

Techniken in OpenBSD zur Vermeidung von ROP-Angriffen

Jan Klemkow

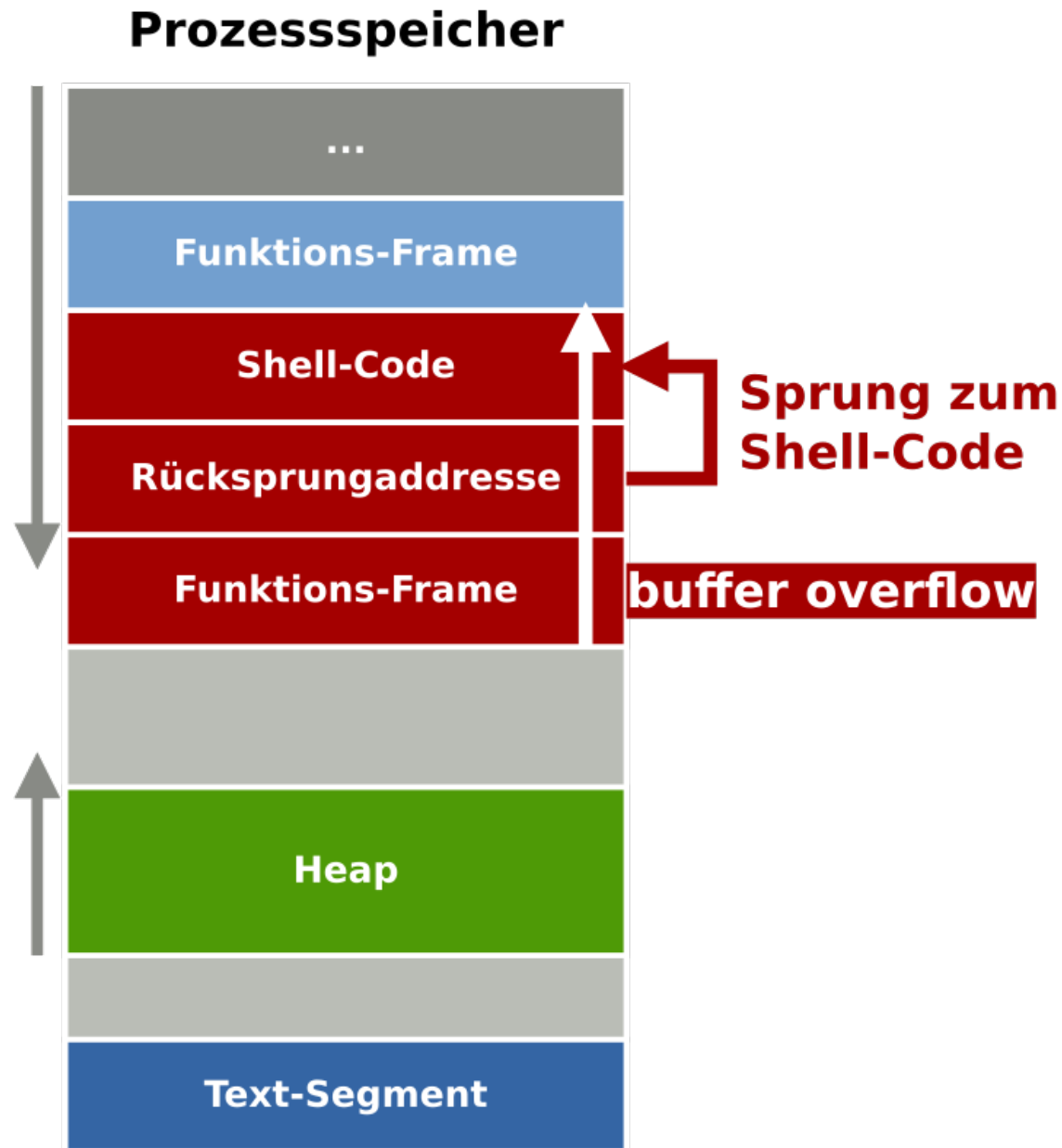
04.09.2018



