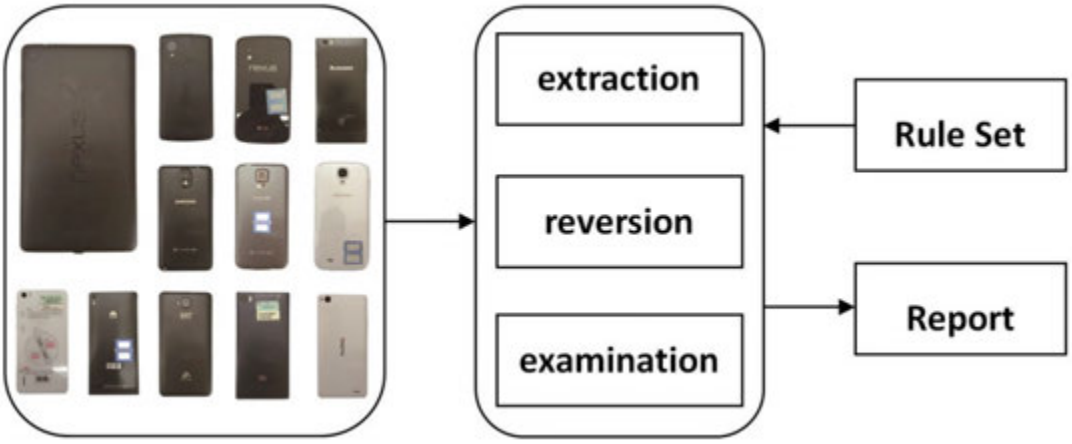
Quality, Reliability and Security Study of Vendor Customized Android Applications

Jingzheng Wu, Zhifei Wu, Mutian Yang, Tianyue Luo, Yanjun Wu, Yongji Wang
Institute of Software, The Chinese Academy of Science

Motivation and Goal

- Because of the fragmentation of Android platform, the different quality management system and the different ability of developers, the vendor customized Android applications suffer from the quality, reliability and security problems.
- we aim to study the quality, reliability and security of the vendor customized android applications.



Methodology

We defined 7 quality, reliability and security related rules, and reversed all the customized applications of 12 representative Android sartphones.

- *Rules 1:* Do not apply the overprivilege permission.
- *Rules 2:* Do not leave the testing files in the applications.
- *Rules 3:* Use encryption modes correctly.
- *Rules 4:* Process Intent objects carefully.
- *Rules 5:* Process content provider carefully.
- *Rules 6:* Process Broadcast Receivers carefully.
- *Rules 7:* Do not use the hide methods.

Case Study

Whenever a rules is violated, there will be at least one quality, reliability or security problem. We take Rule5 as an example. For a carelessly defined accessible tables uri, all the items in the SQLite database are exposed. We also try to insert data into the table, and delete data from the table, and all of these actions are successful. It obviously is a serious security problem, any application locating in the same smartphone can inject the SQLite database and steal the user privacy.

Results of Quality, Reliability and Security Study of Vendor Customized Android Applications

Device	Version#Build	Vendor	Apps	LOC	Quality			Reliability	Security		
					R1	R2	R3	R4	R5	R6	R7
Nexus 7	4.4.3#Nexut7	ASUS	57	1,192,946	292	90	1	155/436	10/366	3	2
Nexus 5	4.4.2#Nexut5	LG	62	1,218,099	209	12	1	161/450	18/331	3	2
HuaWei Honor	4.4.2#H60-L01	HuaWei	89	2,886,973	895	241	36	197/593	68/1547	28	41
HuaWei P6	4.4.2#P6-U06	HuaWei	121	3,391,296	1546	169	38	139/466	81/408	27	45
XiaoMi 3	4.4.2#MI3	XiaoMi	71	1,597,411	848	27	8	103/297	19/65	3	22
Galaxy S5	4.4.2#SM-G9008	Samsung	177	2,914,333	1335	134	65	107/295	198/2620	13	49
Galaxy S4	4.3#SM-I9500	Samsung	269	4,869,453	2300	156	60	177/331	211/2733	21	84
Galaxy Note3	4.3#SM-N9008	Samsung	266	5,946,279	2452	154	63	183/355	227/2811	19	88
Nexus 4	4.2.2#Nexut4	LG	90	1,761,280	893	104	5	111/352	22/352	6	7
Nubia Z5Smini	4.2.2#NX403A	ZTE	105	1,407,642	807	22	2	124/137	34/388	6	13
K900	4.2.2#Lenovo K900	Lenovo	137	2,480,424	1022	137	9	104/299	91/372	16	38
100+	4.1.2#100B	Baidu	102	2,721,388	1264	116	31	96/294	87/353	6	60