

Safety in Open Systems: Trends, Challenges and Research Directions

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Open systems harbor enormous potential regarding new types of services and applications. However, before compelling visions and ideas can be turned into actual economic and societal success, we need to tackle a series of important challenges associated with the engineering of such next generation systems. One key challenge is the assurance of safety, because established methods and standards are designed on the base assumption that systems and contexts are completely known – which can no longer be assumed.

The main problem lies in the enormous complexity and uncertainty that we face at development time, which makes it very challenging or even outright impossible to diligently analyze a system under development in accordance with established approaches. One general solution idea is to shift certain assurance-related checks and activities into runtime, where all correspondingly required information can potentially be obtained.

This talk will detail the challenges of safety in open systems and motivate runtime approaches as a promising solution. It will outline the correlated state of the art and discuss fundamental conceptual questions and trade-offs in relation to such approaches. It will conclude an outlook on future research directions.