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Android Application Security Assessments

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Overview

- **Platform Terminology**
  - Component Names
  - Component Purpose
  - Activating Components
- **Lab Setup**
  - Physical Device
  - Android Virtual Device
- **Process**
- **Tools**
- **What To Look For**
- **Demo Assessment**

Platform Terminology

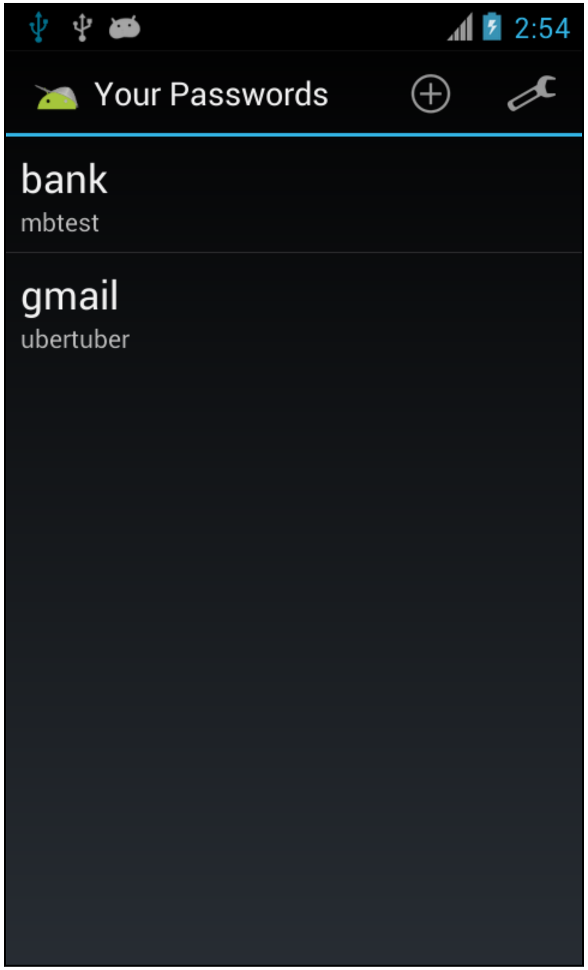
- **Components**
  - Activity
  - Content Provider
  - Service
  - Broadcast Receiver

Platform Terminology

- **Activity**
  - Screen Task
- **Content Provider**
  - Structured Data Task
- **Service**
  - Background Task
- **Broadcast Receiver**
  - System Broadcast Responder Task

Platform Terminology

- **Activation**
  - Intent
  - Intent Filters
- **Intent**
  - Explicit
    - FQCN
    - Own App
  - Implicit
    - General Action
    - Another App



