A SURVEY OF MOBILE MALWARE IN THE WILD

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Does mobile malware exist?

What does it do?

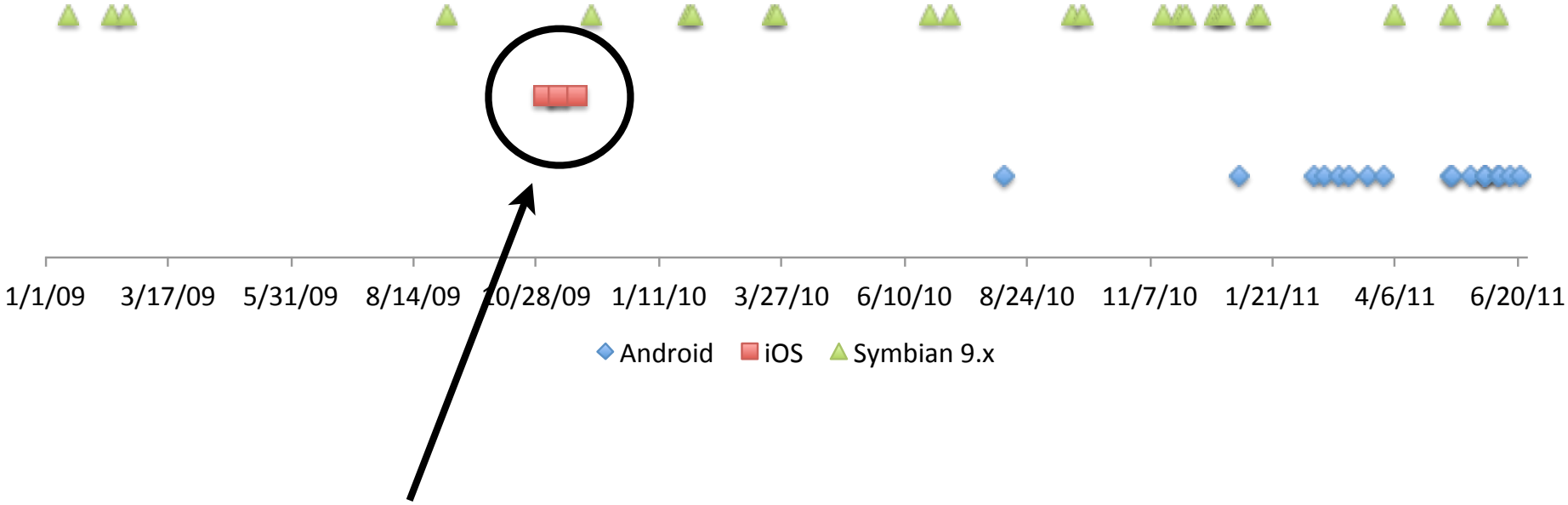
Do existing defenses work?

MALWARE IN THE WILD

iOS	4
Symbian 9.x	24
Android	17
Total	**45**

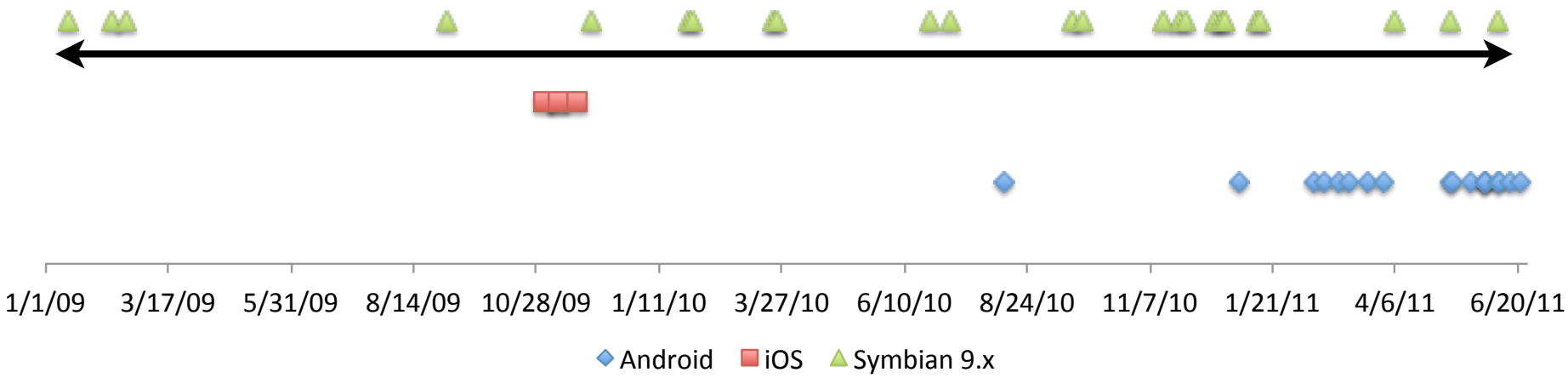
Survey of known malware
from January 2009-June 2011