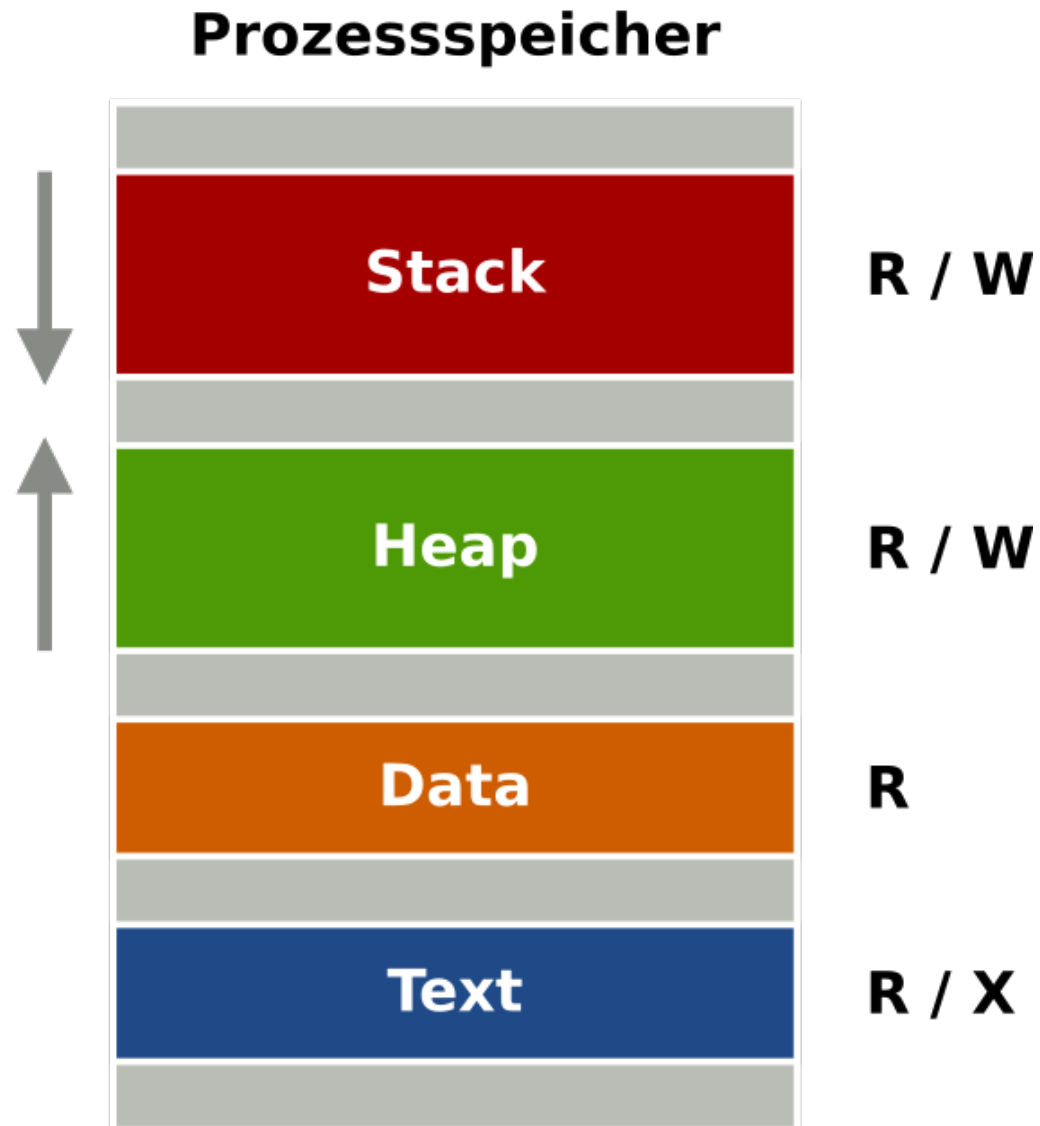
- .. **ROP**
- .. **Stack-Canaries**
- .. **ASLR**
- .. **Trap-Sled**
- .. **Signal-ROP**



