

TABLE . PROGRAMMING LANGUAGES USED IN THE SELECTED PROJECTS.

Project	Name	C/C++	C#	Clojure	CoffeeScript	Erlang	Go	Haskell	Java	JavaScript	Kotlin	Objective-C	Perl	PHP	Python	Ruby	Scala	Swift	TypeScript	#PL
P1	Airavata	x							X	x				x	x				x	6
P2	Ambari	x	x		x				X	x			x	x	x	x	x		x	11
P3	Arrow	X	x				x		x	x		x	x		x	x			x	10
P4	Avro	x	x						X	x			x	x	x	x				8
P5	Beam	x					x		X	x	x				x	x			x	8
P6	Carbondata	x	x						x						x		X			5
P7	Cloudstack	x	x						X	x			x		x	x				7
P8	Couchdb	x				X			x	x					x	x				6
P9	Dispatch	x							x				x		X					4
P10	Ignite	X							x	x					x	x				5
P11	Impala	x	x	x			x		X	x				x	x	x	x			10
P12	Kafka	x	x	x	x	x	x	x	X	x		x	x	x	x	x	x		x	16
P13	Kylin	x							x	x					X				x	5
P14	Ranger	x	x						X	x					x					5
P15	Reef	x	x						X	x					x		x			6
P16	Spark	x	x						x	x					x	x	X			7
P17	Subversion	X	x						x				x		x	x				6
P18	Thrift	X	x			x	x	x	x	x		x	x	x	x	x		x	x	14
P19	Usergrid	x	x						X	x		x	x	x	x	x	x	x		11
P20	Zeppelin				x				X	x					x	x	x		x	7
-	#Project	19	13	2	3	3	5	2	20	17	1	4	9	7	20	14	8	2	8	-
-	#Project X	4	0	0	0	1	0	0	11	0	0	0	0	0	2	0	2	0	0	-

The PLs used in the selected projects are shown in TABLE , where X denotes that the PL in the corresponding column is the main PL of the project in the corresponding row, #Project denotes the number of projects using the PL in the corresponding column, #ProjectX denotes the number of projects using the PL in the corresponding column as the main PL, and #PL denotes the number of PLs used by the project in the corresponding row. As we can see from TABLE , Java and Python are used in all the 20 projects; C/C++, C#, JavaScript, Ruby are also used in most projects; and Java is the main PL of 11 projects, followed by C/C++ which is the main PL of 4 projects. Besides, all projects are written in 4 or more PLs, with a maximum of 16 PLs for project Kafka, followed by project Thrift in 14 PLs.