

Why is a Unified Approach to UVV Important?

The V&V practice for software systems is, with few exceptions, typically approached through informal methods and tools or occasionally approached through the application of formal proof methods. Neither approach alone is complete or satisfactory, and seldom are the methods integrated effectively.

Given the potential synergies of testing, program analysis, and model checking, and given the increasing maturation of these techniques, it is now feasible to integrate these complementary approaches to V&V. It is therefore logical to organize, structure, and present a comprehensive approach to V&V that is language-independent, although tools will always be language-specific. This knowledge can then be used to select methods and tools for V&V of a particular programming paradigm or language.

It is noteworthy that the hardware development community has begun to unify verification by integrating simulation and model checking techniques [Ace04].

The long-term impact of this project on V&V of software is potentially enormous, both economically and socially. The project will develop a unified and comprehensive approach to the V&V of software systems and will incorporate it into college curricula, encouraging new generations of students to study these problems. In doing so, the project will establish the basis for an additional generation of tools for V&V and, both through the dissemination of technical papers on V&V and through the changed attitudes of students who enter the workforce, will encourage industry to adopt more rigorous V&V techniques. This surely will increase the reliability and security of software systems. The educational impact of an even partial success in unification being incorporated into computer science and computer engineering curricula could be substantial.

But this is a long-term process. Culture must be changed. Curricula must be developed. The concept must be popularized and widely adopted in universities. It will take decades to fully develop this technology and bring it into the mainstream.