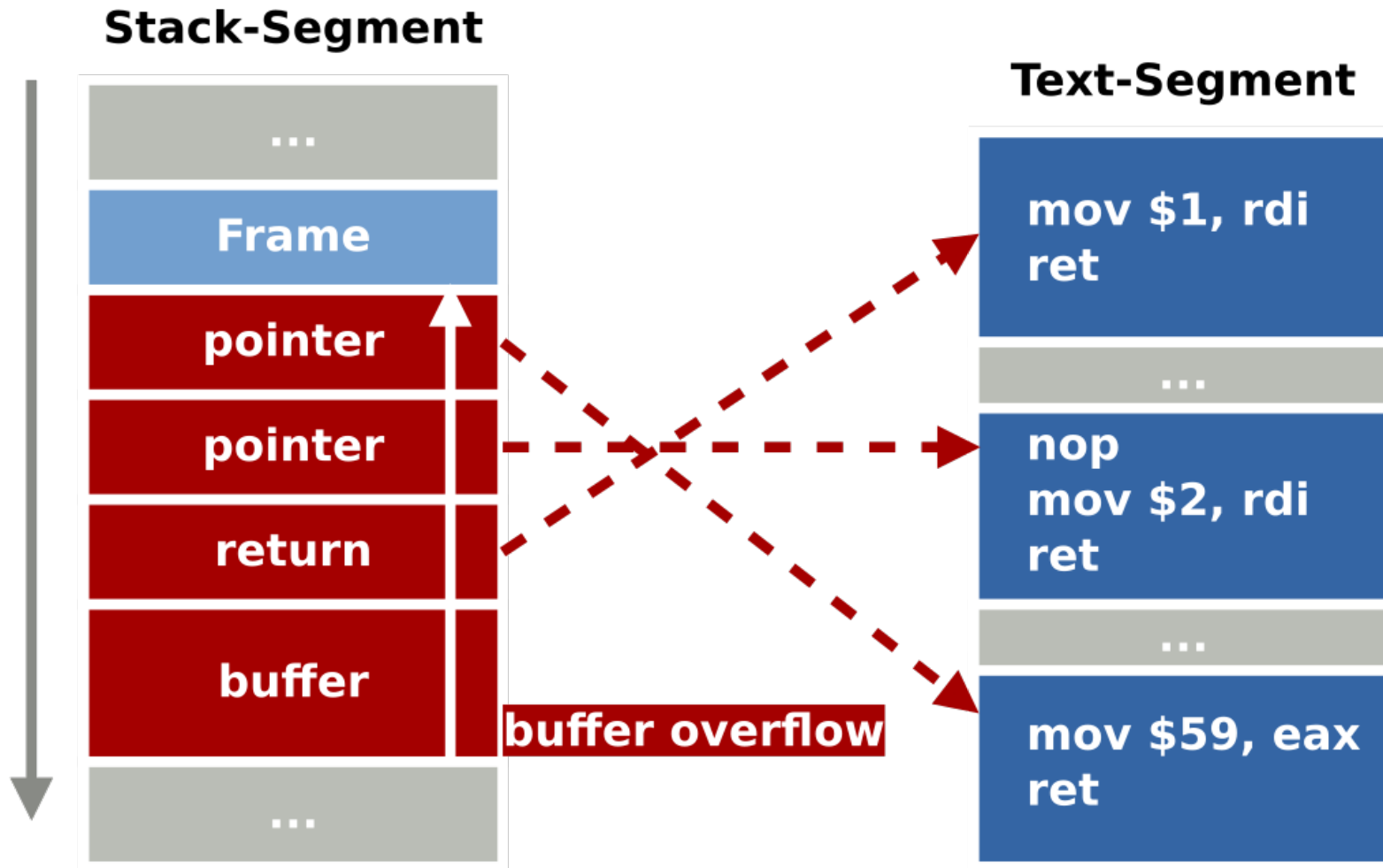
Buffer-Overflow mit Shell-Code



Data-Execution-Prevention



