Grooming the Hairball - How to Tidy up Network Visualizations?

Hans-Jörg Schulz[1], Christophe Hurter[2]

VIS Tutorial 2013

1. University of Rostock, Rostock, Germany
2. French Civil Aviation University, ENAC, Toulouse, France

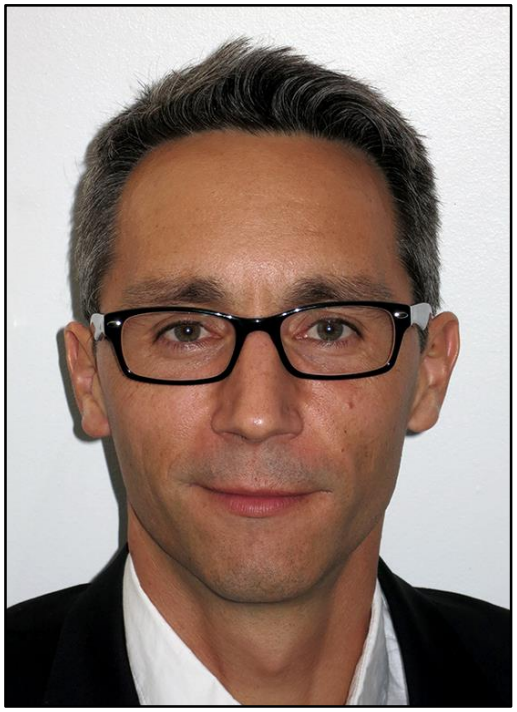
INTRODUCTION

Speakers: Hans-Jörg Schulz & Christophe Hurter

About the Speakers: Hans-Jörg Schulz

- PhD in 2010 @ Rostock
- Thesis on Graph Visualization
- Now PostDoc @ Rostock
- Fields of Research:
  - Design Spaces
  - Vis. of Heterogeneous Data
  - Vis. for the Life Sciences
  - Graph & Tree Visualization

About the Speakers: Christophe Hurter

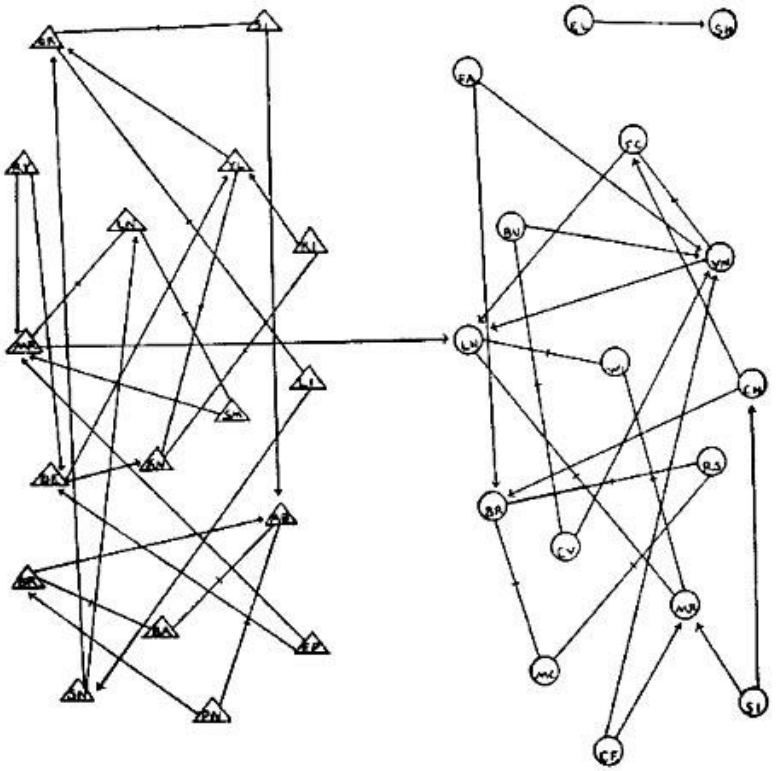


- PhD in 2010 @ University of Toulouse
- Thesis on Multivariate data exploration
- Now Assistant Professor @ ENAC, French Civil Aviation University
- Fields of Research:
  - Multivariate data exploration
  - GP-GPU techniques
  - Information visualization
  - Trajectory exploration