TIMELINE



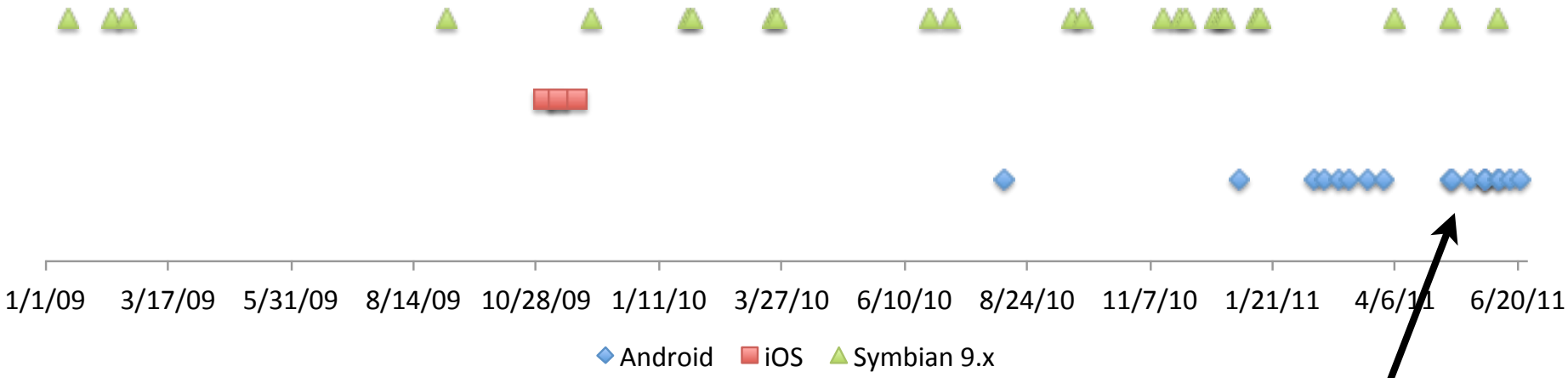
iOS malware clustered around 1 backdoor

TIMELINE



Symbian 9.x malware is evenly spread out

TIMELINE



Android malware seems to be increasing

MOTIVATIONS

BEHAVIOR SURVEY

Steals user information	**60%**
Premium calls or SMS	**53%**
Sends SMS ad spam	18%
Novelty and amusement	13%
Steals user credentials	9%
Search engine optimization	2%
Ransom	2%

45 pieces of malware
(some exhibit multiple behaviors)

USER INFORMATION

Steals user information	**60%**

- Location, browsing history, list of installs
- IMEI for stolen phones

SMS

Premium calls or SMS	**53%**
Sends SMS ad spam	18%

- Easy & lucrative for Symbian/Android
- Special setting to allow sending SMS?
  - Only 0.8% of Android apps use this ability

MORE TO COME?

