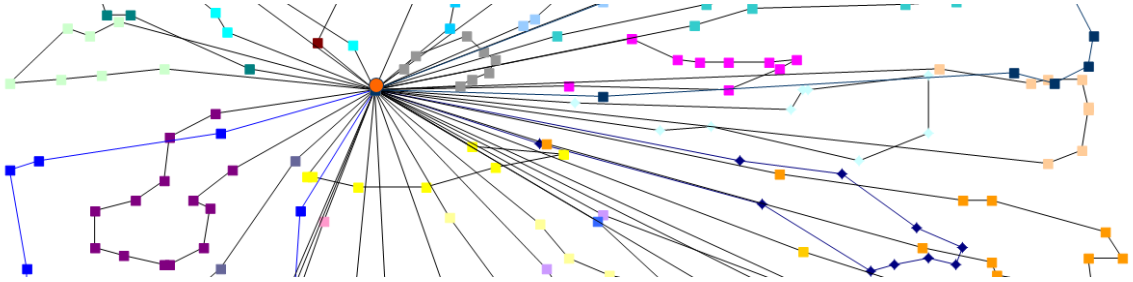
Spider

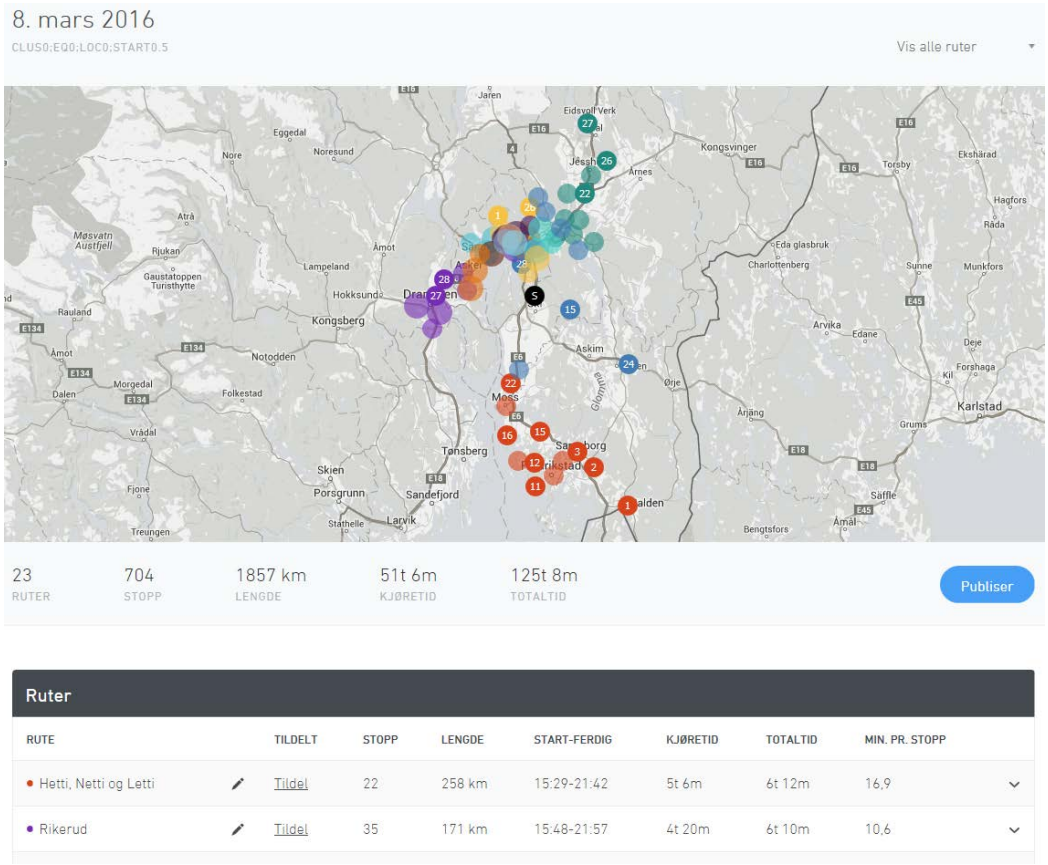
A software component for optimized transportation planning and vehicle routing



Spider is a software tool for planning transportation or service operations for a fleet of vehicles. By applying modern mathematical optimization techniques, it offers a huge potential for savings in transportation costs, increased revenues, and higher efficiency. As well dynamic fleet management and fastest route calculations, Spider can be used in transportation network design and fleet dimensioning. Good co-ordination of transportation activities through optimization can improve customer service and give environmental and economical savings.

Applications

Spider (http://www.sintef.no/en/software/spider/) has been developed by SINTEF Digital, in close R&D collaboration with industrial users over many years. The result is a versatile and robust software product that easily extends to meet special requirements, making it an ideal tool as a planning kernel for apps and services. As an example, Spider is integrated in the solution of Distribution Innovation AS (DI) for planning of carrier routes in the media product business, and in DI's solution Plan & Go for more dynamic transportation planning.



Screenshot from the Plan & Go solution of Distribution Innovation AS. Spider is the optimization engine.

Mathematical basis

The algorithms used for optimal planning in Spider are based on state-of-the-art approximation methods - so-called metaheuristics - for the solution of Vehicle Routing Problems (VRP), and efficient optimization methods for the Dynamic Shortest Path Problem (SPP). The VRP is about how to best assign customer requests to each of the available vehicles, and for each vehicle, what is the best sequence of customer visits. The goal is to find the best transportation plan according to revenues and economical and environmental transportation costs. The plan must obey constraints, such as vehicle capacity and opening hours at the customers.

Technical components and interfaces

C++ library

At the core of Spider is a C++ class library. The library is available for all recent Windows platforms. A port for FreeBSD is also available, and ports to other Unix variants will be provided on request.

Spider Server

Spider Server is a VRP optimization server built on top of the Spider core library. Running this server, the client may add, modify, examine and remove VRP instances and use the tool to calculate optimized plans for each problem instance.

Programming against Spider Server can be done using a client library in Java or .Net. The client library exposes classes that represent VRPs and associated objects. Communication with the server is handled transparently by the client library, over a TCP/IP connection.