About the Tutorial Topic

Node-link diagrams for network data

- often attributed to Moreno for depicting social networks

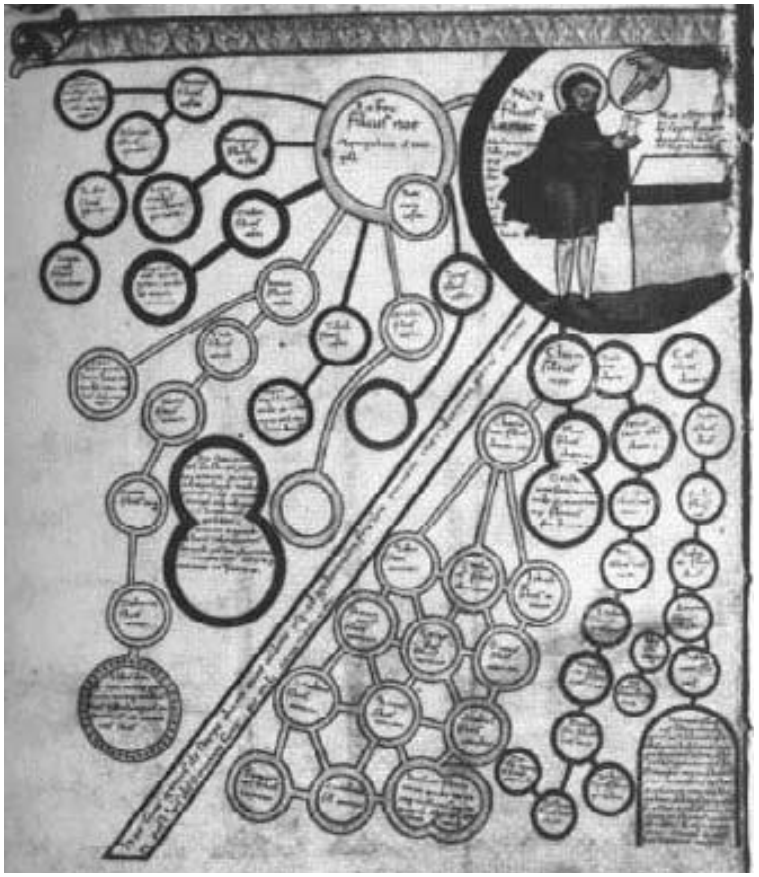


[source: Freeman 2000]

About the Tutorial Topic

Node-link diagrams for network data

- often attributed to Moreno for depicting social networks
- but instances of earlier examples exist (e.g., family trees) that go back as far as the 13th century
- (obviously) still hand-drawn back then

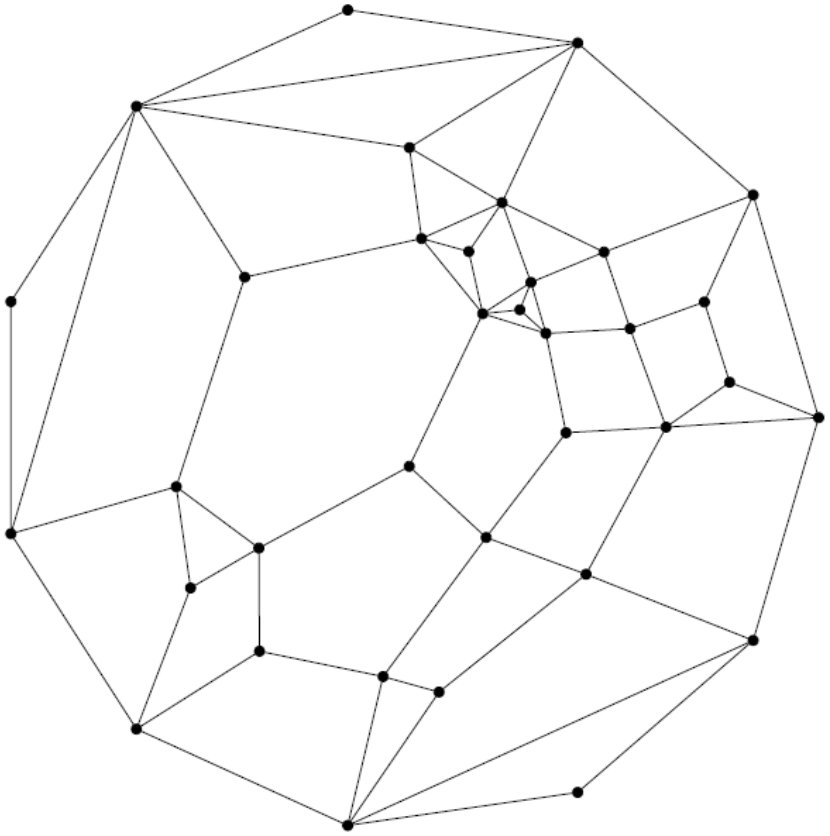


[source: Kruja et al. 2001]

