



Third International Workshop on
Requirements Engineering Visualization (REV'08) -
Monday 8th September, 2008, Barcelona, Spain



Graph-based Visualization of Requirements Relationships

Philipp Heim¹, Steffen Lohmann¹, Kim Lauenroth²,
Jürgen Ziegler¹

¹ Interactive Systems and Interaction Design

² Software Systems Engineering

University of Duisburg-Essen, Germany

Motivation

1. Requirements are often interrelated

- Multiple relationships
- Relationships of different types:
 - User-defined relations
 - Content relations
 - **Shared metadata relations** (focus of this talk)

2. Visualizing relationships facilitates

- Understanding of the requirements themselves
- Understanding of their dependencies

3. Existing requirements management tools

- Mainly use lists, tables, trees and matrices
- Limited capacity to show multiple relationships of different types

Our Approach

- **Graph-based visualization of Requirements Relationships**
 - As extension to existing visualization forms
 - Represents requirements as nodes and relationships as edges
 - Allows for flexible visualization of multidimensional relationships
- **Problems to meet:**
 - Graphs do not scale well to large datasets
 - They get over-cluttered and hence difficult to understand
- **Our solution:**
 - Show a limited set only
 - Focus and context approach

Focus and Context Approach

- Global and local navigation

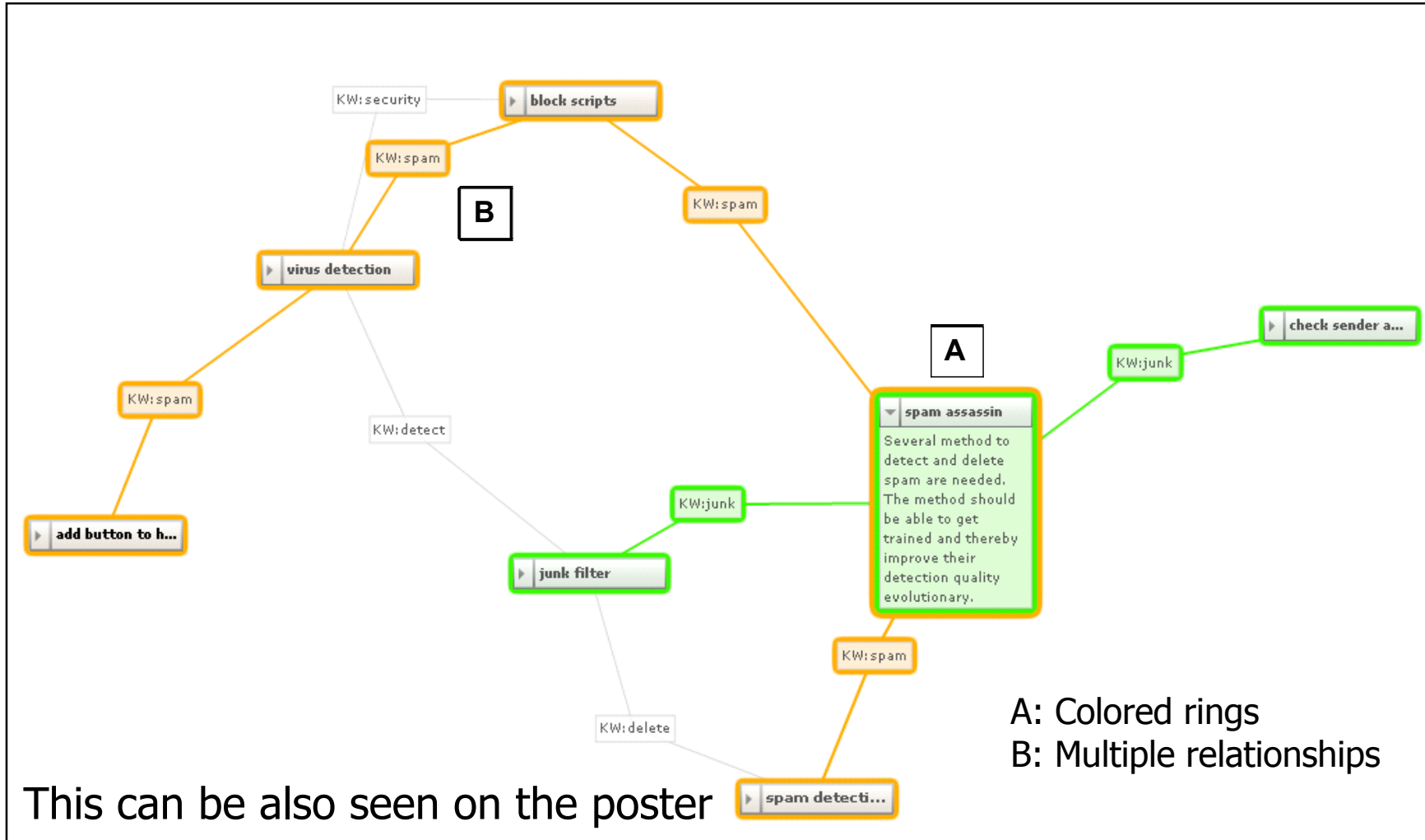
The screenshot illustrates the Focus and Context Approach in a web application. It is divided into several key components:

