

Table 1 Distribution of commit messages among Why categories

Categories	Subcategories	Number	Proportion
Describe Issue	Describe error scenario	50	19.8%
	Introduce issue report	11	4.4%
	Describe shortcoming	9	3.6%
Illustrate Requirement	Usage need	11	4.4%
	Out of date	24	9.5%
	Runtime or development environment change	11	4.4%
Describe Objective	To solve the defects	9	3.6%
	For property promotion	13	5.2%
Imply Necessity	Conventions and standards	15	6.0%
	Relation to prior commits	9	3.6%
	Relation to an implemented feature	9	3.6%
	Improvements and benefits	39	15.5%
Missing Why	Test cases	4	1.6%
	Typographic fixes	7	2.8%
	Text file changes	13	5.2%
	Annotation changes	5	2.0%
	Code refactoring	15	6.0%
	Version management	5	2.0%

\*Note: There are six commit messages that use multiple ways to describe Why.

Table 2 Distribution of commit messages among What categories

Categories	Subcategories	Number	Proportion
Summarize Code Object Change	Characteristics of changes	13	5.2%
	Object of change	143	56.8%
	Change list	6	2.4%
	Contrast before and after	16	6.4%
Describe Implementation Principle	--	6	2.4%
Illustrate Function	--	65	25.8%
Missing What	--	19	7.5%

Note: There are sixteen commit messages that use multiple ways to describe What.