Lab 6

Main Goals

- **Build** various ROP chains
- **Explore** different ROP gadgets
- **Bypass** NX bit using ROP

Task 1: Setting `eax` Value

- Create a ROP chain to set `eax` value to 21
- You shouldn’t use `inc eax`

- Think of different arithmetic operations!

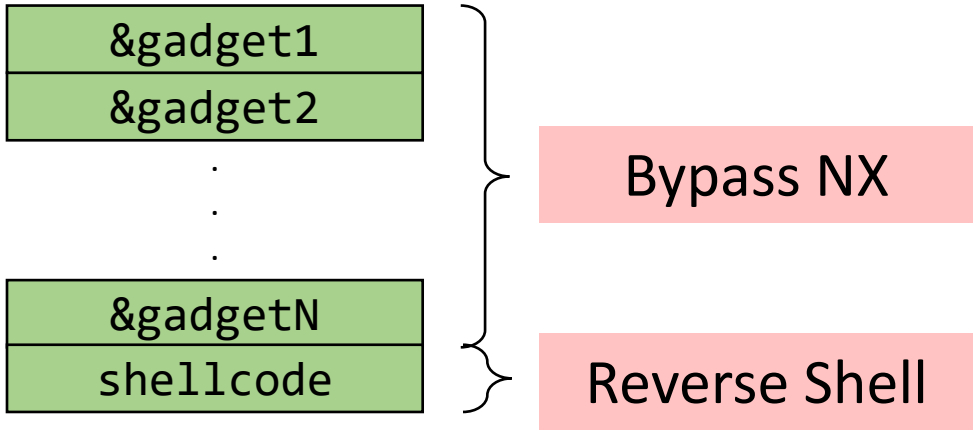
Task 2: Open a Shell

- Using the `execve` system call
- Main Steps:
  - `ebx` = address of null-terminated string
  - `ecx` = `NULL`
  - `edx` = `NULL`
  - `eax` = `0x0b`
  - Invoke "`int 0x80`" or "`call gs:[0x10]`"

- Where can you insert the string?
  - Can you use the stack?

Task 3: Open a Reverse Shell

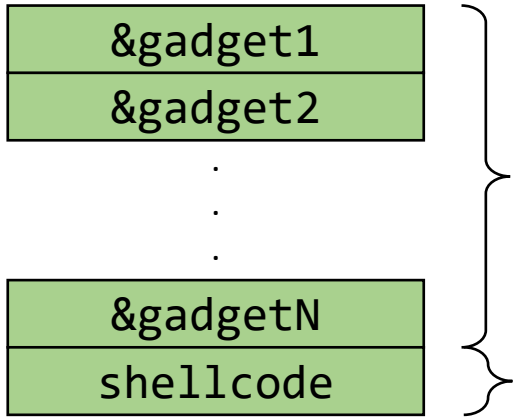
- Using ROP + Shellcode. Is this possible?

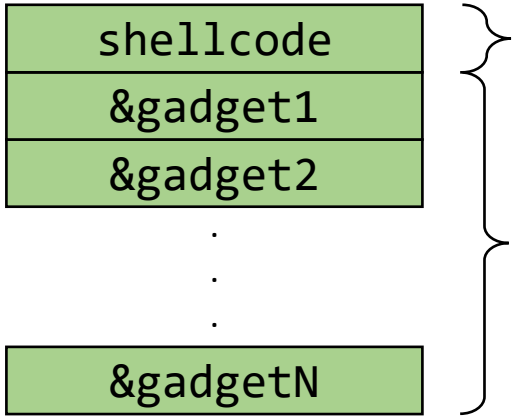


You may place the shellcode in any proper location in your payload.

Task 3: Open a Reverse Shell

- Using ROP + Shellcode. Is this possible?

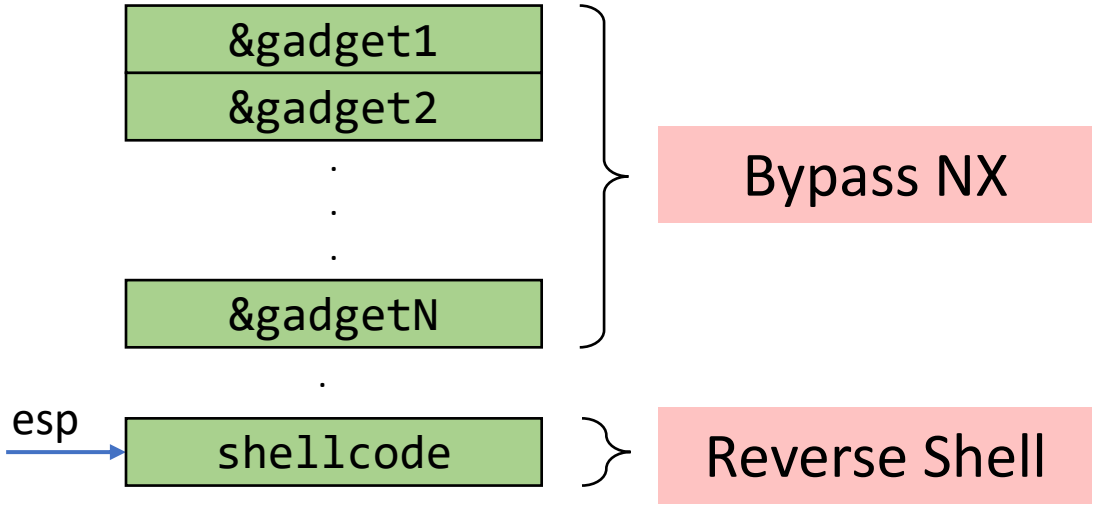




You may place the shellcode in any proper location in your payload.

