

# Infrastructure Management in Swiss Municipalities – Development of a Modern, Spatially Enabled Management Cockpit

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## SUMMARY

Swiss municipalities own about half of the existing public infrastructure in the country, worth over 460 billion CHF. They face enormous challenges, not only in operating and maintaining the infrastructure, but also in planning replacements and future investments. Crucial problems are long life cycles of infrastructure components vs. 4-year legislation periods, divided responsibilities, lack of knowledge on the part of decision makers and insufficient or even incorrect information. Major parts of the entire infrastructure are nearing the end of their life cycle and will have to be replaced over the next decades. This will increase the demand for optimizing the investment in infrastructure even more. In order to meet these challenges, municipalities need suitable processes based on tailored infrastructure management strategies. Typical management instruments support these processes and help to plan, coordinate and make decisions based on key facts and figures. An interdisciplinary team from university, industrial partners and municipalities developed a specialized instrument that supports the efficient and coordinated management of municipal infrastructure. This management instrument is supported by a web based cockpit that integrates data from different sources and combines them with geographical information. To implement this cockpit the project is developing a service-oriented architecture that allows for the flexible combination of different data sources and applications. Key features of the cockpit include planning of long-term infrastructure investment, coordinating the planned actions and visualizing relevant management information for both administrative and executive needs (dashboard). The cockpit employs small, specialized apps (e.g. a map client or a project planning component) that can be combined into more complex applications like the cockpit. The apps utilize a number of common base components that implement much of the core functionality of the architecture. A data abstraction layer with pluggable data adapters allows the declarative definition and combination of data from different sources as well as the creation and management of references between objects from different sources using services. The modern and highly-flexible architecture does not require a change of responsibilities or of the data maintenance processes. The cockpit supports the municipalities in developing their infrastructure strategy and continuously monitoring the implementation progress. For the operational level the cockpit supports the planning of investments and their optimization with respect to costs and financial constraints (how much can be invested for the renewal per year) and, therefore, also smoothing the peak of investments and the change from a reacting to an active acting party.

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