About the Tutorial Topic

Node-link diagrams for network data

- often attributed to Moreno for depicting social networks
- but instances of earlier examples exist (e.g., family trees) that go back as far as the 13th century
- (obviously) still hand-drawn back then
- first automated layout routines appeared in the 1960‘s – e.g., [Tutte 1963]

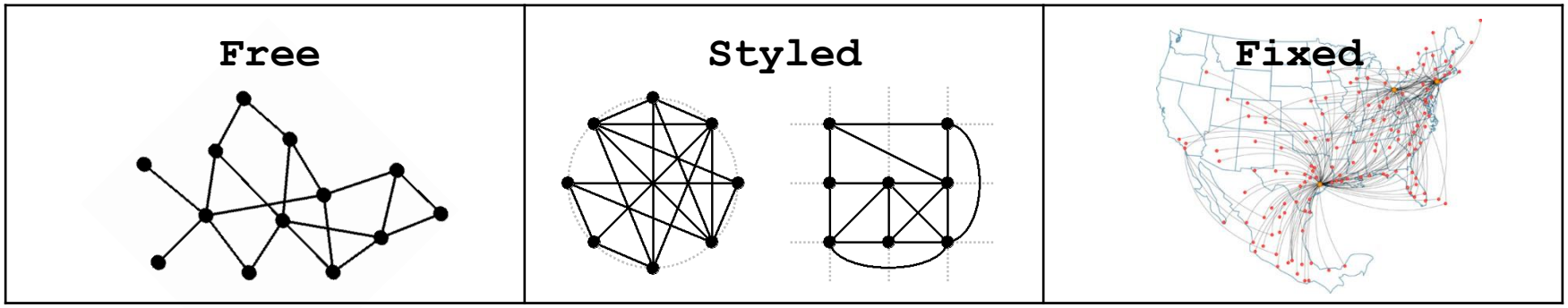


[source: Eades+Hong 2012]