Task 3: Open a Reverse Shell

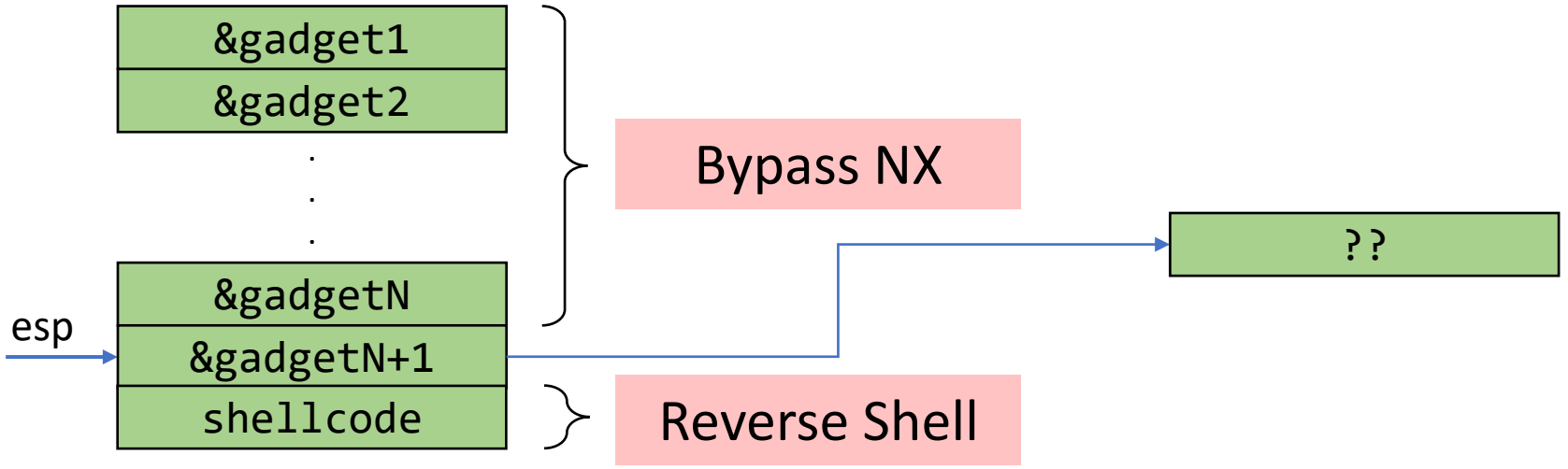
- If shellcode is placed **after** the ROP chain?
  - After ROP chain is done: `esp` would be pointing to shellcode
  - This cannot execute the shellcode



How should your shellcode start?

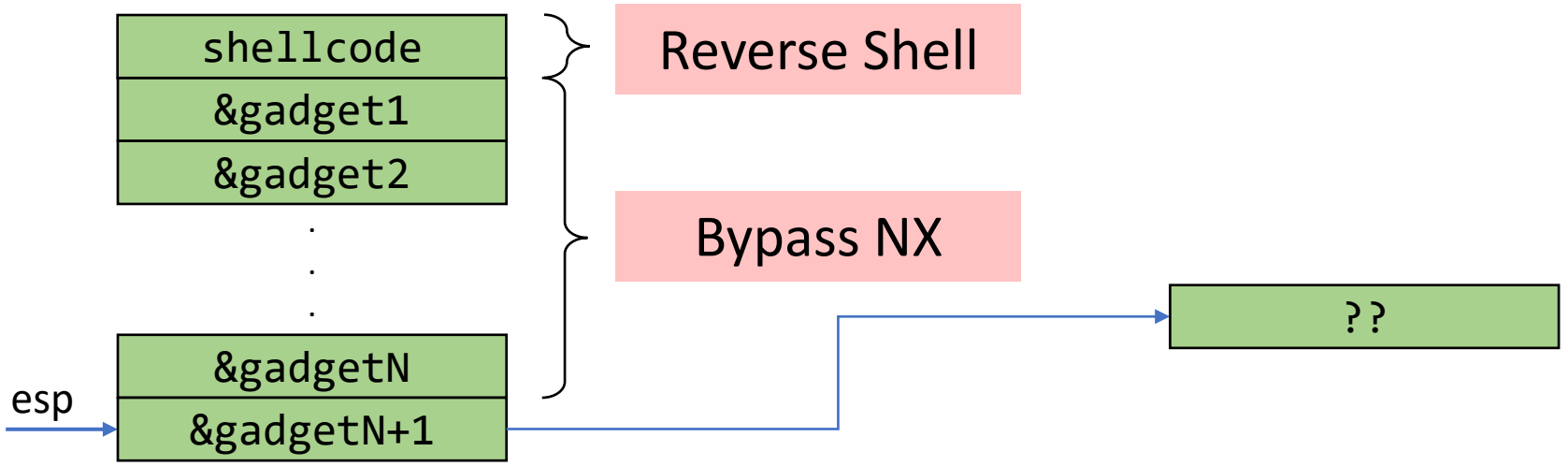
Task 3: Open a Reverse Shell

- If shellcode is placed **after** the ROP chain?
  - What gadget can control `eip`?



Task 3: Open a Reverse Shell

- If shellcode is placed **before** the ROP chain?



Helpful Tools and Commands

- gdb > info files # files linked to the binary and sections addresses
- ROPgadget
- ropper

Questions?