Abstract

Divergent forks are a common practice in open-source software development to perform long-term, independent and diverging development on top of a popular source repository. However, keeping such divergent downstream forks in sync with the upstream source evolution poses engineering challenges in terms of frequent merge conflicts. In this work, we conduct the first industrial case study of frequent merges from upstream and the resulting merge conflicts, in the context of Microsoft Edge development. The study consists of two parts. First, we describe the nature of merge conflicts that arise due to merges from upstream. Second, we investigate the feasibility of automatically fixing a class of merge conflicts related to build breaks that consume a significant amount of developer time to root-cause and fix. Towards this end, we have implemented a tool Mrg BldBrkFixer and evaluate it on three months of real Microsoft Edge development data, and report encouraging results.

Study of merge conflicts in divergent forks

Overview of automatic patch for build breaks

AST-based patch inference

Upstream commit pruning

More details can be found on our paper "Towards Understanding and Fixing Upstream Merge Induced Conflicts in Divergent Forks: An Industrial Case Study", ICSE-SEIP