About the Tutorial Topic

Classifications of Node-link diagrams

- By degrees of freedom of the nodes

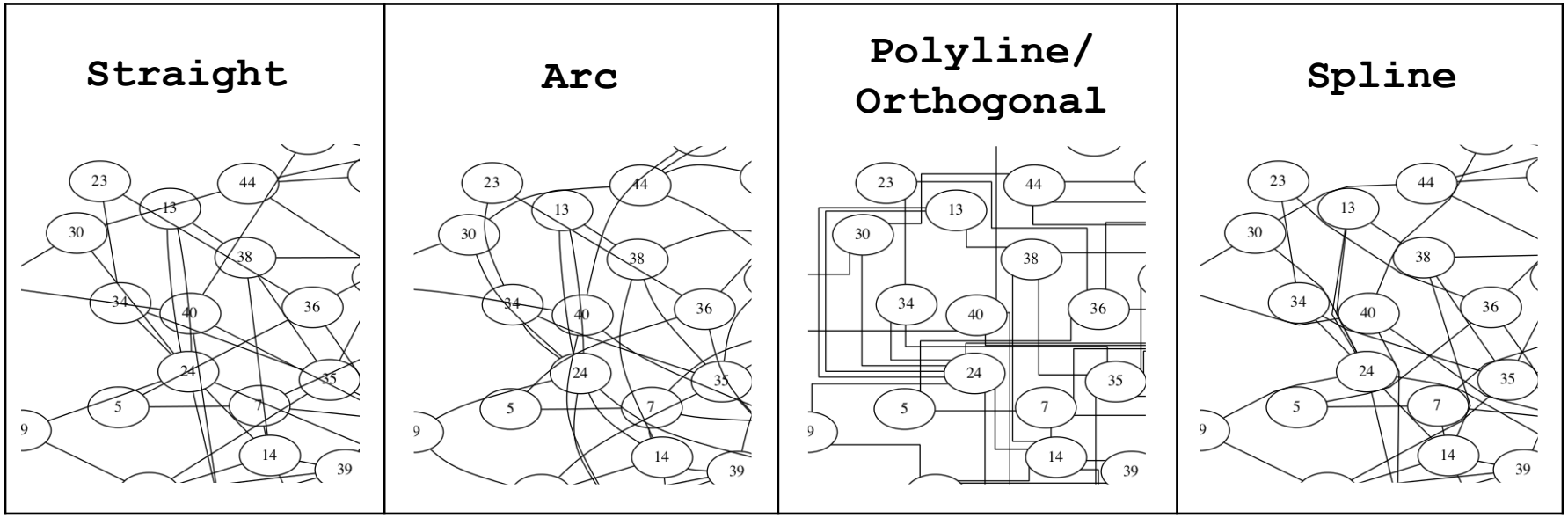


[adapted from: Schulz+Schumann 2006]

About the Tutorial Topic

Classifications of Node-link diagrams

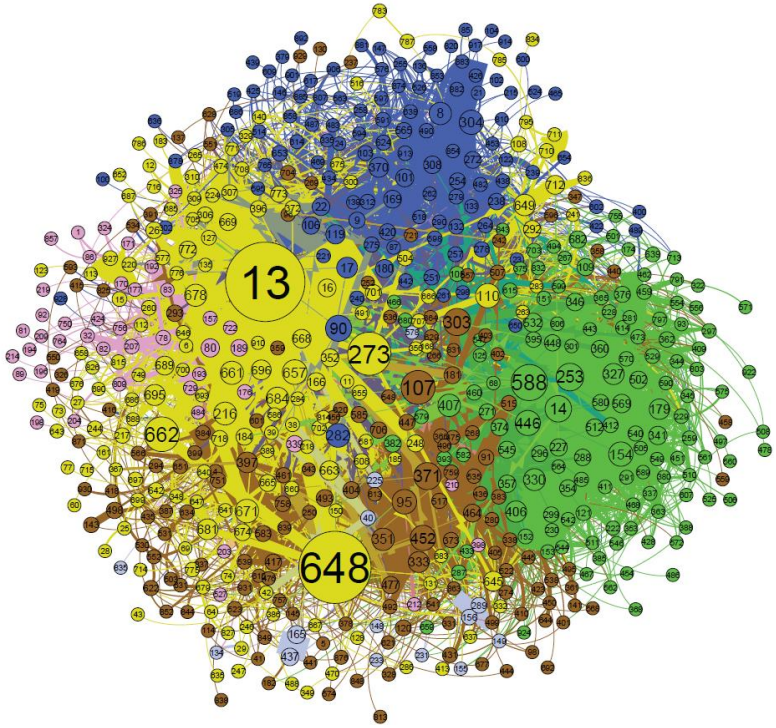
- By degrees of freedom of the edges



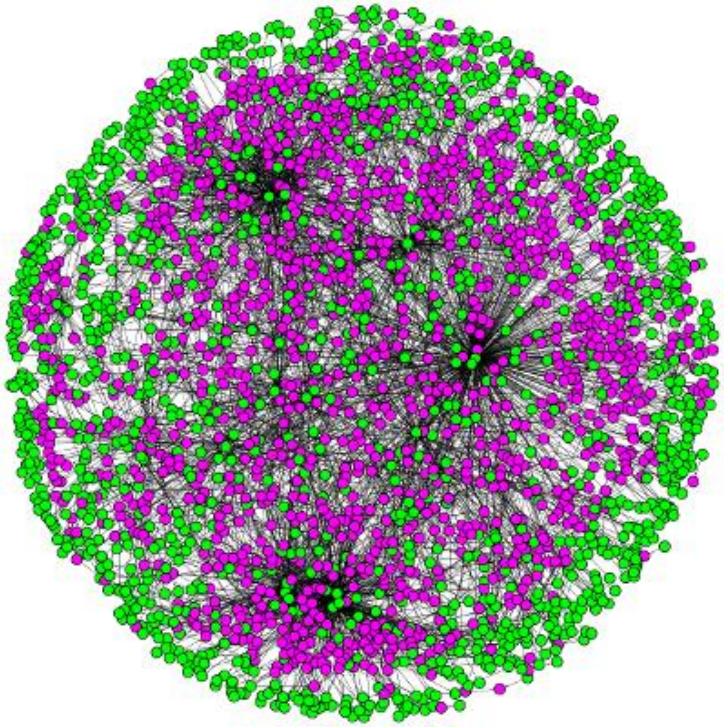
[adapted from: Gansner 2013, Dagstuhl talk]

About the Tutorial Topic

But, Node-Link-Layouts usually don't scale!