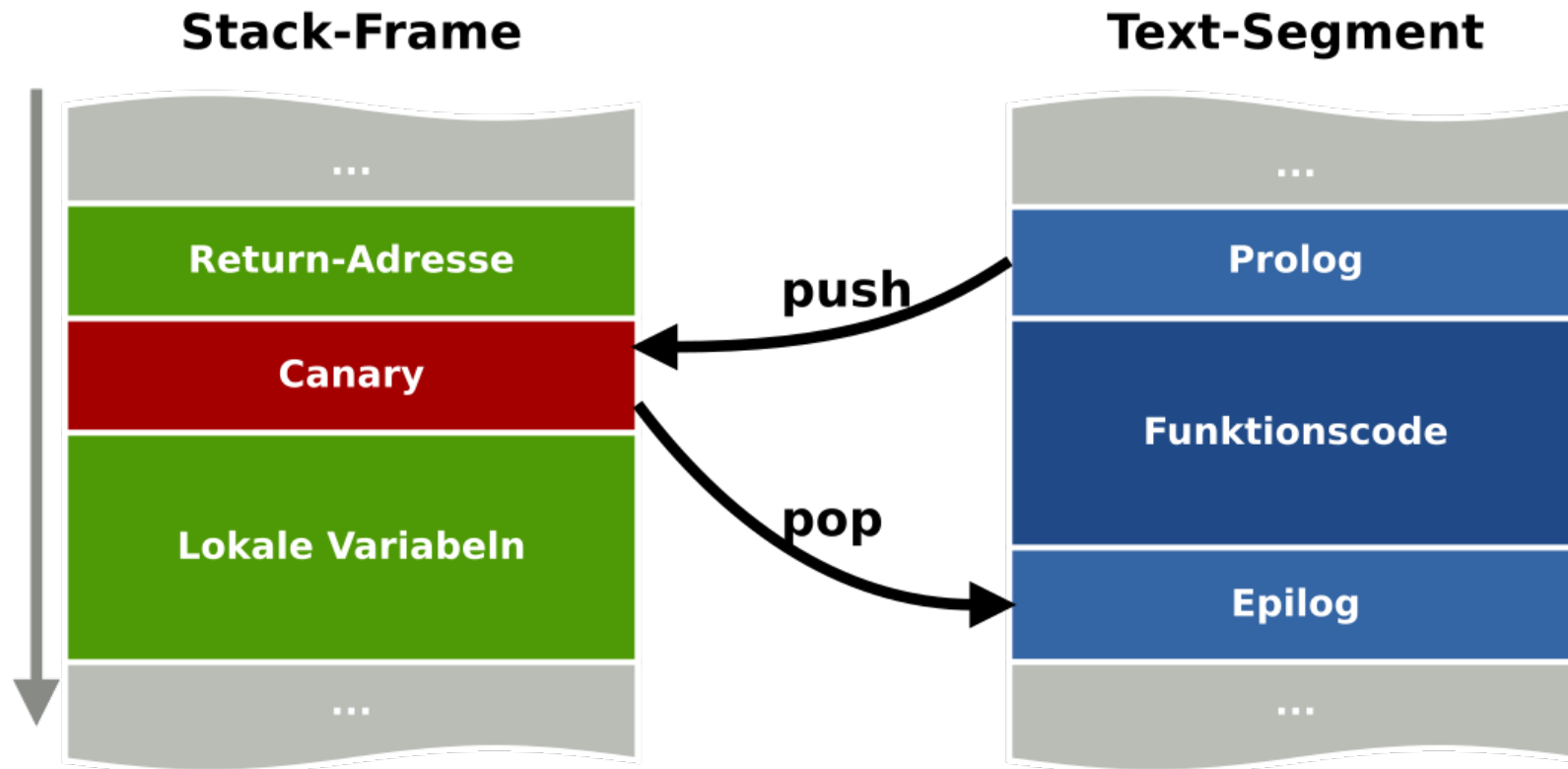
Buffer-Overflow mit ROP



Verbesserte Stack-Canaries



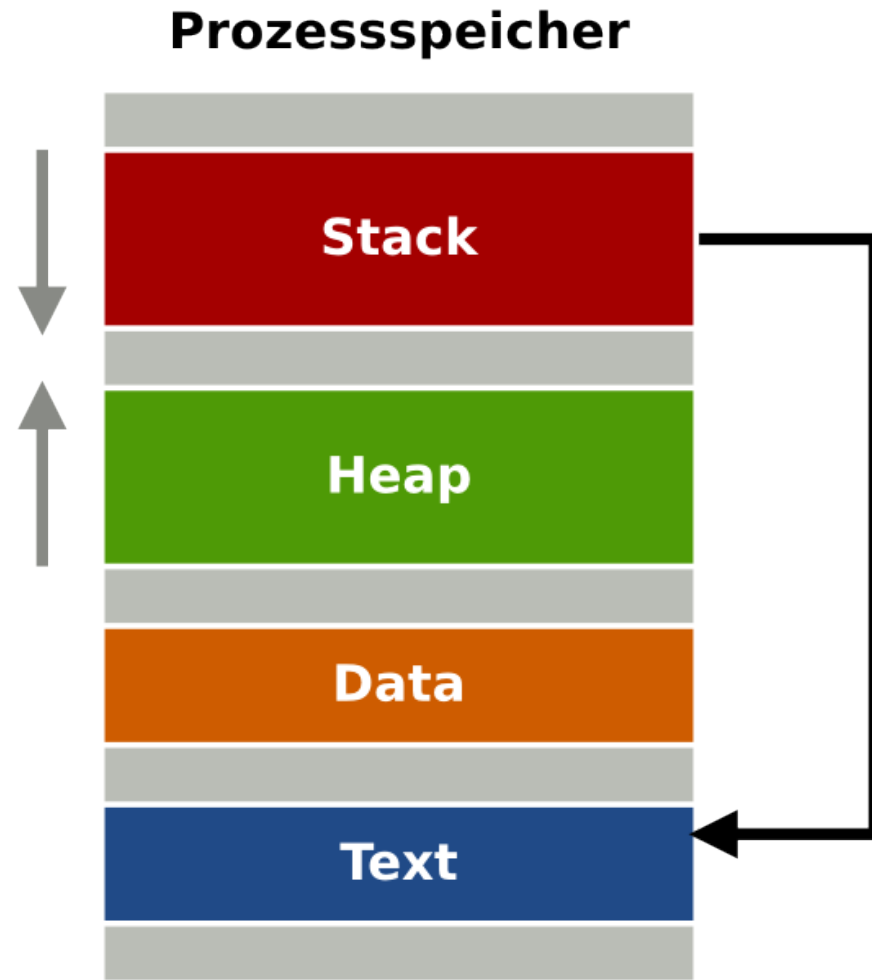