Steals user credentials	9%
Search engine optimization	2%

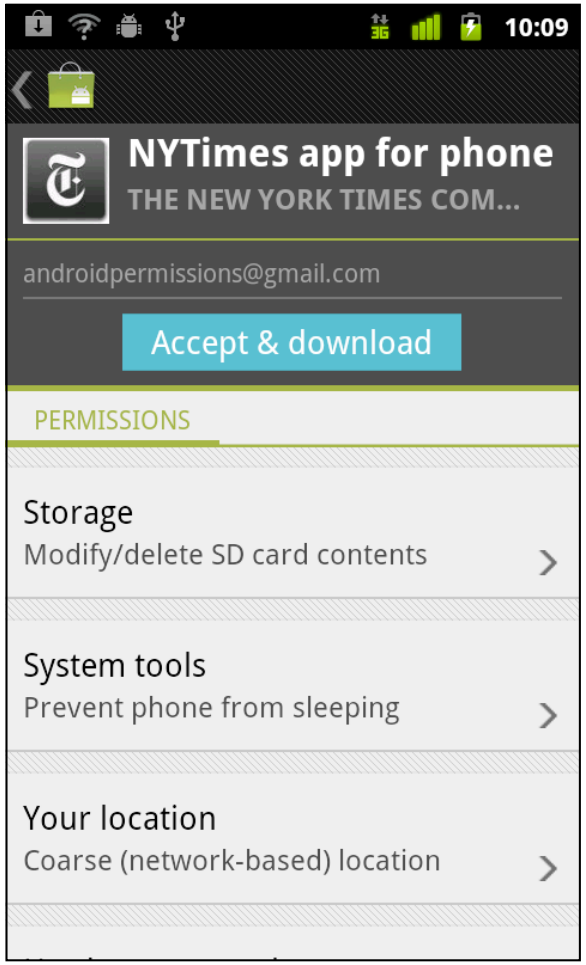
- I think we'll see more of these
- SEO might be under-reported

MALWARE DEFENSES

APPLICATION REVIEW

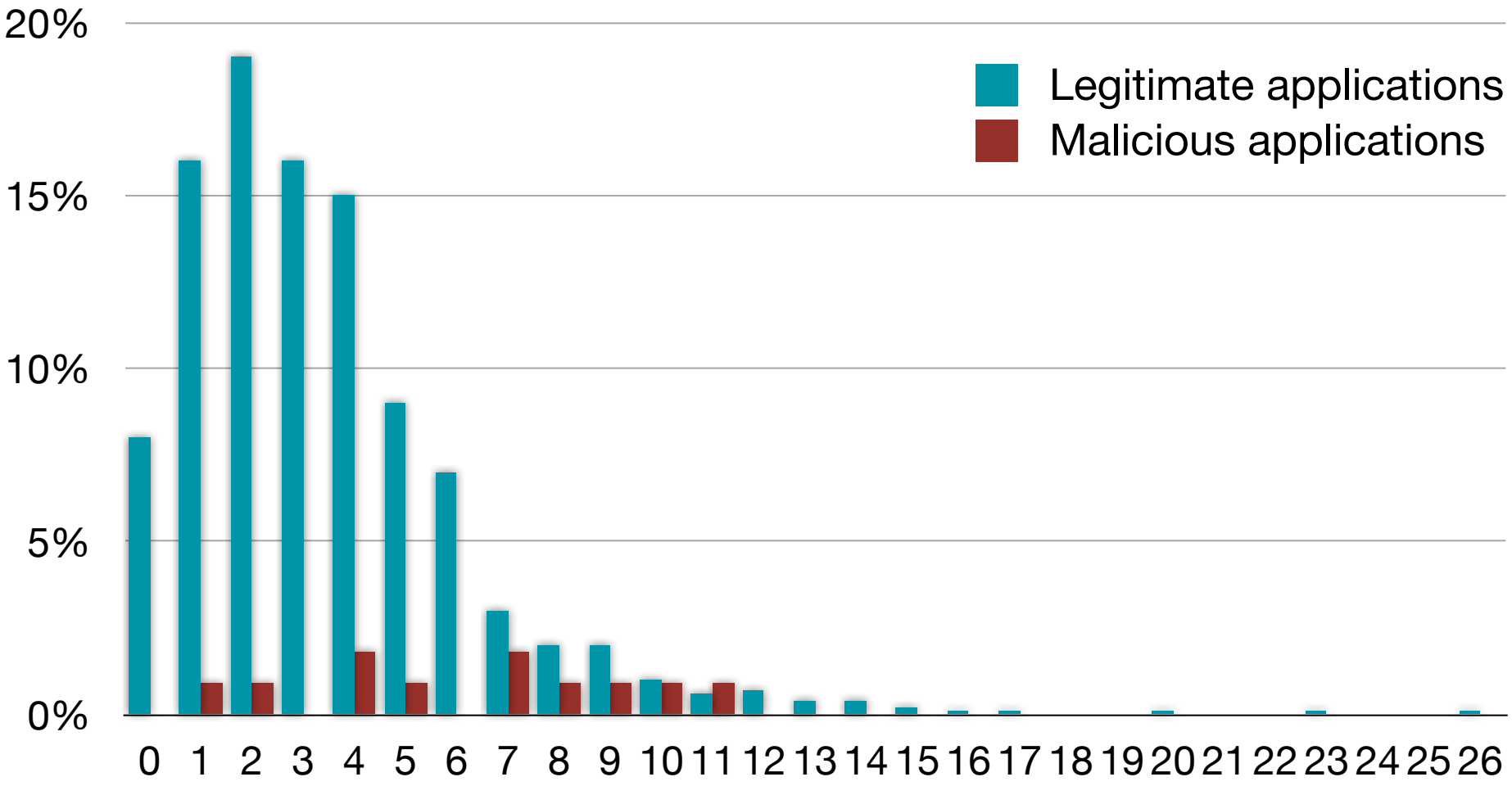
- Do review processes stop malware?
- **0** malware in Apple App Store
- **5** pieces of Symbian Signed malware

