ViENA: Visual Enterprise Network Analytics

P. Federico[1], W. Aigner[1], S. Miksch[1], J. Pfeffer[2], M. Smuc[3], F. Windhager[3], and L. Zenk[3]

[1]Vienna University of Technology, Austria [2]Carnegie Mellon University, Pittsburgh, PA, USA [3]Danube University Krems, Austria

1. Introduction

Collaboration is the way work gets done in organisations. Therefore social networks of different types, functions and compositions have become an inevitable precondition of organisational performance. Moreover, these networks are not static, but changing over time. Organisational analysts are seeking for appropriate tools and methods supporting the information discovery processes of these dynamic networks.

2. Proposed solutions

Within the ViENA project we address this need by adopting a visual analytics approach, and provide a prototypical solution that integrates visual, interactive and computational techniques [FAM*11] [FAM*12].

We combined three interactive views, based on coordinated node-link diagrams:

- a juxtaposition view, enabling the direct comparison of network structures over time.
- a superimposition view, enabling the tracking of node evolutions.
- a two-and-a-half-dimensional view (2.5D) with trajectories, aiming to support synoptic tasks (see Fig. 1).

Besides basic interactions supporting network exploration (2D and 3D zooming, panning, rotation), coordinated across the different time points, we developed:

- smooth animated transitions between the different views;
- a force-directed dynamic layout whose stability can be interactively controlled by the user, in order to perceive changes while maintaining the mental map;
- the vertigo-zoom, a specific interaction for 2.5D views that enables transitions between the relational perspective and the time perspective by varying the field of view.

An integrated Social Network Analysis computational kernel enriches the visualization with static and dynamic metrics, that highlight network changes and support the comparison of topological properties over time.
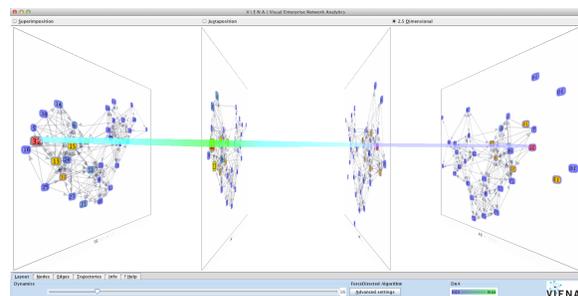
Figure 1: *A 2.5D view of a dynamic enterprise network.*

3. Evaluation

We performed an insight-based qualitative evaluation [SFW*12] that, besides revealing some usability issues, confirmed the importance of a direct user's control of the mechanism for the preservation of the mental map (not only over time, but also across different views). Moreover, the evaluation showed how the combination of visual, interactive and analytical techniques supports complex tasks, also according to different users' problem-solving strategies.

References

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