Verbesserte Stack-Canaries



Verbessertes ASLR

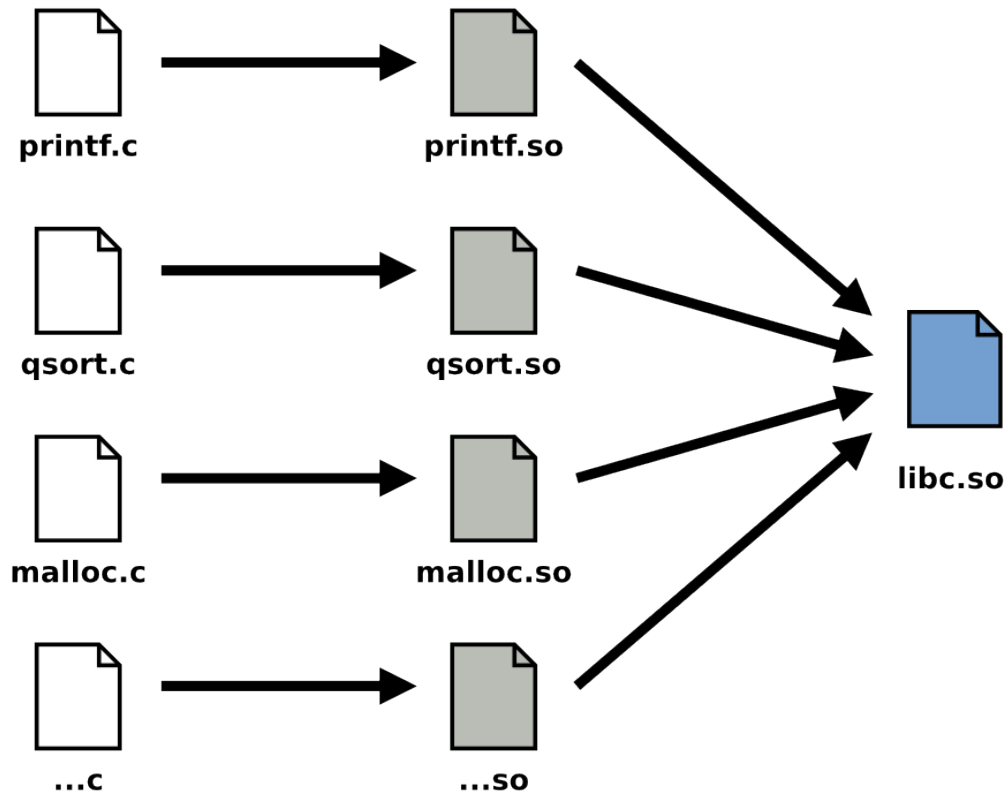


Return to LibC



