

Bachelor's thesis:

**Graphical Interaction**  
on  
**Enterprise Architecture**  
**Visualisations**

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## **1. Introduction to Graphical Interaction**

## **2. Requirements**

## **3. Design**

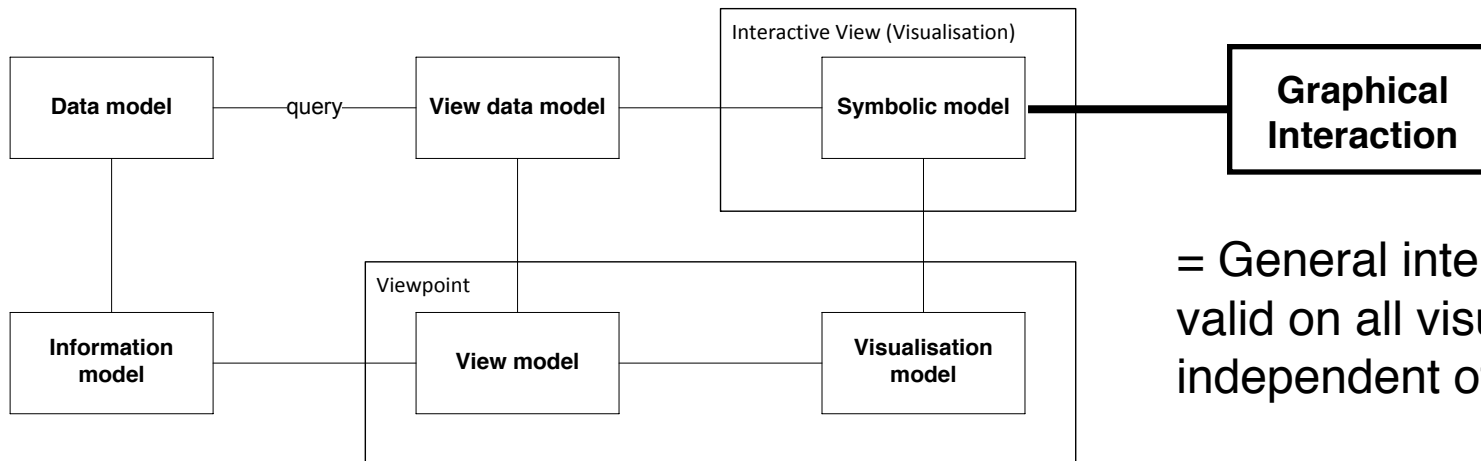
## **4. Demo**

## **5. Problems**

## **6. Outlook**

# 1. Introduction to Graphical Interaction

- “Visualisation provides a powerful means of making sense of data” [HS12].  
=> Visualisations for decision support
- “Displaying an entire large graph may give an indication of the overall structure, but makes it difficult to understand” [HMM00].  
=> Need for Graphical Interaction