ANDROID PERMISSIONS

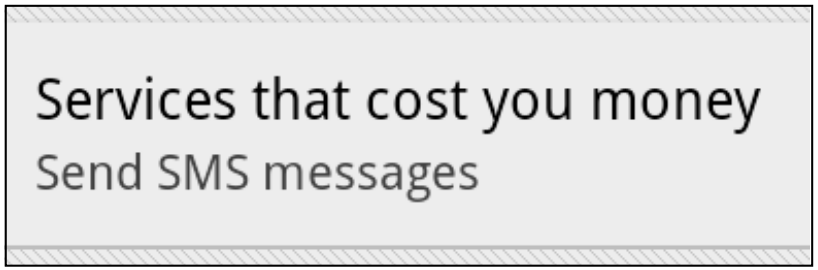


Can they help users (or researchers) identify malware?

OF PERMISSIONS



SMS PERMISSION



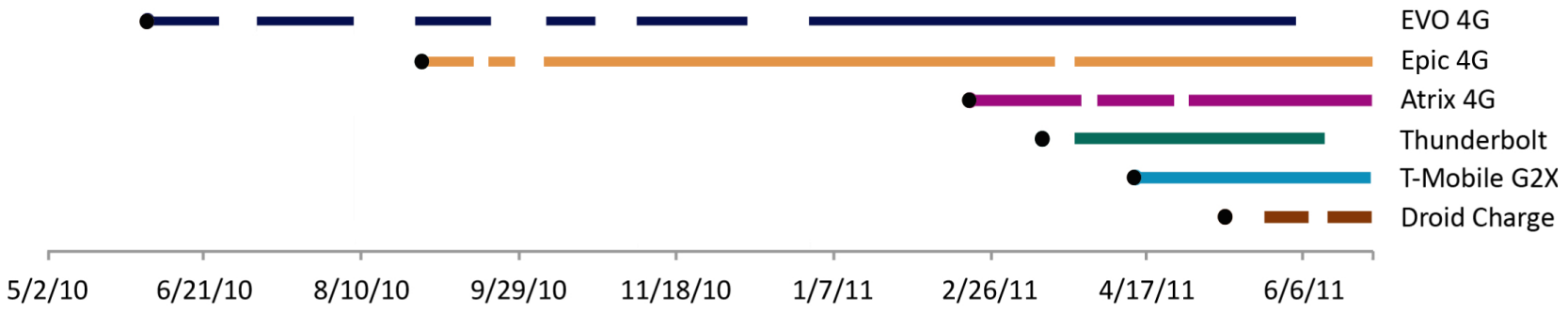
73% of malicious apps
vs
4% of legitimate apps

ROOT EXPLOITS

JAILBREAK

- People want to customize their phones
- So they find and publish **root exploits**
- Malware authors read forums too
  - 4 pieces of malware in our set use them

EXPLOIT AVAILABILITY



Each version remains un-rooted
for an average of 5.2 days

CONCLUSION

- Mobile malware exists, although rare
- Apple's review process is effective; permissions may be useful
- Locking phones indirectly aids malware
- www.cs.berkeley.edu/~afelt/malware.html