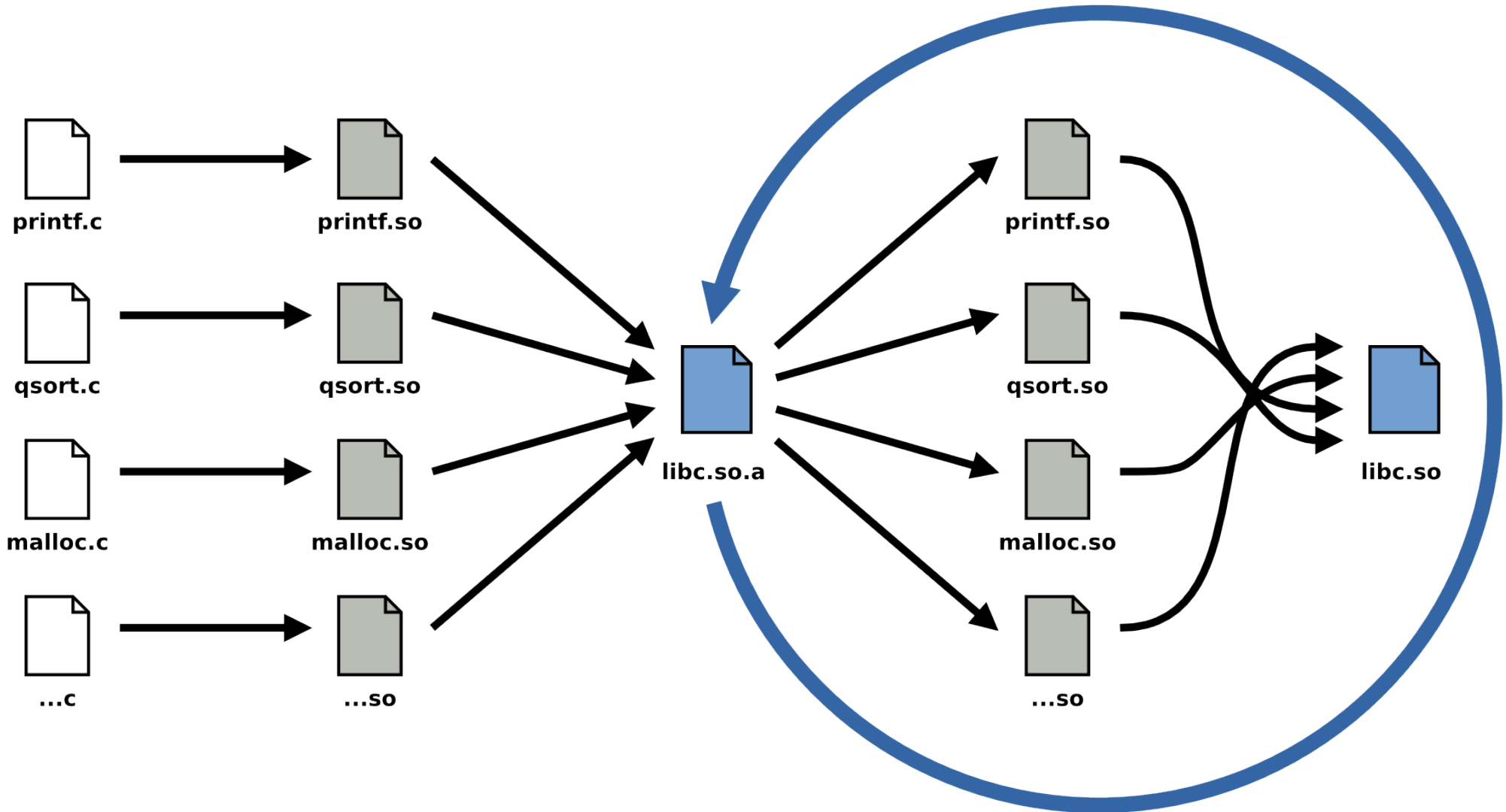
Return to LibC

```
cc -shared -fpic -o libc.so *.so
```



