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**Using Implicit Calls to Improve Malware Dynamic Execution**

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**Dynamic Analysis: The Need for Malware Triggering**
- Malware evade dynamic analysis
- Wait for: a specific time, an event, C&C command
- If suspicious code is triggered → Capture dynamic behavior

**GrodDroid: a Gorilla for Triggering Malicious Behaviors**
- Locates the suspicious code
- Builds an interprocedural control flow graph
- Finds a path that reaches the suspicious code
- Instruments & Executes APK

**Problem: Execution paths May Use Implicit Calls**
- Alarm Controller (com.al.alarm.controller)
- SHA256: 03c32aca9f894b8a7263e65fd8845a53618f1131877cc818d018e2d07e2f596
- Decrypts and loads code dynamically
- Installs malicious apps
- Displays unwanted ads
- Malicious code execution path contains an implicit call: `AsyncTask.execute()` -> `AsyncTask.doInBackground()`
- GroddDroid cannot find such a path because of implicit calls

**Challenge**
Discover execution paths with implicit calls to reach suspicious code

**Including Implicit Calls into CFGs**
- Without implicit calls
  - Suspicious code execution rate for this sample: 37.5%
- Use pairs of registration-callback
  - Suspicious code execution rate for this sample: 87.5%

**Executing Malware**
- Program designed and implemented
- Experiments on large sets of malware
- Measure malicious code coverage with and without implicit calls
- Online malware analysis platform

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