprise Applications

**Apache Derby**
Open Source In-Memory Database

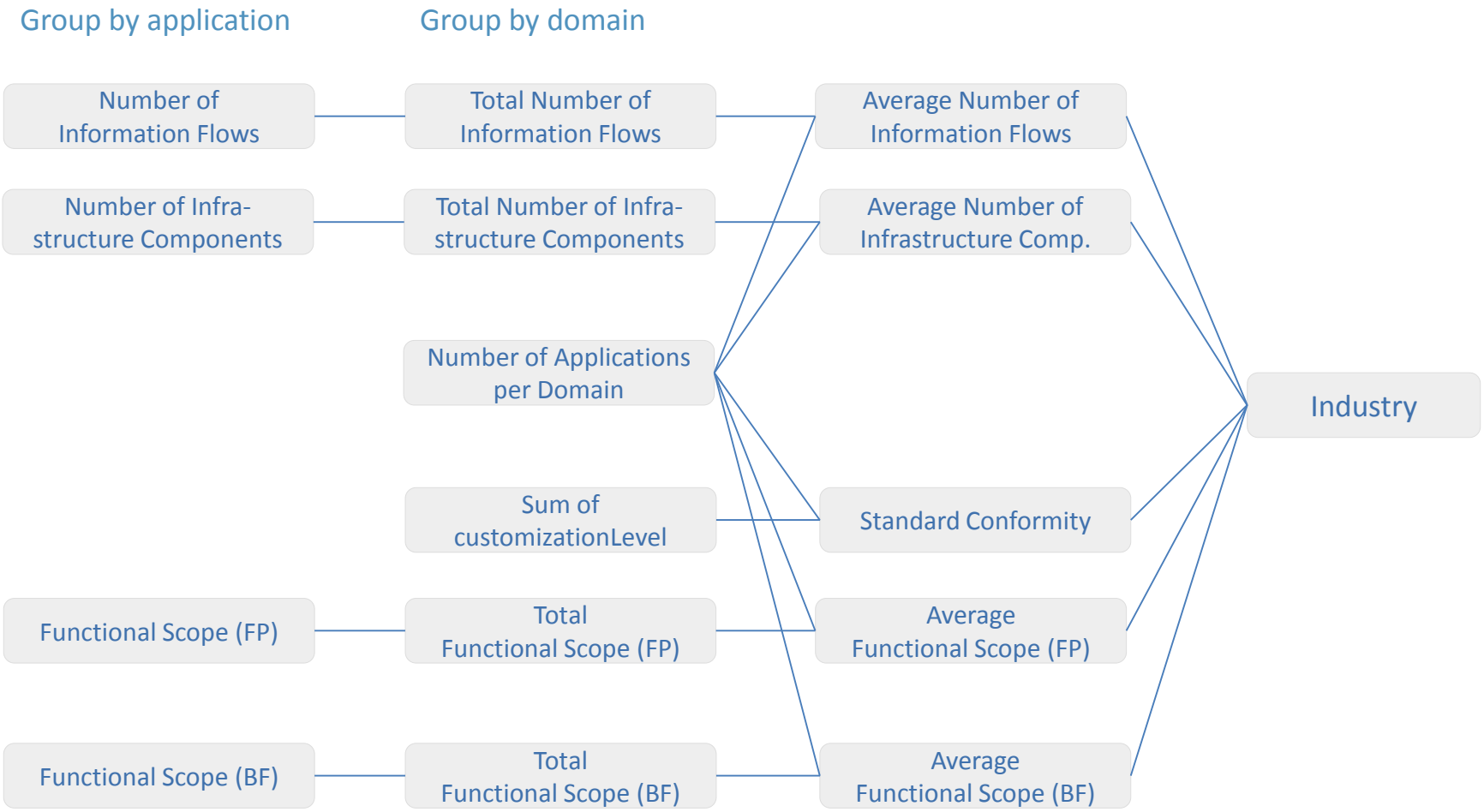
# Transformation



# EAM: Complexity Metrics



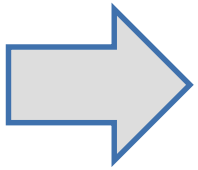
# EAM: Industry Metrics



# EAM: Sample Questions

What happens if…

…the number of operating systems increases?
…we increase the use of standard software?
…the functionality of our applications increases?