2:54

Your Passwords

bank
mbtest

gmail
ubertuber

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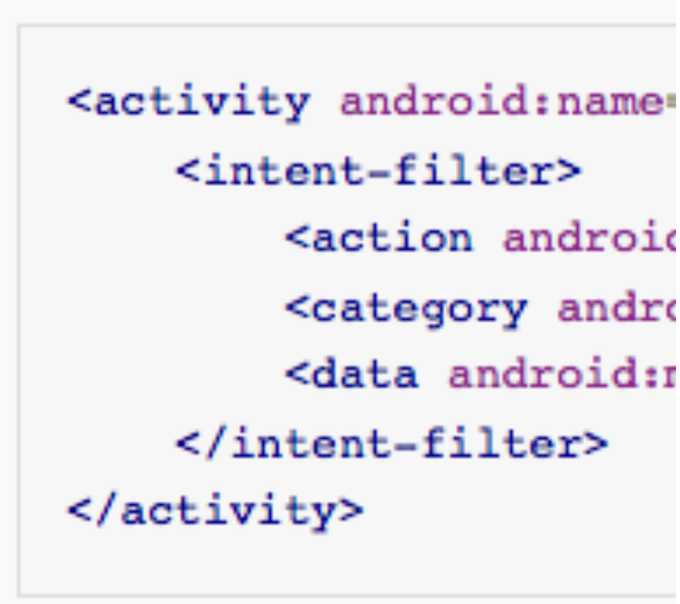
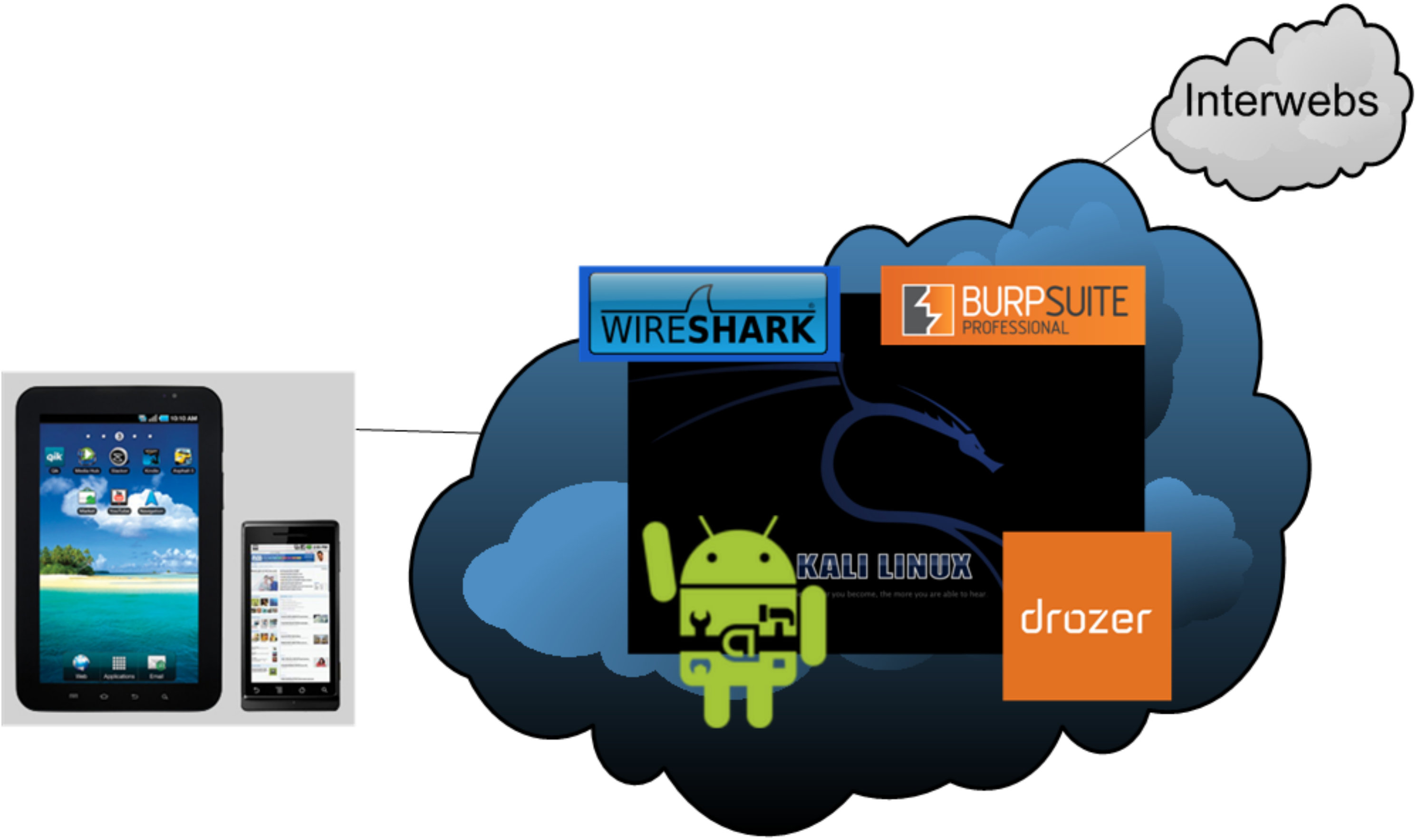
Platform Terminology

- **Intent Filters**
  - Implicit Only
  - Advertises Receivable Intents
    - Action
    - Data
    - Category
  - Per Component
    - Exception: Service



