The Effectiveness of Instruction Set Randomization

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Instruction Set Randomization

Encryption Key
Decryption Key

Compile Load In memory Execution

Jump Attack: jmp -2

- 2-byte instruction
- Correct: infinite loop
- Wrong:
  - Usually crashes
  - Sometimes false positive
- False positives
  - Conditional jumps
  - Used to reduce the number of attempts (average 24 per byte)

Requirements

- Multiple guess attempts on same key
  - Server forks process
  - No rerandomization
- Remotely observable behavior
- Injection at known address
- Simple encryption scheme
  - Byte-wise
  - Learn key from one plain/cipher pair

Conclusion

- It sometimes works
- Possible countermeasures
  - Rerandomize periodically
  - Stronger encryption

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