Overlap and Synergy in Testing Software Components across Loosely-Coupled Communities

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Abstract: Component integration rather than from-scratch programming increasingly defines software development. As a result software developers often playing diverse roles including component provider - packaging a component for others to use, component user - integrating other providers' components into their software, and component tester - ensuring that other providers' components work as part of an integrated system. In this paper, we explore the conjecture that we can better utilize testing resources by focusing not just on individual component-based systems, but on groups of systems that form what we refer to as loosely-coupled software development communities, meaning a set of independently-managed systems that use many of the same components. Using components from two different open source development communities that share a variety of common infrastructure components, such as compilers, math libraries, data management packages, communication frameworks and simulation models, we demonstrate that such communities do in fact exist, and that there are significant overlaps and synergies in their testing efforts.