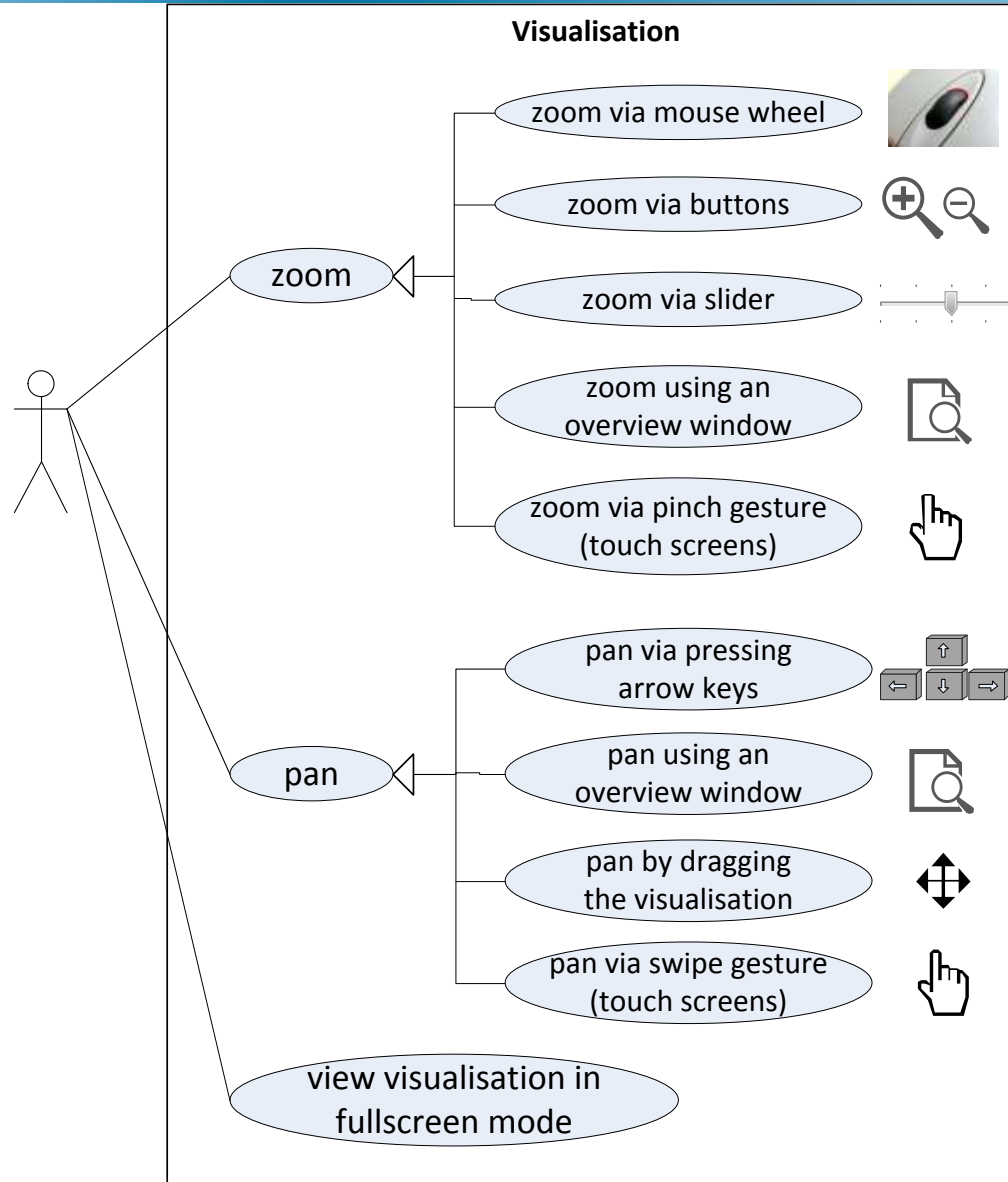


Conceptual Framework for Interactive Enterprise Architecture Management Visualizations [SMR12]

