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Perspective

Automotive Engineering in Systematic Technology

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ABOUT THE STUDY

A large automotive company team uses a variety of Requirements Engineering (RE) practices. RE practices are manifested in the Requirements Information Model (RIM). RIM defines what concepts and information should be captured for the requirements. Collaboration between practitioners in different parts of the organization is required to define a suitable RIM that balances the coordination needed to support a common view and team at the system level, and support the different practices of individual teams are required. There are no instructions for this demanding task. This paper presents a mixed-methods study to examine RIM's role in balancing the integrity and diversity of RE practices at four automotive companies. Our analysis is based on data from systems engineering tools, 11 semi-structured interviews, and study to validate our findings and recommendations. In defining RIM, we found it important to strike a balance between consistency and diversity of RE practices. We further explored ways to achieve this balance and the actions practitioners are taking to achieve it. From these factors, we derive practical RIM management recommendations that consider the life cycle of requirements and allow for different practices in sub-areas early in development, while enhancing future coordination of requirements will be released.

Scaling is a major examination topic in requirements engineering as systems grow in size and complexity and requirements come from more and more investors and disciplines and need to be combined into a single coherent study. While efforts are being made to create common, enterprise-wide requirements engineering methods, there is a recognized need to allow for diversity and tailor requirements engineering methodologies to specific situations. Especially in the automotive field, practitioners must balance the diversity and convergence of requirements engineering practices. Diversity and consistency can be observed through the creation, modification, and maintenance of requirements-related knowledge of artifacts (such as models and documents) by several different groups within an organization. A common Requirements Information Model (RIM) helps to "develop a common view of requirements" and create tool to support. A practitioner understands the benefits of standardizing artifact models for requirements engineering, but they also recognize the need to smart models to individual projects. Automotive systems offer a high degree of automation and tight integration with other vehicles, transportation infrastructure, and cloud services.

CONCLUSION

This greatly increases complexity and uncertainty, but at the same time opens up new possibilities for realizing innovative security capabilities. Additionally, cyber security has become an important additional concern as the chance and severity of attacks have increased. However, safety technology in general, and vehicle safety departments in particular, lack experience with safety issues. To address this issue, we propose a systematic, pattern-based approach that links safety and security patterns and provides guidance for choosing and combining both types of patterns in the context of systems engineering. Increase in workflow combining safety and safety pattern engineering is proposed to provide systematic guidance to assist lay engineers with best practices. The application of this approach is illustrated and demonstrated using an automotive study.

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