

vm86

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Anti-debugging under Linux using vm86

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Anti-debugging



vm86

- Reduces a debugger efficiency
- "Security" by ofuscation
- Makes dynamic binary analysis harder/misleading

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- Virtual 8086 Mode
- First appearance on the Intel 80386
- Emulates 8086 real mode for compatibility purposes
- Only on x86-32, removed from x86-64

Syscall



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- Two syscalls: vm86, vm86old
- Not a lot of differences
- Almost no documentation, the few that exists is wrong
- You have to go look at the headers and dosemu source code

Usage



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- Initialize a vm86_struct structure
- Map some code at an offset below 64k
- Set the EIP in the structure to your entry point
- Call vm86 (VM86_ENTER, &st)

During 8086 mode



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- The processor is in 16 bit mode using a virtual context
- You can do whatever you want
- Returns in case of signal or interrupt
- Macros to get the return cause and interrupt number

How I used it



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- Control flow emulation
- Algorithm obfuscation
- Confusing the disassembler
- Confusing debuggers

How can it be debugged?



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- ptrace does not work!
- When the process get SIGTRAP-ed, it gets out of vm86 mode
- Kernel land hooking

Similar techniques



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- modify_ldt
- Works on Linux x86-32, x86-64, Win32, Win64
- Confuses the debugger by using a non standard code segment

Conclusion



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- Once in a while, look at a random syscall
- Remember that debuggers can miss a lot of stuff
- Static analysis FTW, but can be made very hard