Asking for (and about) Permissions Used by Android Apps

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Overprivileged Apps
Overprivileged Apps

Diagram:
- App
- Network
- Camera

Diagram shows an app connected to a network and a camera.
Overprivileged Apps

Manifest.xml

Permissions

INTERNET

Network

App

Camera

Android
Overprivileged Apps

Manifest.xml

Permissions

INTERNET

READ_SMS

App

Network

Camera

Android
Overprivileged Apps

App Permissions
Manifest.xml
INTERNET
Network
Camera
SMS READ_SMS
Stowaway
Permissions API Functions

Func 1
Perm 1

Func 2
Perm 2

Func 3
Perm 3

Func 4

App

Manifest.xml

Permission Mapping

Stowaway

Misused Permissions
Research Goals

RQ1: What properties of permissions predict permission misuse?

RQ2: Why do developers misuse some permissions more than others?
Dataset

- Stowaway results for 10,300 free Android apps
- Stowaway’s permission mapping
- StackOverflow’s post history (as of August 2012)
Dataset

- Stowaway results for 10,300 free Android apps
  - popularity
  - misusage
- Stowaway’s permission mapping
  - influence
  - interference
- StackOverflow’s post history (as of August 2012)
  - questions
  - answers
Dataset

- Stowaway results for 10,300 free Android apps
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  - influence
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  - questions
  - answers

<table>
<thead>
<tr>
<th>Permission</th>
<th>popularity</th>
<th>misusage</th>
<th>influence</th>
<th>interference</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERNET</td>
<td>9,789</td>
<td>193</td>
<td>65</td>
<td>3</td>
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<td>WAKE_LOCK</td>
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<td>8</td>
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<td>CAMERA</td>
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<td>260</td>
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**RQ1:** What properties of permissions predict permission misuse?

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Research Goals

RQ1: What properties of permissions predict permission misuse?

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RQ1: Permission Misuse
RQ1: Permission Misuse

\[ s = 0.588 \]

\[ x = y \]
Research Goals

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Research Goals

RQ1: What properties of permissions predict permission misuse?

RQ2: Why do developers misuse some permissions more than others?
RQ2: Demand for Documentation

\[ \log(\text{popularity}) \]

\[ \log(\text{questions}) \]

\[ s=0.499 \]

\[ x = y \]
Conclusions

• Influence and interference are not strong indicators of permission misuse

• Significant sub-linear relationship between a permission’s popularity and its frequency of misuse

• Community forums - specifically StackOverflow - provide developers with adequate documentation

• More results in paper!
Questions/Comments?

Presenter:

Ryan Stevens
rcstevens@ucdavis.edu
## Permission Misuse

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<th>DV</th>
<th>IV</th>
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<tr>
<td>misused</td>
<td>popularity</td>
<td>0.56</td>
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<td>0.82</td>
</tr>
<tr>
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<td>log(popularity)</td>
<td>0.73</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td></td>
<td>influence</td>
<td>0.29</td>
<td>0.50</td>
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Our data does not support the hypothesis that our measures of interference and influence affect the degree of misuse.
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<tr>
<td></td>
<td>( \text{interference} )</td>
<td>−0.18</td>
<td>&lt; 0.01</td>
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Demand for Documentation

Frequency of Use vs. Ratio of Answers to Questions

- Frequency of Use: 0, 2000, 4000, 6000, 8000, 10000
- Ratio of Answers to Questions: 1.0, 1.5, 2.0, 2.5
- Count: 2, 4, 6, 8, 10, 12, 14