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Malware Forensics on Mobile Devices for DOE-EM Applications

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Introduction

- Malware attacks are deployed in order to achieve one of the following goals:
  1. To disrupt system functionality.
  2. To gather sensitive information.
  3. To gain access to private data.
- The top areas that become primary targets for malware to attack are:
  1. Availability
  2. Integrity
  3. Confidentiality
- Malware forensics is a particular field where the execution and methods of a malware are studied.

Purpose

- Malware activity has increased on unprotected mobile devices.
- Establishing an accurate and ethical approach is critical when assessing security issues.
- Knowing the method of execution leads to fewer security risks and prevention of future attacks.
- Our intentions are not to create a new wave of malware attacks, but to study them and point to possible vulnerabilities that can occur.

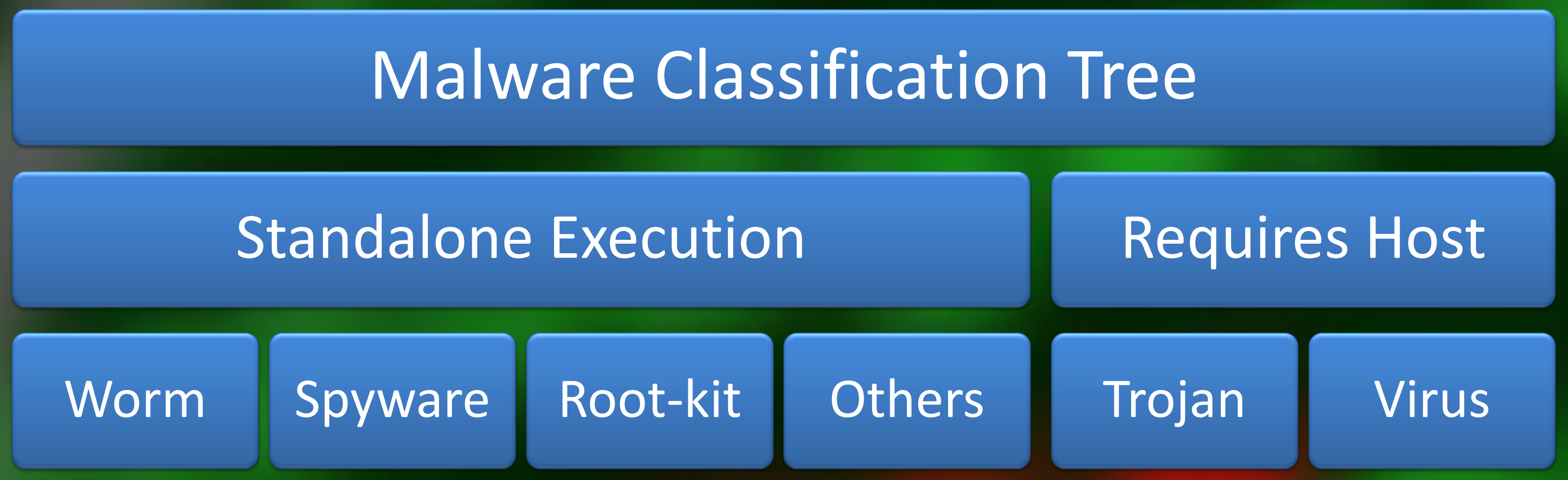
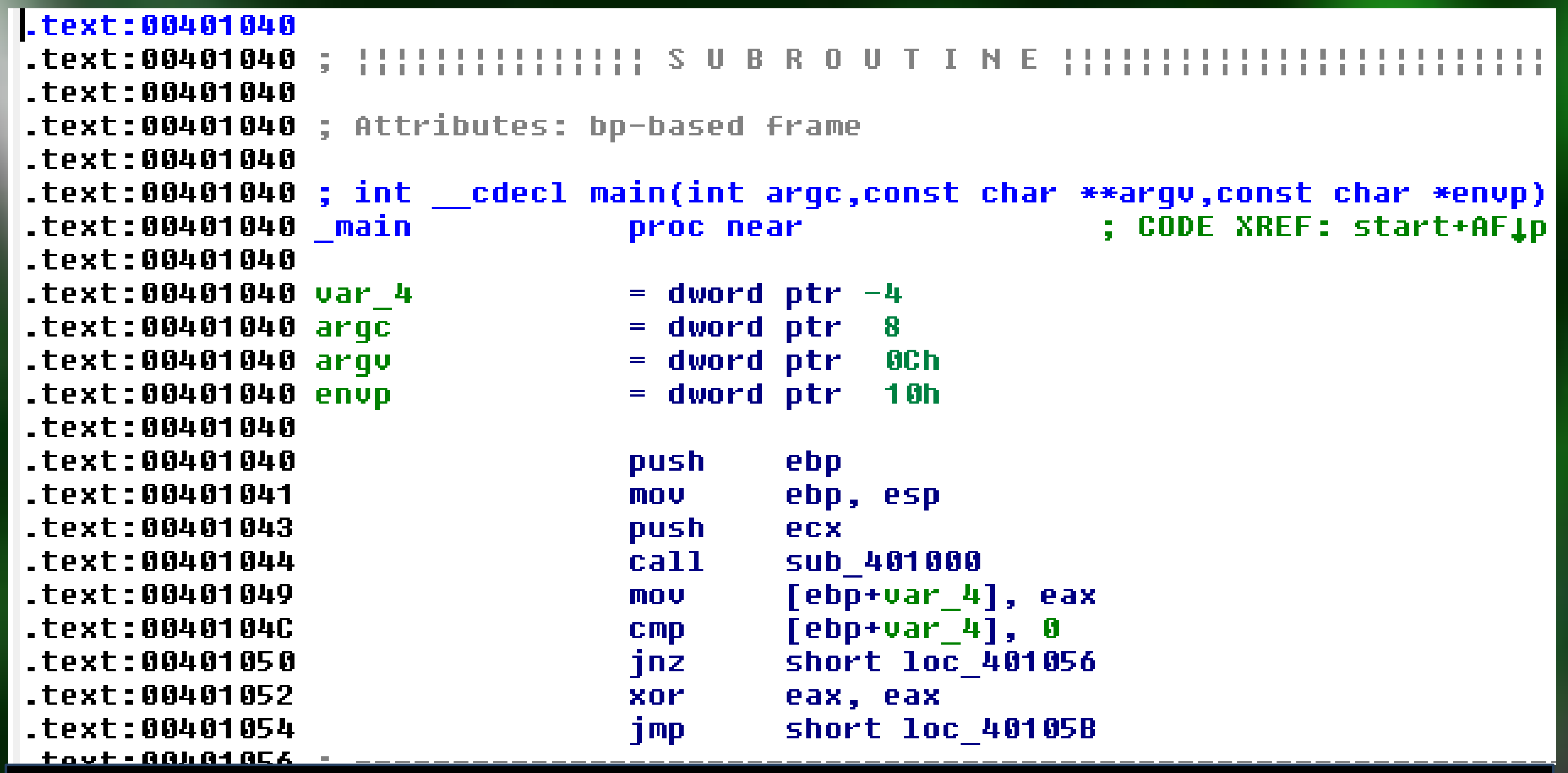