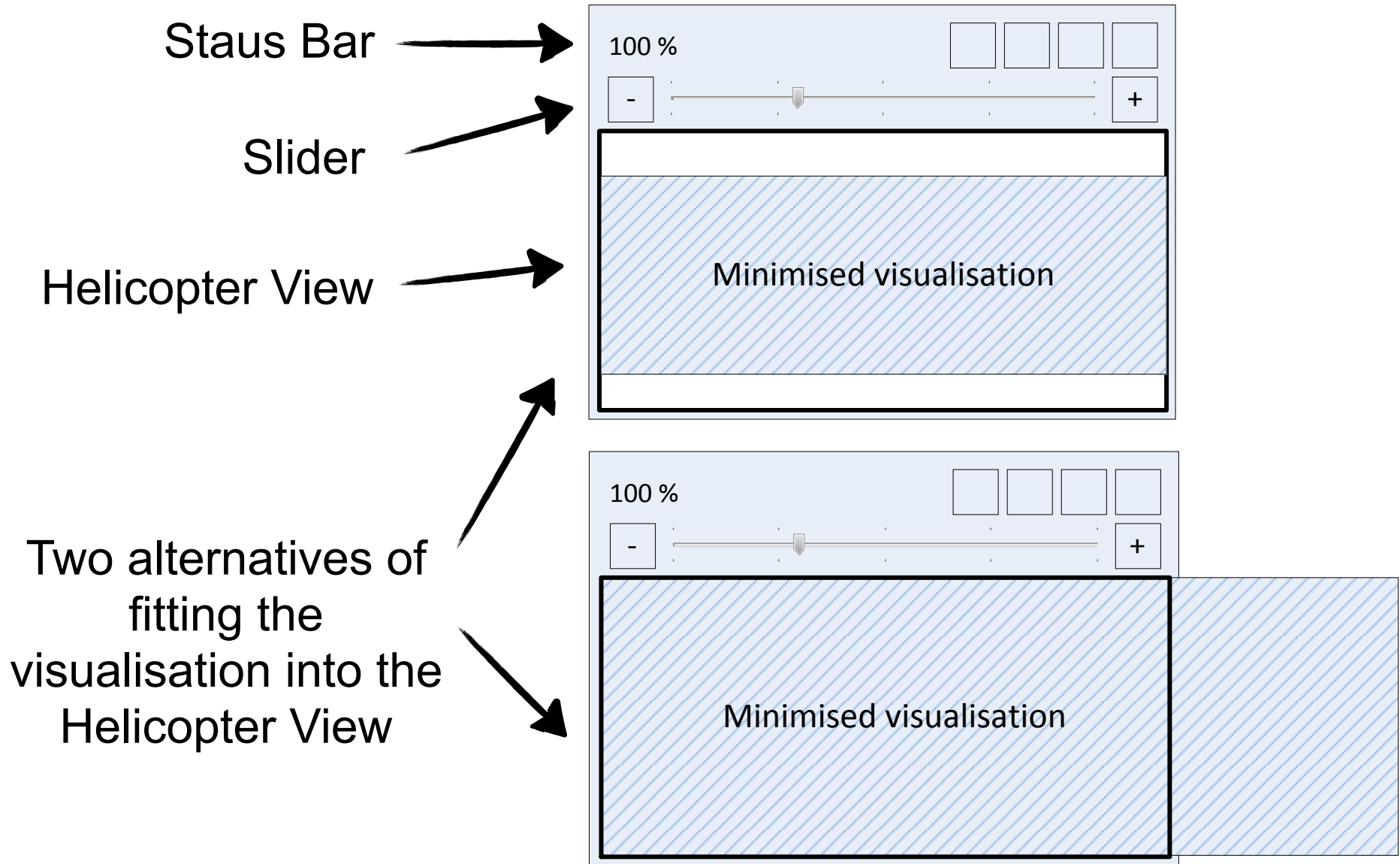
= General interaction functionality valid on all visualisations independent