- A: tree view**: A sidebar navigation menu showing a hierarchical structure of topics.
- B: tag cloud**: A collection of tags representing different topics or keywords.
- C: result list**: A list of search results, with one item selected and highlighted in blue.
- D: detail view of the selected requirement (focus)**: A detailed view of the selected requirement, showing its title, description, theme, tags, and authors.
- E: related requirements (context)**: A list of related requirements, each with a title, keywords, and a brief description. A small table is overlaid on this section, showing a list of keywords and their values.

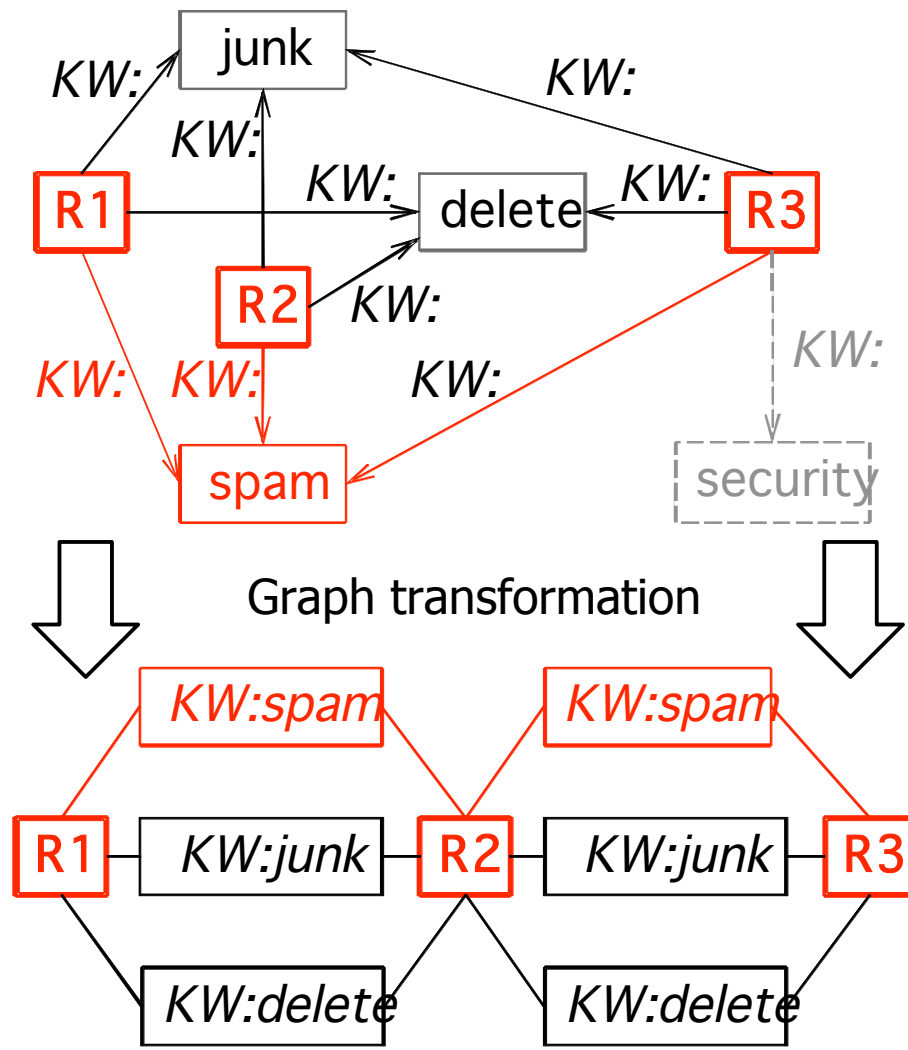
Typ	Value
KeyWord	junk
KeyWord	spam
KeyWord	detect
KeyWord	delete
KeyWord	security

Graph-based Visualization

- Direct representation of relations



RDF Graph Transformation (ChainGraph)



- Indirect representation of shared metadata relations (e.g. the keyword KW: spam)

- Presentation of **shared** metadata only
- **Direct** representation of shared metadata relations
- Reduced number of edges
- “ChainGraph”

Conclusion and Future Work

■ Pros:

- Single visualization (not distributed over several pages)
- Direct representation of shared metadata
- Fewer number of crossing edges
- Following path

■ Cons:

- Not suited to visualize large numbers of requirements or large numbers of shared metadata

■ Future Work:

- Complete integration into the main system
- Evaluation of benefits with the help of eye tracking

**Thank you for your attention!
Any questions?**