

Presenting InfraVis, The National Research Infrastructure For Data Visualization

InfraVis is the national Swedish infrastructure for the visualization and analysis of data from all academic domains. InfraVis supports its users on three levels with varying degrees of depth and effort: from a few hours without user fees to several months with co-funding. In this paper, we document and analyse our approach to support levels to extract lessons learned for the reader.

InfraVis is a human-resource infrastructure. It's distributed across 9 different node universities, in 8 different cities. The leading/hosting node is Chalmers University, and the others are Lund University, Linnaeus University, Gothenburg University, Linköping University, KTH Royal Institute of Technology, Uppsala University, Mid Sweden University, and Umeå University. Its capacity to provide service is based primarily on the know-how of the people who operate the infrastructure. In this respect, we are different from research infrastructures that provide access to rare high-end equipment, such as supercomputers or electron microscopes. At most, the infrastructure provides users with, for example, specialized graphics hardware and motion capture environments. The infrastructure addressed a general lack of visualization expertise and literacy among many scientists and researchers in Sweden. While most scientists know how to produce figures from experimental results, they typically don't know how to create interactive visual representations tailor-made to address their analytical and exploratory tasks or how to avoid misleading their audience with accidental visualization misrepresentations. At best, typical researchers may know of tools that approximate these analysis and exploration requirements, but, even then, InfraVis plays a dissemination role amongst those that are not up to date with the latest tools.

Towards fulfilling these requirements, we identified that there would be different levels of support that researchers may need. We defined three levels of support, namely helpdesk support, mid-level support, and in-depth support. Helpdesk support is meant to be under 10 hours of work (often less) and the infrastructure's application experts are not meant to handle user data. If the application experts need to handle the data, we automatically claim it is at least a mid-level support project. In mid-level support projects, application experts are operating directly on a version of the data and are providing visualization services for up to 100 hours. The in-depth support projects are defined as those that will require more than 100 human hours to provide adequate support. In practice we have placed a cap of 600 hours for in-depth support. If needed, we advise users to split off the work and apply over multiple rounds of in-depth support. Furthermore, users need to co-finance, either with direct funds or in-kind contributions, the in-depth support projects.

Within the infrastructure, the people doing the actual ground work of providing research support to the users are referred to as InfraVis Application Expert (IAE/AE).

Defining the criteria for these different levels of projects:

- A helpdesk support project is one where the users have clean data, a clear idea of what about this data they want to visualize, what tasks they want to perform with the visualization, and a short list of visualization tools that may perform the task effectively. Their issue might be that they lack the best practice for visualization or don't have the time to invest in learning the tools or methods they need unsupervised. Their issue may be resolved by the IAE answering a few questions or by providing them the specific tool set up they require.
- A mid-level project is one where the user has most of the data and it is mostly clean and needs to hand over the data to the application expert for further processing and visualizing. The user may have a vision of what the final visualization should look like or what cognition tasks it is meant to facilitate, but does not know how to or the tools that will create that vision. A well-defined mid-level project will typically have the user engage with the IAE with a clear idea of what they want and how it might be achieved on a high level, but lack the specific know-how to realise it.
- An example of an in-depth project is one where users request extensive design and evaluation expertise in interactive data visualizations. A common user for this level of project is one that simply has no idea how to efficiently read and understand their data, not because of a lack of effort, rather that there is no clear established way of doing so. The AE(s) not only handle the data, but are in charge of uncovering user requirements and tasks, creating visual analytics tools to support them, and evaluating the effectiveness of these tools in supporting the identified tasks. It is not unreasonable that the final output of an in-depth project becomes grounds for publishing a paper, presenting the new visual analytics method or tool for the broader community of the users' domain.

A potential user would typically submit a request in less than 5 minutes through our online contact form or talk directly with an InfraVis representative, to present a project proposal. The process is simple and undaunting by design, encouraging potential users to discover what powerful, tailor-made visualization support can do for them, without needless consideration about the time or resource cost.

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