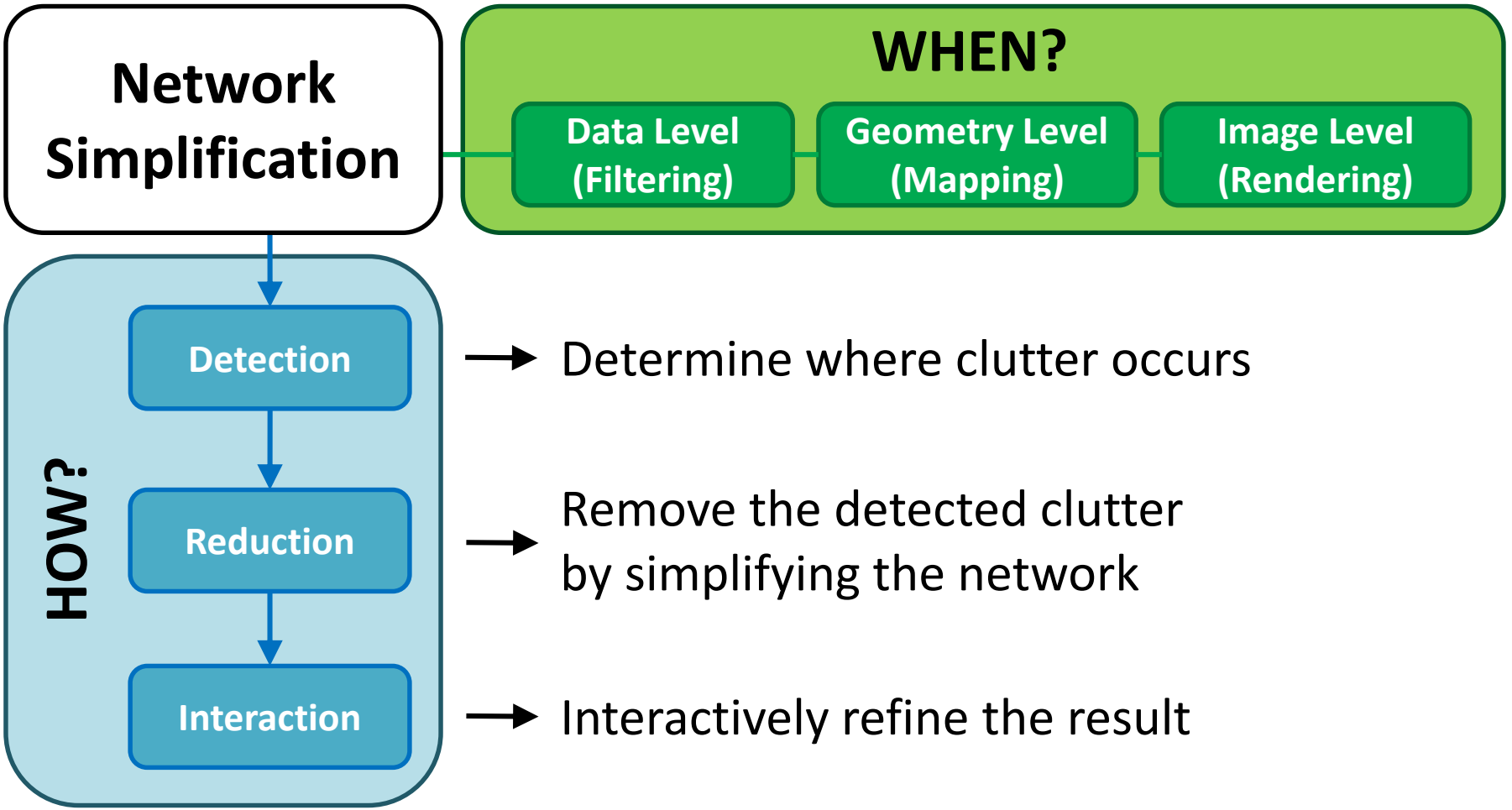
Blog network visualized with Gephi
[source: learningfrontiers.eu]