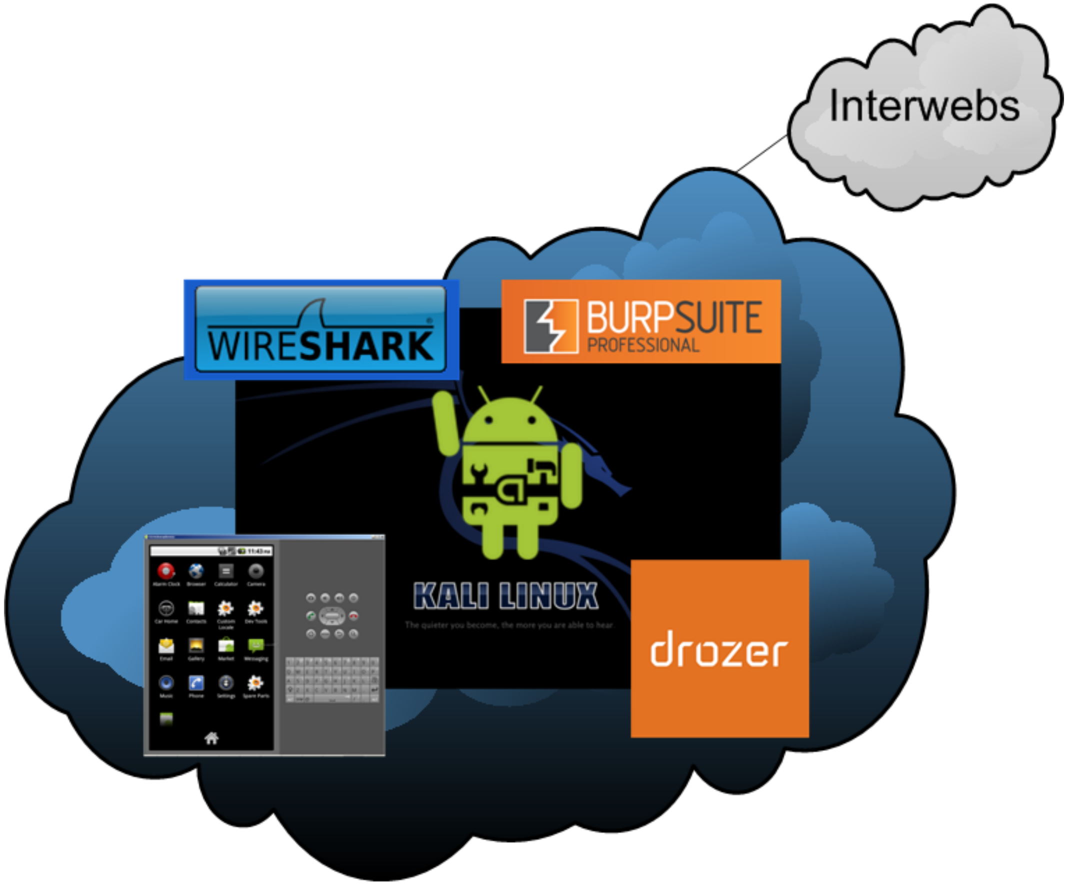
```
<activity android:name=
    <intent-filter>
        <action androi
        <category andr
        <data android:
    </intent-filter>
</activity>
```

