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3.14 Mind the Gap: Assessing the Conformance of Software Traceability to Relevant Guidelines

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Many guidelines for safety-critical industries such as aeronautics, medical devices, and railway communications, specify that traceability must be used to demonstrate that a rigorous process has been followed and to provide evidence that the system is safe for use. However, practitioners rarely follow explicit traceability strategies [2, 1]. Organizations struggle to establish and maintain accurate and complete sets of traceability links [3, 4]. In practice, there is a gap between what is prescribed by guidelines and what is implemented in practice, making it difficult for organizations and certifiers to fully evaluate the safety of the software system [5]. We present an approach, which parses a guideline to extract a Traceability Model depicting software artifact types and their prescribed traces. It then analyzes the traceability data within a project to identify areas of traceability failure [7]. Missing traceability paths, redundant and/or inconsistent data, and other problems are highlighted. We used our approach to evaluate the traceability of seven safety-critical software systems and found that none of the evaluated projects contained traceability that fully conformed to its relevant guidelines [6].

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