of the viewpoint.

Examples: zoom, pan

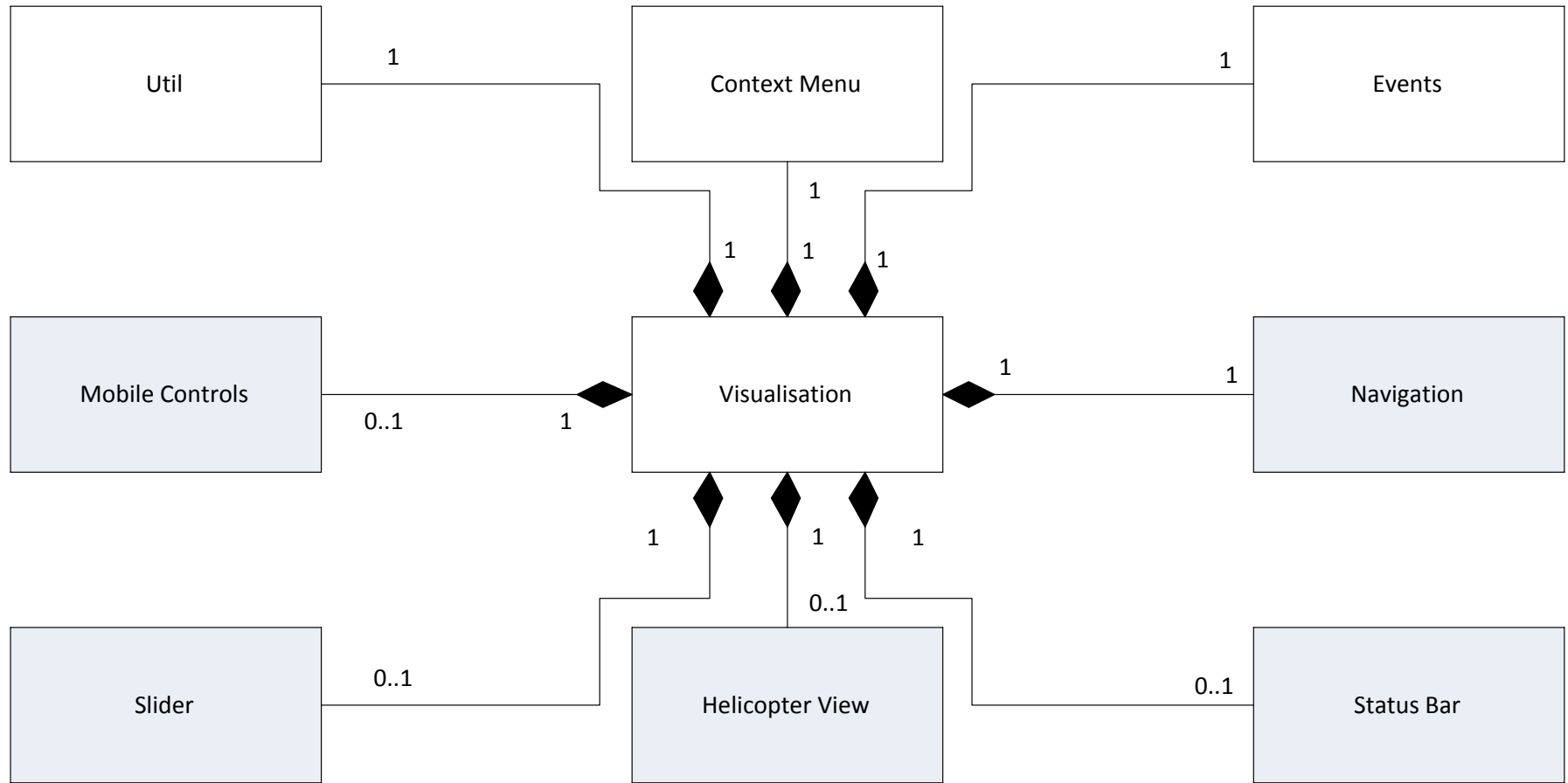
## 2. Requirements (use cases)



