

Original	First Map	Category	Used by	Frequencies in %	Semantics in ITS
Backports	Backport	Workflow	MongoDB	0.2% [66]	This issue backports / backported by Issue A
Blocked	Block	Temporal/Causal	Apache	0.4%	This issue Blocked Issue A
Blocker	Block	Temporal/Causal	Apache, IntelDAOS, Jira, JiraEcosystem	5.7%, 6.5%, 1.0%, 5.8%	This issue blocks / is blocked by / is blocking Issue A
Blocks	Block	Temporal/Causal	Hyperledger, JiraEcosystem, MariaDB, Mindville, RedHat	8.3%, 0.0% [1], 13.0%, 2.3% [1], 15.3%	This issue blocks / is blocked by Issue A
Bonfire Testing	Bonfire Testing	Workflow	Jira, JiraEcosystem, Sonatype	0.2% [216], 0.4%, 8.1%	This issue Discovered while testing / Testing discovered Issue A
Bonfire testing	Bonfire Testing	Workflow	JiraEcosystem	0.5%	This issue Discovered while testing / Testing discovered Issue A
Git Code Review	Bonfire Testing	Workflow	Hyperledger, Sakai	0.0% [7], 0.0% [1]	This issue opened during git code review in / git code review opened Issue A
Testing	Bonfire Testing	Workflow	Apache	0.0% [2]	This issue Testing discovered / Discovered while testing Issue A
Causality	Cause	Temporal/Causal	RedHat	2.7%	This issue causes / caused by Issue A
Cause	Cause	Temporal/Causal	Jira, JiraEcosystem	1.8%, 3.7%	This issue causes / caused by Issue A
Caused	Cause	Temporal/Causal	Sonatype	5.2%	This issue causes / caused by Issue A
Problem/Incident	Cause	Temporal/Causal	Apache, MariaDB, MongoDB	1.0%, 6.0%, 1.7%	This issue causes / caused by Issue A
Child-Issue	Parent-Child	Composition	Apache	0.8%	This issue is a parent / child of Issue A
Parent Feature	Parent-Child	Composition	Apache	0.0% [47]	This issue Parent Feature Issue A
Parent/Child	Parent-Child	Composition	SecondLife	6.5%	This issue is a parent / child of Issue A
multi-level hierarchy [GANTT]	Parent-Child	Composition	RedHat	0.1% [57]	This issue is parent task / subtask of Issue A
Cloners	Clone	Duplication	Apache, Hyperledger, IntelDAOS, JFrog, Jira, JiraEcosystem, Mindville, MongoDB, RedHat, Sakai, SecondLife, Spring	1.7%, 2.9%, 4.5%, 0.6%, 2.8%, 1.8%, 15.9%, 0.2% [59], 14.4%, 4.8%, 7.6%, 0.1% [14]	This issue is a clone of / cloned by / cloned as / cloned from / cloned to / clones / original of duplicate / duplicates Issue A
Cloners (old)	Clone	Duplication	RedHat	1.2%	This issue cloned to / cloned from Issue A
Collection	Incorporate	Composition	SecondLife	2.2%	This issue includes / is included in Issue A
Container	Incorporate	Composition	Apache	1.4%	This issue contains / is contained by Issue A
Contains(WBSGantt)	Incorporate	Composition	JFrog	1.3%	This issue contains / is contained in Issue A
Incorporate	Incorporate	Composition	Sakai	6.7%	This issue incorporates / incorporated by Issue A
Incorporates	Incorporate	Composition	Apache	2.7%	This issue incorporates / is part of Issue A
Part	Incorporate	Composition	Jira, JiraEcosystem	2.5%, 1.8%	This issue incorporates / incorporated by Issue A
PartOf	Incorporate	Composition	MariaDB	7.9%	This issue includes / is part of
Superset	Incorporate	Composition	RedHat	9.1%	This issue incorporates / incorporated by Issue A
Completes	Fix	Workflow	Apache	0.2% [533]	This issue fixes / fixed by Issue A
Fixes	Fix	Workflow	Sonatype	2.4%	This issue fixes / fixed by Issue A
Resolve	Fix	Workflow	Jira	0.1% [54]	This issue resolves / resolved by Issue A
Depend	Depend	Temporal/Causal	Sakai, Spring	12.9%, 8.7%	This issue is depended on by / depends on Issue A
Dependency	Depend	Temporal/Causal	Apache, JFrog, Qt	0.0% [99], 8.0%, 16.4%	This issue Dependency / depends on / is a precondition for / is required for Issue A
Dependent	Depend	Temporal/Causal	Apache	0.2% [368]	This issue Dependent Issue A
Depends	Depend	Temporal/Causal	Jira, JiraEcosystem, MongoDB, SecondLife, Spring	0.1% [51], 1.1%, 17.4%, 4.4%, 3.4%	This issue depends on / depended on by Issue A
Gantt Dependency	Depend	Temporal/Causal	MongoDB	1.1%	This issue has to be done before / after Issue A
dependent	Depend	Temporal/Causal	Apache, Sonatype	5.0%, 3.7%	This issue depends upon / is depended upon by Issue A
Derived	Derive	Workflow	Jira	0.5%	This issue derived from / has a derivative of Issue A
Detail	Detail	Workflow	Jira	1.9%	This issue details / is detailed by Issue A
Documentation	Documented	Workflow	RedHat	0.5%	This issue documents / is documented by Issue A
Documented	Documented	Workflow	MongoDB	4.5%	This issue documents / is documented by Issue A