Lab Setup – Physical Device



LAB – Physical Device

Lab – Android Virtual Device



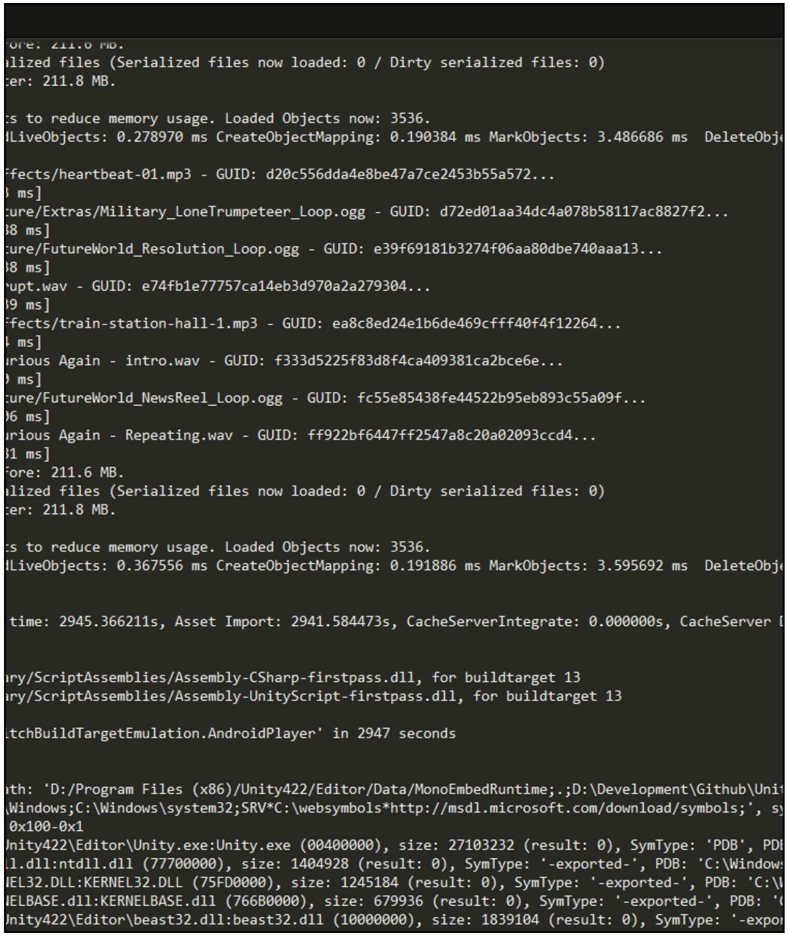
LAB – Emulated Device

Assessment Process

- **File System Snapshot**
  - Pre-Installation
  - Post-Installation
  - Post-App Use
- **File System Review**
  - Cache
  - Logs
  - Configuration Files

Assessment Process

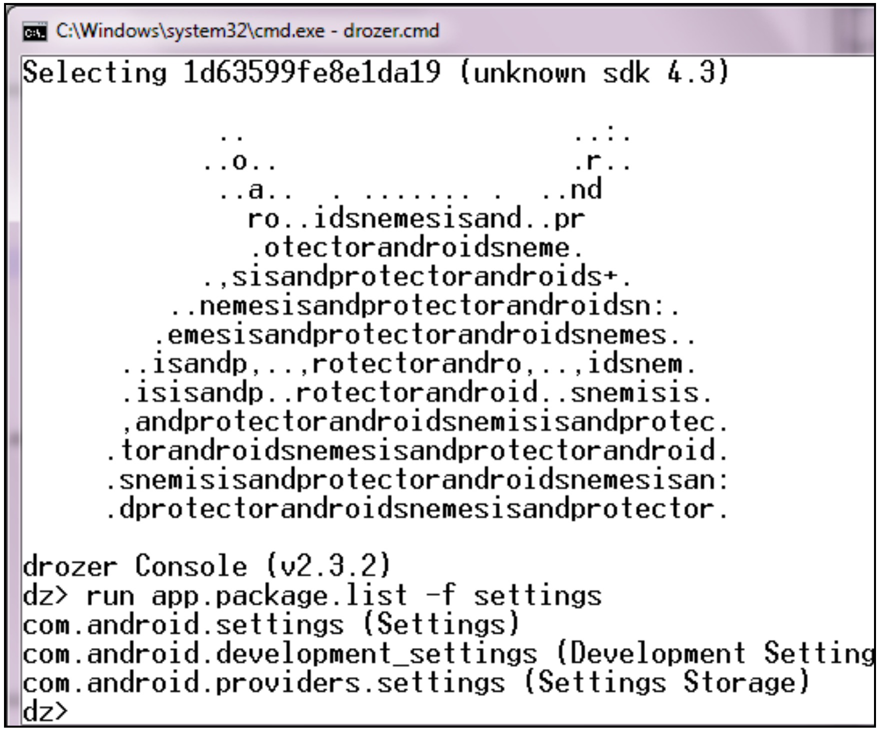
- **Application**
  - Authentication
  - Registration
  - Input Injection
  - Encryption
  - Information Storage
- **Web Services**
  - Server Configuration
  - Server Input Validation
  - Cipher Strength



```
ore: 211.6 MB.
alized files (Serialized files now loaded: 0 / Dirty serialized files: 0)
ter: 211.8 MB.

ts to reduce memory usage. Loaded Objects now: 3536.
dLiveObjects: 0.278970 ms CreateObjectMapping: 0.190384 ms MarkObjects: 3.486686 ms  DeleteObje

ffects/heartbeat-01.mp3 - GUID: d20c556dda4e8be47a7ce2453b55a572...
3 ms]
ture/Extras/Military_LoneTrumpeteer_Loop.ogg - GUID: d72ed01aa34dc4a078b58117ac8827f2...
38 ms]
ture/FutureWorld_Resolution_Loop.ogg - GUID: e39f69181b3274f06aa80dbe740aaa13...
38 ms]
rupt.wav - GUID: e74fb1e77757ca14eb3d970a2a279304...
39 ms]
ffects/train-station-hall-1.mp3 - GUID: ea8c8ed24e1b6de469cfff40f4f12264...
4 ms]
urious Again - intro.wav - GUID: f333d5225f83d8f4ca409381ca2bce6e...
0 ms]
ture/FutureWorld_NewsReel_Loop.ogg - GUID: fc55e85438fe44522b95eb893c55a09f...
