

Number of PLs Used in the Source Files Modified in MPLBs (RQ2)

#	Project	#PL2	%PL2	#PL3	%PL3	#PL3+	%PL3+	#MPLB
1	Airavata	12	60.00	7	35.00	1	5.00	20
2	Ambari	832	94.22	49	5.55	2	0.23	883
3	Archiva	17	100.00	0	0.00	0	0.00	17
4	Arrow	407	96.67	14	3.33	0	0.00	421
5	Atlas	53	98.15	1	1.85	0	0.00	54
6	Avro	7	63.64	4	36.36	0	0.00	11
7	Beam	35	87.50	5	12.50	0	0.00	40
8	Bigtop	1	100.00	0	0.00	0	0.00	1
9	CarbonData	452	99.78	1	0.22	0	0.00	453
10	CloudStack	184	95.34	7	3.63	2	1.04	193
11	Cocoon	1	100.00	0	0.00	0	0.00	1
12	CouchDB	65	100.00	0	0.00	0	0.00	65
13	Falcon	1	100.00	0	0.00	0	0.00	1
14	Flink	533	95.18	27	4.82	0	0.00	560
15	Guacamole-client	7	100.00	0	0.00	0	0.00	7
16	Harmony	4	100.00	0	0.00	0	0.00	4
17	HAWQ	9	75.00	2	16.67	1	8.33	12
18	Hudi	64	100.00	0	0.00	0	0.00	64
19	Ignite	162	87.10	24	12.90	0	0.00	186
20	Impala	616	89.53	72	10.47	0	0.00	688
21	Isis(Causeway)	12	100.00	0	0.00	0	0.00	12
22	James-project	19	100.00	0	0.00	0	0.00	19
23	JSPWiki	33	100.00	0	0.00	0	0.00	33
24	jUDDI	19	90.48	2	9.52	0	0.00	21
25	Kafka	313	98.43	5	1.57	0	0.00	318
26	Kudu	23	100.00	0	0.00	0	0.00	23
27	Kylin	37	94.87	2	5.13	0	0.00	39
28	Mahout	6	100.00	0	0.00	0	0.00	6
29	Metron	17	89.47	2	10.53	0	0.00	19
30	MXNet	14	100.00	0	0.00	0	0.00	14
31	NiFi	73	100.00	0	0.00	0	0.00	73
32	OFBiz	6	100.00	0	0.00	0	0.00	6
33	OpenMeetings	85	100.00	0	0.00	0	0.00	85
34	Qpid	216	93.91	12	5.22	2	0.87	230
35	Qpid-dispatch	174	100.00	0	0.00	0	0.00	174
36	Ranger	102	95.33	5	4.67	0	0.00	107
37	Rave	13	100.00	0	0.00	0	0.00	13
38	REEF	12	70.59	5	29.41	0	0.00	17
39	Samza	132	99.25	1	0.75	0	0.00	133
40	Shindig	27	93.10	2	6.90	0	0.00	29
41	Spark	541	96.43	20	3.57	0	0.00	561
42	Storm	68	93.15	4	5.48	1	1.37	73
43	Stratos	5	100.00	0	0.00	0	0.00	5
44	Submarine	5	83.33	0	0.00	1	16.67	6
45	Subversion	531	98.88	5	0.93	1	0.19	537
46	Tapestry-5	60	98.36	1	1.64	0	0.00	61
47	Thrift	142	86.06	11	6.67	12	7.27	165
48	TinkerPop	10	58.82	3	17.65	4	23.53	17
49	TrafficServer	33	91.67	3	8.33	0	0.00	36
50	Trafodion	34	97.14	1	2.86	0	0.00	35
51	Usergrid	1	100.00	0	0.00	0	0.00	1
52	VCL	16	88.89	2	11.11	0	0.00	18
53	Zeppelin	98	97.03	3	2.97	0	0.00	101
54	ZooKeeper	31	96.88	0	0.00	1	3.13	32
	Total	6370	95.07	302	4.51	28	0.42	6700

In the table, #PL2, #PL3, and #PL3+ denote the number of MPLBs that their bug-fixing commits involving source files written in 2, 3, and 4 or more PLs, respectively. %PL2, %PL3, and %PL3+ denote the percentages of #PL2, #PL3, and #PL3+ over #MPLB (i.e., the total number of MPLBs of a project), respectively.