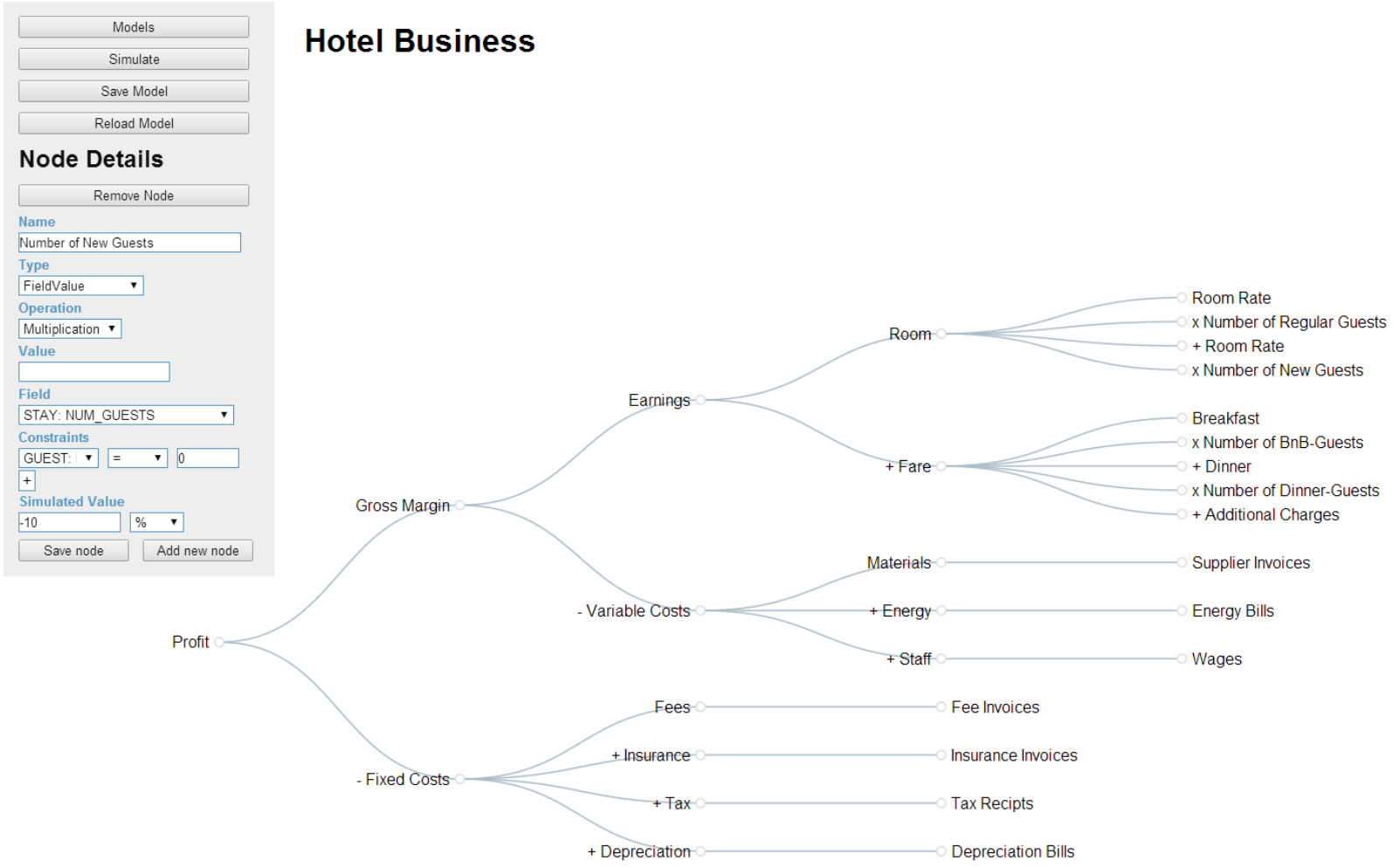


**Answers on EAM complexity metrics basis**

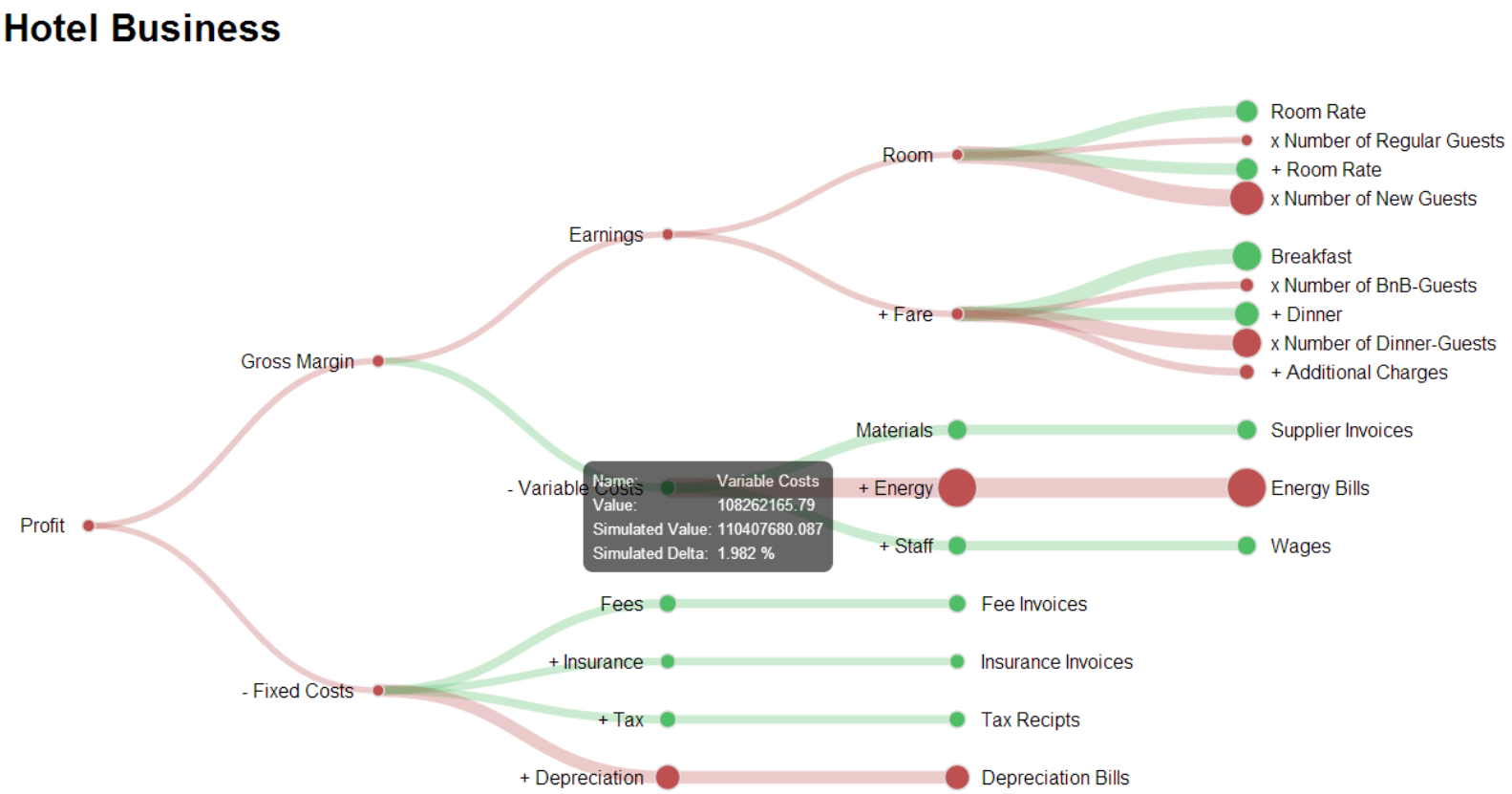
# EAM: Challenges

- Models of large size
  - Complex to understand from a user perspective
- Complex operations for heterogenity and topological metrics
  - Matrix Calculation
  - Transitivity
- Main Information is in relations between objects, not in the objects themselves
  - Many aggregations
  - Many joins / unions