06 ms]
urious Again - Repeating.wav - GUID: ff922bf6447ff2547a8c20a02093ccd4...
31 ms]
fore: 211.6 MB.
alized files (Serialized files now loaded: 0 / Dirty serialized files: 0)
ter: 211.8 MB.

ts to reduce memory usage. Loaded Objects now: 3536.
dLiveObjects: 0.367556 ms CreateObjectMapping: 0.191886 ms MarkObjects: 3.595692 ms  DeleteObje


 time: 2945.366211s, Asset Import: 2941.584473s, CacheServerIntegrate: 0.000000s, CacheServer 


ary/ScriptAssemblies/Assembly-CSharp-firstpass.dll, for buildtarget 13
ary/ScriptAssemblies/Assembly-UnityScript-firstpass.dll, for buildtarget 13

itchBuildTargetEmulation.AndroidPlayer' in 2947 seconds


ath: 'D:/Program Files (x86)/Unity422/Editor/Data/MonoEmbedRuntime;.;D:\Development\Github\Unit
\Windows;C:\Windows\system32;SRV*C:\websymbols*http://msdl.microsoft.com/download/symbols;', sy
 0x100-0x1
Unity422\Editor\Unity.exe:Unity.exe (00400000), size: 27103232 (result: 0), SymType: 'PDB', PDB
ll.dll:ntdll.dll (77700000), size: 1404928 (result: 0), SymType: '-exported-', PDB: 'C:\Windows
NEL32.DLL:KERNEL32.DLL (75FD0000), size: 1245184 (result: 0), SymType: '-exported-', PDB: 'C:\W
NELBASE.dll:KERNELBASE.dll (766B0000), size: 679936 (result: 0), SymType: '-exported-', PDB: 'C
Unity422\Editor\beast32.dll:beast32.dll (10000000), size: 1839104 (result: 0), SymType: '-expor
```