Duplicate	Duplicate	Duplication	Apache, Hyperledger, IntelDAOS, JFrog, Jira, JiraEcosystem, MariaDB, Mindville, MongoDB, Qt, RedHat, Sakai, Sonatype, Spring	10.2%, 3.9%, 3.6%, 19.9%, 21.8%, 15.8%, 9.4%, 38.6%, 17.4%, 10.7%, 5.1%, 9.5%, 7.9%, 12.1%	This issue duplicates / duplicated by Issue A
Epic	Epic	Composition	JiraEcosystem	0.2% [21]	This issue belongs to epic / is the epic for Issue A
Finish-to-Finish link (WBSGantt)	finish-finish	Temporal/Causal	JFrog	0.0% [1]	This issue Linked one can't finish until this issue is done. / can't finish until the linked issue is done. Issue A
Gantt End to End	finish-finish	Temporal/Causal	IntelDAOS, JFrog, MongoDB	0.4% [13], 0.1% [4], 0.0% [16]	This issue has to be finished together with Issue A
Gantt: finish-finish	finish-finish	Temporal/Causal	RedHat	0.0% [18]	This issue has to be finished together with Issue A
finish-finish [GANTT]	finish-finish	Temporal/Causal	RedHat	0.0% [1]	This issue has to be finished together with Issue A
Gantt End to Start	finish-start	Temporal/Causal	IntelDAOS, JFrog	1.1%, 0.1% [3]	This issue has to be done before / after Issue A
Gantt: finish-start	finish-start	Temporal/Causal	RedHat	0.0% [42]	This issue has to be done before / after Issue A
finish-start [GANTT]	finish-start	Temporal/Causal	RedHat	0.0% [9]	This issue has to be done before / after Issue A
Gantt Start to Start	start-start	Temporal/Causal	IntelDAOS, JFrog	0.0% [1], 0.0% [1]	This issue has to be started together with Issue A
Gantt: start-finish	start-finish	Temporal/Causal	RedHat	0% [11]	This issue is triggering / triggered by Issue A
Follows	Follow	Temporal/Causal	Jira, JiraEcosystem	0.0% [42], 0.8%	This issue follows / is followed by / Follow up to / Followed up by Issue A
Sequence	Follow	Temporal/Causal	RedHat	4.2%	This issue follows up on / is followed up by Issue A
Implement	Implement	Workflow	IntelDAOS	0.1% [3]	This issue implements / is implemented by Issue A
Implements	Implement	Workflow	Sonatype	0.3% [11]	This issue implements / is implemented by Issue A
Issue split	Split	Composition	Hyperledger, Jira, JiraEcosystem, MariaDB, MongoDB, RedHat, Sonatype	0.5%, 0.0% [1], 0.1% [10], 0.2% [22], 0.4%, 0.1% [104], 0.1% [5]	This issue split to / from Issue A
Split	Split	Composition	Jira, JiraEcosystem	0.2% [167], 1.1%	This issue split to / into / from Issue A
Work Breakdown	Split	Composition	Qt	6.4%	This issue resulted in / from Issue A
Preceded By	Precede	Temporal/Causal	JiraEcosystem	0.1% [7]	This issue Precedes / Preceded By
Reference	Relate	General Relation	Apache, Jira, JiraEcosystem	27.1%, 63.6%, 1.3%	This issue relates to / is related to Issue A
Relate	Relate	General Relation	Jira, JiraEcosystem, Sakai, Spring	0.3%, 22.0%, 48.7%, 40.9%	This issue relates to / is related to Issue A
Related	Relate	General Relation	Apache, IntelDAOS, Jira, MongoDB, RedHat, Spring	1.4%, 12.1%, 0.0% [38], 49.1%, 26.6%, 6.9%	This issue relates to / is related to Issue A
Relates	Relate	General Relation	Hyperledger, MariaDB, Mindville, Qt, SecondLife, Sonatype	17.1%, 51.1%, 43.2%, 22.4%, 29.4%, 38.8%	This issue relates to / is related to Issue A
Relationship	Relate	General Relation	JFrog	27.2%	This issue relates to / is related to Issue A
Regression	Breaks	Workflow	Apache, Jira	1.8%, 0.4%	This issue is broken by / breaks / is a regression of / has a regression in Issue A
Replacement	Replace	Duplication	Qt	7.1%	This issue is replaced by / replaces Issue A
Required	Require	Temporal/Causal	Apache	1.4%	This issue requires / is required by Issue A
Supercedes	Supercede	Workflow	Apache, Sonatype	1.3%, 2.4%	This issue supercedes / is superseded by Issue A
Supersedes	Supercede	Workflow	Spring	3.3%	This issue supersedes / is superseded by Issue A
Supersession	Supercede	Workflow	Jira	0.5%	This issue supersedes / is superseded by Issue A

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Test	Test	Workflow	Qt	0.1% [47]	This issue tests / is tested by Issue A
Tested	Test	Workflow	MongoDB	0.1% [48]	This issue is testing / is tested by Issue A
Trigger	Trigger	Workflow	JFrog	6.3%	This issue triggered / was triggered by Issue A
Parental-Relation	Parent-Child	Composition	RedHat	0.2% [254]	Special issue property
Subtask	Subtask	Composition	Apache, Hyperledger, IntelDAOS, JFrog, Jira, JiraEcosystem, MariaDB, MongoDB, Qt, RedHat, Sakai, SecondLife, Sonatype, Spring	32.5%, 27.6%, 5.8%, 36.3%, 2.5%, 20.4%, 6.1%, 1.6%, 23.8%, 20.4%, 17.6%, 31.0% , 13.4%, 49.8%	Special issue property
Epic-Relation	Epic	Composition	Apache, Hyperledger, IntelDAOS, JiraEcosystem, MariaDB, MongoDB, Qt, Sonatype, Spring	4.9%, 39.7%, 65.7%, 23.1%, 6.4%, 6.3%, 13.2%, 0.2% [9], 11.3%	Special issue property