E. coli metabolic network visualized with Cytoscape [source: kavrakilab.org]

About the Tutorial Topic

A Conceptual Framework to Solve this Problem



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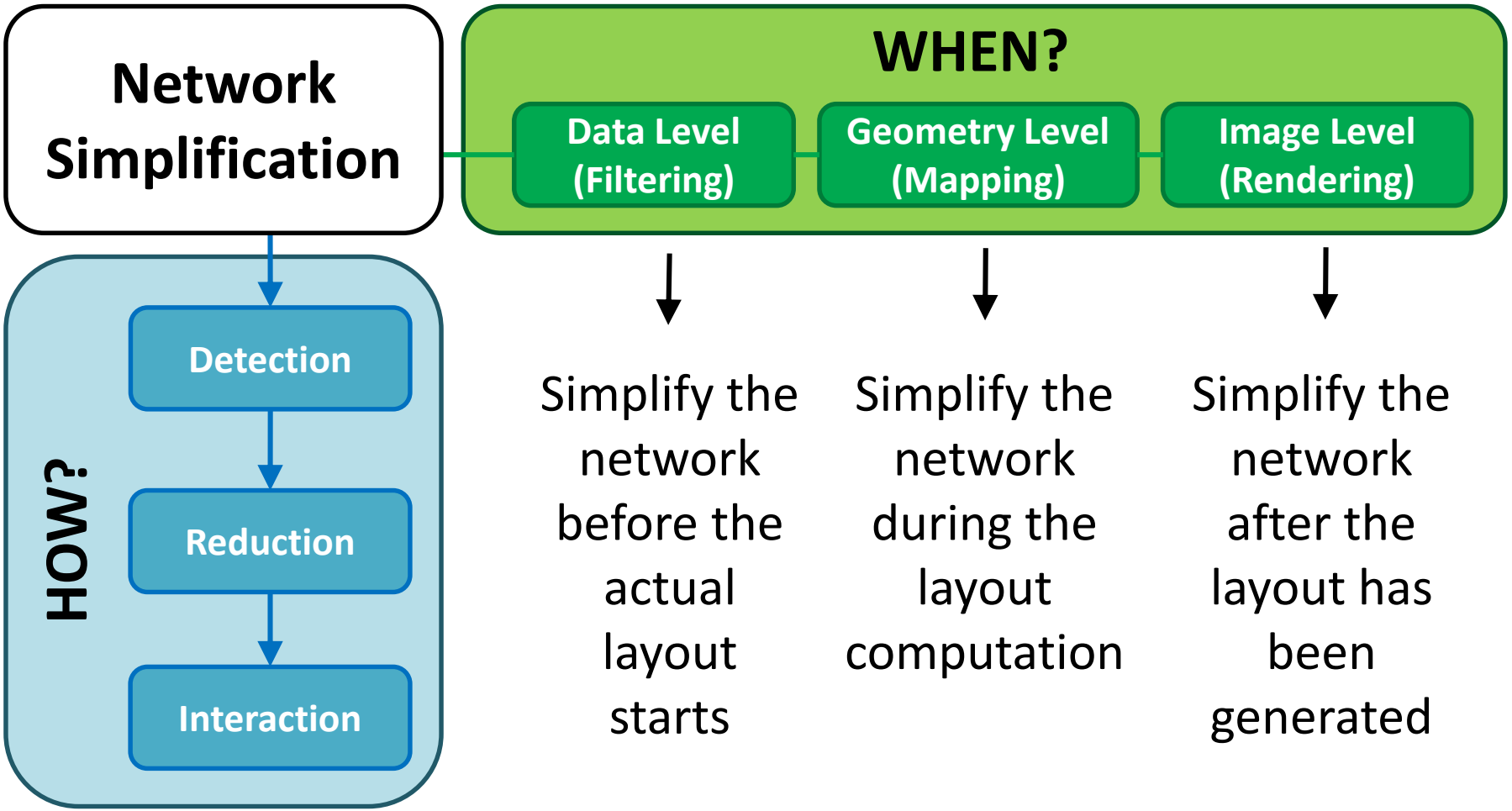