Assessment Process

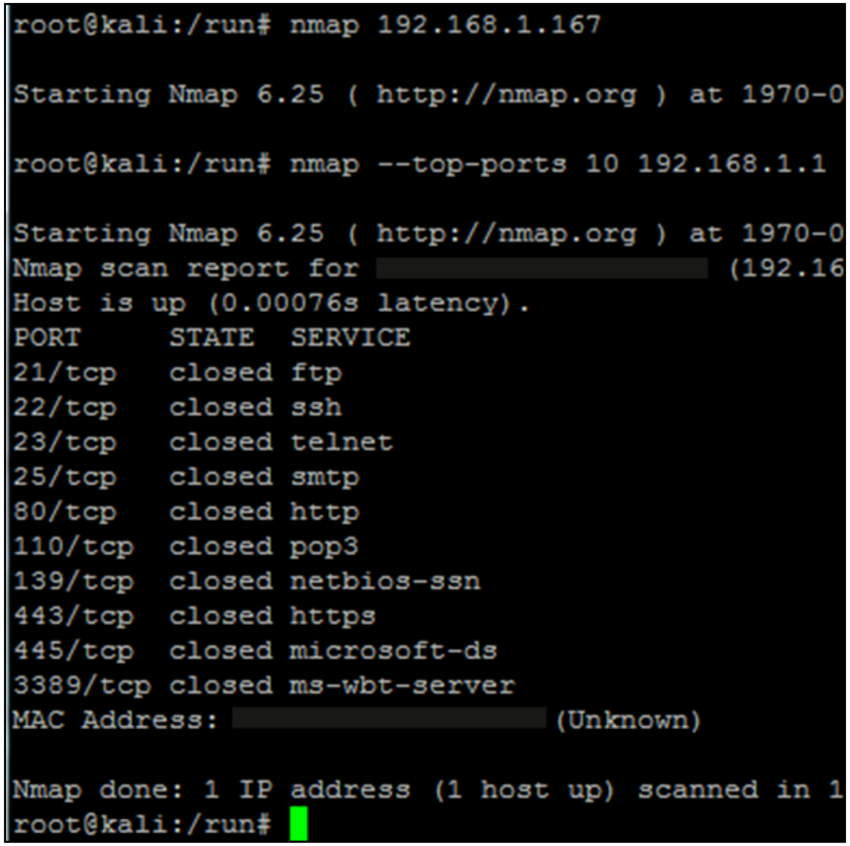
- **Component Tests**
  - Exported Activities
    - Permissions
    - Intent Filters
  - Content Providers
    - Permissions
    - Injection
    - Data Retrieval
    - URI Discovery
  - Exported Services
    - Permissions



```
Selecting 1d63599fe8e1da19 (unknown sdk 4.3)

            ..                    ..:.
           ..o..                  .r..
            ..a..  . .......  .  ..nd
              ro..idsnemesisand..pr
              .otectorandroidsneme.
           .,sisandprotectorandroids+.
         ..nemesisandprotectorandroidsn:.
        .emesisandprotectorandroidsnemes..
      ..isandp,..,rotectorandro,..,idsnem.
      .isisandp..rotectorandroid..snemisis.
      ,andprotectorandroidsnemisisandprotec.
     .torandroidsnemesisandprotectorandroid.
     .snemisisandprotectorandroidsnemesisan:
     .dprotectorandroidsnemesisandprotector.

drozer Console (v2.3.2)
dz> run app.package.list -f settings
com.android.settings (Settings)
com.android.development_settings (Development Setting
com.android.providers.settings (Settings Storage)
dz>
```

Assessment Tools

- **Linux Commands**
  - tree
  - strings
  - diff
- **Intercepting Proxy**
  - Burp Suite Pro
  - Web Scarab
  - OWASP Zap



```
root@kali:/run# nmap 192.168.1.167

Starting Nmap 6.25 ( http://nmap.org ) at 1970-0

root@kali:/run# nmap --top-ports 10 192.168.1.1

Starting Nmap 6.25 ( http://nmap.org ) at 1970-0
Nmap scan report for [redacted] (192.16
Host is up (0.00076s latency).
PORT      STATE  SERVICE
21/tcp    closed ftp
22/tcp    closed ssh
23/tcp    closed telnet
25/tcp    closed smtp
80/tcp    closed http
110/tcp   closed pop3
139/tcp   closed netbios-ssn
443/tcp   closed https
445/tcp   closed microsoft-ds
3389/tcp closed ms-wbt-server
MAC Address: [redacted] (Unknown)

Nmap done: 1 IP address (1 host up) scanned in 1
root@kali:/run#
```

Assessment Tools

- **Kali Tools**
  - Dex2Jar
  - Nmap
  - Wireshark
  - Metasploit
  - JD Gui
- **Drozer**
- **Drozer Agent**
- **Android SDK**

What To Look For

- **OWASP Top 10**
- **Components**
  - Exported Permissions
  - Input Injection
  - Data Retrieval
  - Authentication Bypass
- **Encryption**
  - Present
  - Cipher Strength
  - SSL/TLS Version
- **Sensitive Data**
  - Cache
  - Logs
  - Manifest
- **Application**
  - Input
  - Authentication
  - Password Strength
  - Certificate Pinning

What To Look For

- **Web Services**
  - Server Misconfiguration
  - Server Side Validation
  - Enumeration
    - Payment Type
    - Payment Info
    - Usernames
    - Other Sensitive Information

Further Reading

- **Android Developer Guides**
  - http://developer.android.com
- **Drozer User Manual**
  - https://www.mwrinfosecurity.com/products/drozer
- **Vulnerable Android App Sieve**
  - https://www.mwrinfosecurity.com/products/drozer
- **OWASP Mobile Top 10**
  - https://www.owasp.org/index.php/OWASP_Mobile_Security_Project

Android Demo

DEMO

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Thank You!