Figure 1: General Classification of Malware

Figure 2: Emulation of Android Nexus 4, using Genymotion, an Android Emulator



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.text:00401040
.text:00401040 ; ¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦ S U B R O U T I N E ¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦
.text:00401040
.text:00401040 ; Attributes: bp-based frame
.text:00401040
.text:00401040 ; int __cdecl main(int argc,const char **argv,const char *envp)
.text:00401040 _main           proc near               ; CODE XREF: start+AF↓p
.text:00401040
.text:00401040 var_4           = dword ptr -4
.text:00401040 argc            = dword ptr  8
.text:00401040 argv            = dword ptr  0Ch
.text:00401040 envp            = dword ptr  10h
.text:00401040
.text:00401040                 push    ebp
.text:00401041                 mov     ebp, esp
.text:00401043                 push    ecx
.text:00401044                 call    sub_401000
.text:00401049                 mov     [ebp+var_4], eax
.text:0040104C                 cmp     [ebp+var_4], 0
.text:00401050                 jnz     short loc_401056
.text:00401052                 xor     eax, eax
.text:00401054                 jmp     short loc_40105B
.text:00401056 ; ---------------------------------------------------------------
```

Figure 3: Entrance Point of Virus (Hacking port 8225, TCP)

Methodology & Results

- To create a workflow for desktop computers, the following benchmarks are used: Using an isolated environment, tracing the host processes, using dynamic analysis to isolate the malware and destroy it.
  - The isolated environment will prevent any malignant code from activating and risking the rest of the computers in the vicinity and/or network.
  - Tracing the host processes will allow us to read the host and user processes, giving us valuable information on the activities of the device.
  - Using dynamic analysis will allow us to manipulate the malware in a number of ways, such as using a debugger to try and change it.
- We used a virus and a Trojan to infiltrate a desktop computer for the following reasons:
  A. The virus will inject itself to force data to connect using a port.
  B. The Trojan will unlock and grant access to an unauthorized port.

Conclusion and Future Work

- With the desktop workflow in place as a systematic approach for mobile applications, we will investigate how to apply the same methods to the mobile devices.
- We are currently looking into different ways to develop ‘friendly’ malware to launch on the Android.
- We will then try to use malignant Windows malware to infect an Android, and using the workflow try to come to the same conclusion as with the Android and Desktop, separately.

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