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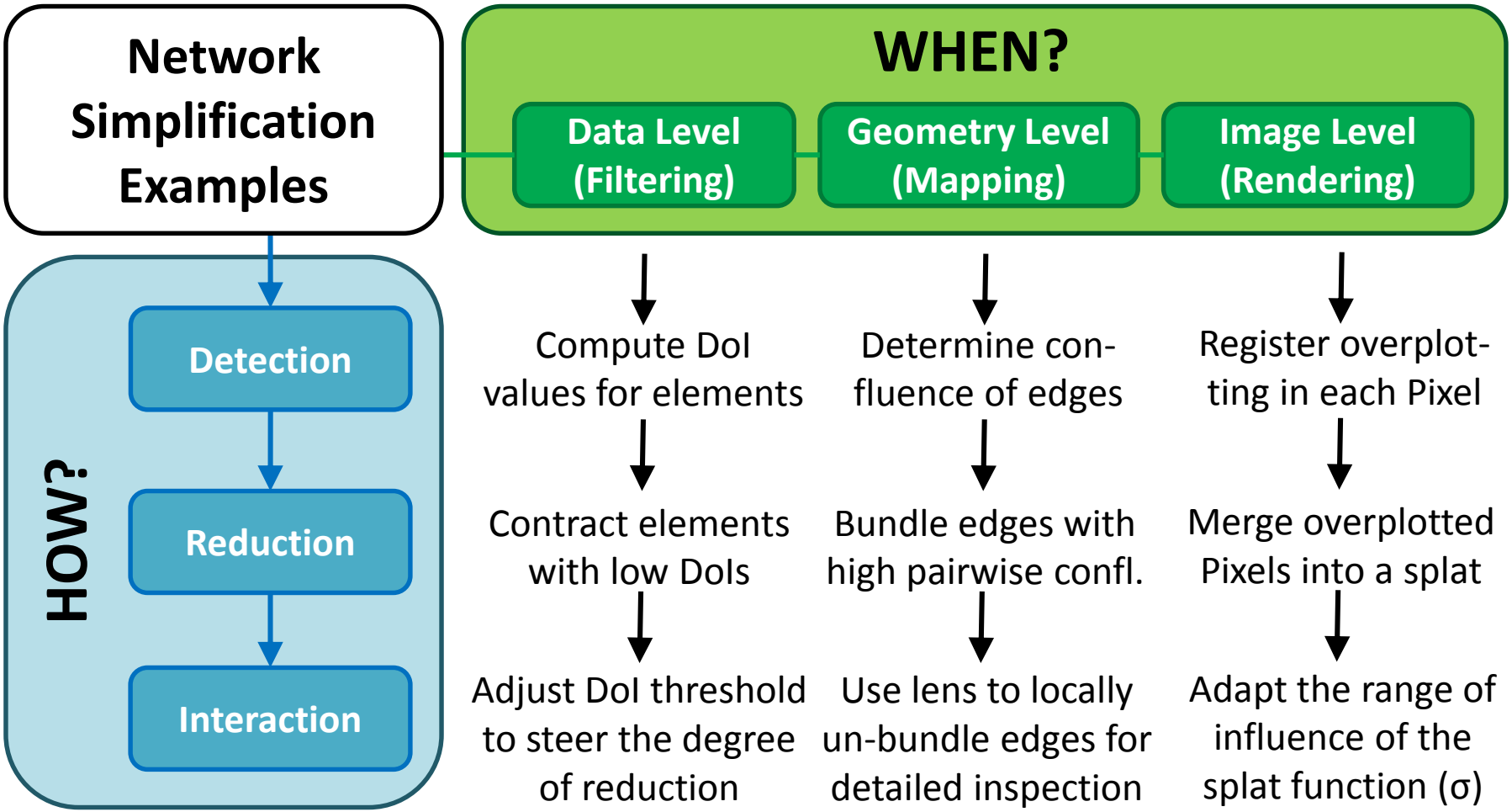

About the Tutorial Structure

Tentative Schedule:

0. Introduction (you're listening to it right now)
   8:30-8:45 (≈ 20 minutes)
1. Node Set Simplification
   8:45-10:00 (≈ 70 minutes)
2. Edge Set Simplification
   10:00-10:10 (≈ 10 minutes)
   10:10-10:30 coffee break
   10:30-11:35 (≈ 65 minutes)
3. Applications & Open Research Questions
   11:35-12:10 (≈ 35 minutes)

About the Tutorial Structure

If you have remarks or questions please feel free to ask them on the spot!

Download this Slide Deck + the Literature List @

http://tinyurl.com/tutorial2013