### 3. Design - The Helicopter View



# 3. Design



...the actual program...

- Setting the view box on a SVG is very slow
  - Possible improvements via:
    - working with timeouts
    - showing only wireframe during interaction
    - employing hardware acceleration
- Web workers in HTML5 (concept for multithreading) bring no enhancements since there is still only one UI thread.

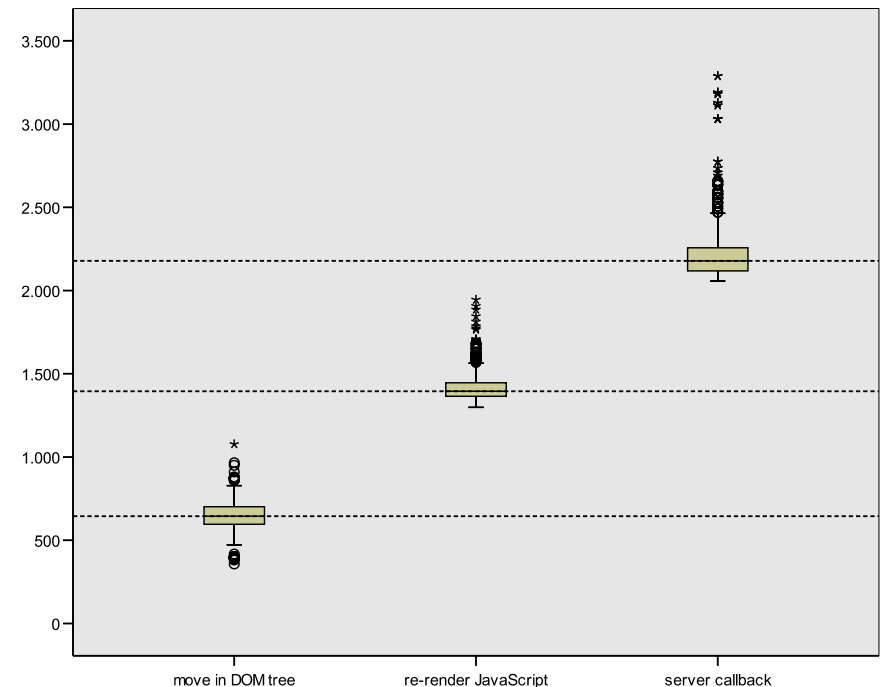


## 5. Problems - Opening a new window

- Opening the visualisation in a new window

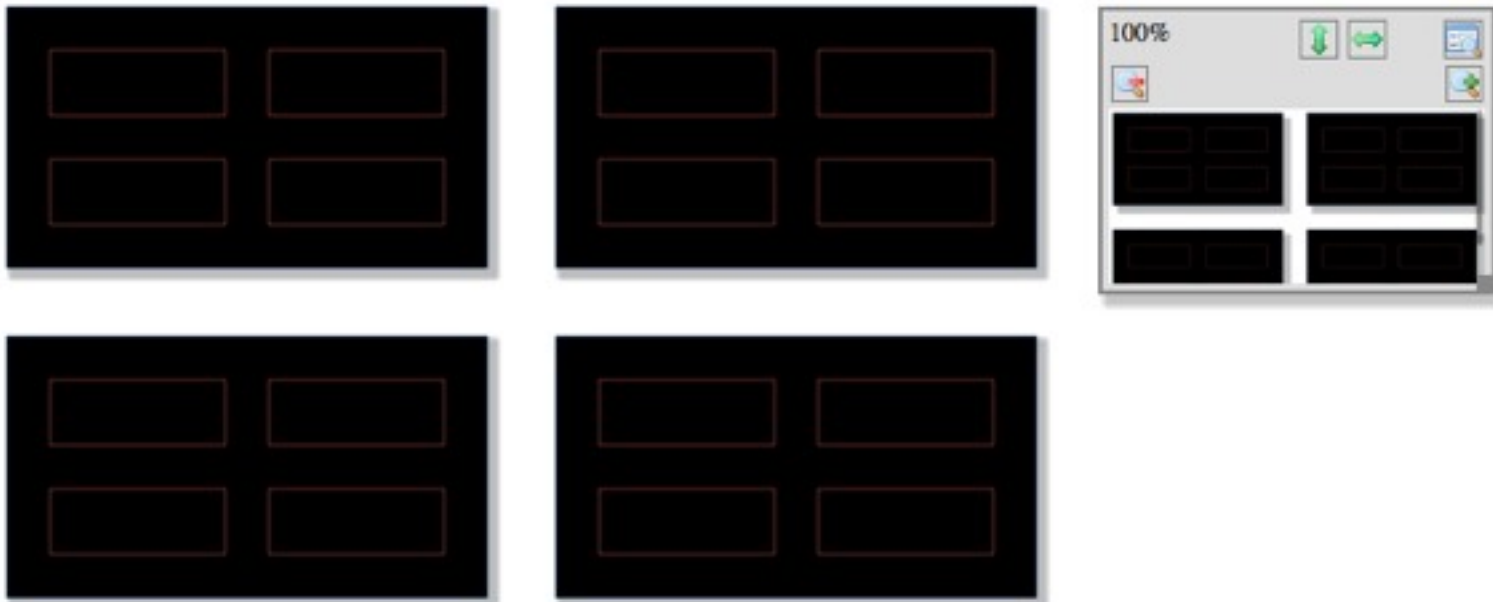
Tests of three alternatives (n=1000 on a map with 250 nodes):

- Server callback (2220ms)
- Re-render JavaScript (1414ms)
- Move DOM elements to the child window (649ms)



## 5. Problems - Bugs

- Bugs especially in Firefox when opening visualisations with colour gradients in a new window



- Poor standardisation of gesture detection on touch screens (pinch, swipe)
  - Safari on iOS: events which detect pinch and twist (ongesturestart, ...)
  - W3C Standards (work on iOS and Android): events which forward list of touches of all fingers (ontouchstart, ...) => own gesture detection algorithm necessary!
  - Opera Mini: no information about touches
  - Only limited support offered by third-party libraries: E.g. JQuery Mobile: no pinch, no vertical swipes

- Usability improvements after user feedback
- Performance improvements
- Helicopter View component as basis for additional functionality

...?

Citation:

[HS12] Heer, Jeffrey ; Shneiderman, Ben: Interactive Dynamics for Visual Analysis A taxonomy of tools that support the fluent and flexible use of visualizations. In: ACM Queue 10 (2012), No. 2

[HMM00] Herman, I ; Melancon, G ; Marshall, M S.: Graph visualization and navigation in information visualization: A survey. In: IEEE Transactions on Visualization and Computer Graphics 6 (2000), No. 1

[SMR12] Schaub, Michael ; Matthes, Florian ; Roth, Sascha: Towards a Conceptual Framework for Interactive Enterprise Architecture Management Visualizations. In: Modellierung, 2012