

Addressing Quality Requirements in GIS Architectures

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SUMMARY

Several surveys have shown that about 80% of data in local governments and utility companies are geographical and 1.5% to 2% of the annual budget of such sectors is spent on collecting geographic information. Therefore, such reliance on geographic information has necessitated the development of high quality Geographic Information Systems (GIS) with system qualities such as performance, availability and maintainability. However, in practice, attention is paid to GIS functionalities, rather than such qualities, thereby leading to inefficient and unreliable GIS systems that exceed cost and time allocations.

Software architecture design is the first, and most fundamental, stage that addresses the achievement of quality requirements for software-intensive systems such as GIS. Hence, this paper presents and analyzes a systematic framework for the architectural design of a GIS. It is based on the establishment of mappings between quality requirements and architectural decisions by providing the mappings' rationale, benefits, tradeoffs, and risks. Such a framework enables the early discovery of the critical technical decisions involved in achieving GIS system qualities.