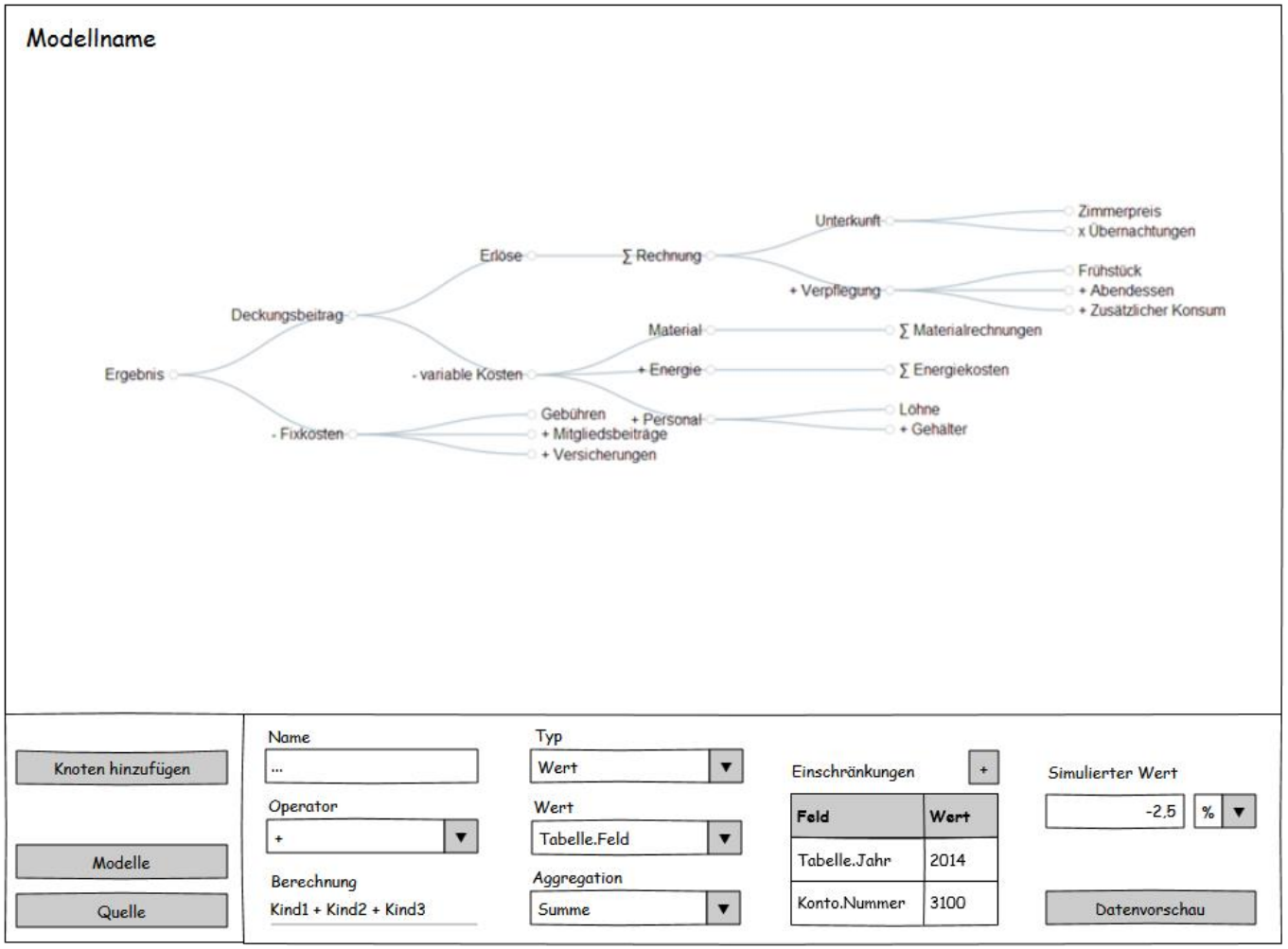
# Web Application: Screenshot



# Example: Calculated Model



# Web Application Mockup: Sidebar bottom



# Web Application Mockup: Others