Continuous Integration and Quality Assurance: a case study of two open source projects

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Abstract

A decentralized variant of continuous integration can be defined in terms of two fundamental rules: (1) Developers' access to add contributions to the development version at any time, and (2) developers' obligation to integrate their own contributions properly. Decentralized, continuous integration may adapt well to organizations where developers work relatively independently, as in many open source projects. The approach raises the issue of how these organizations can exercise central control, as attaining the benefits of continuous integration requires that contributions are useful and satisfy the project's definition of successful integration. We have investigated the use of continuous integration in FreeBSD and Mozilla. Our account of quality assurance activities in the two open source projects distinguishes between Mintzberg's three complementary forms of central control: Standardization and control of work output, work processes, and worker skills. Our study indicates that two major challenges face projects using decentralized, continuous integration: (1) To balance the access to add contributions against the need to stabilize and mature the software prior to a release, and (2) to consider the developers' limited time and resources when interpreting their obligation to integrate their changes properly.

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