Anti - Return to LibC

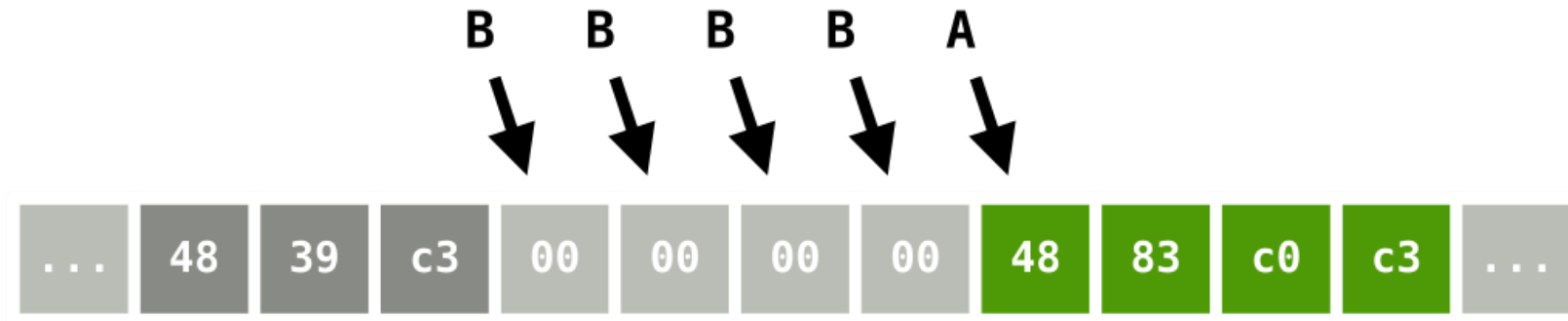
```
cc -shared -fpic -o libc.so $(ls *.so | sort -R)
```



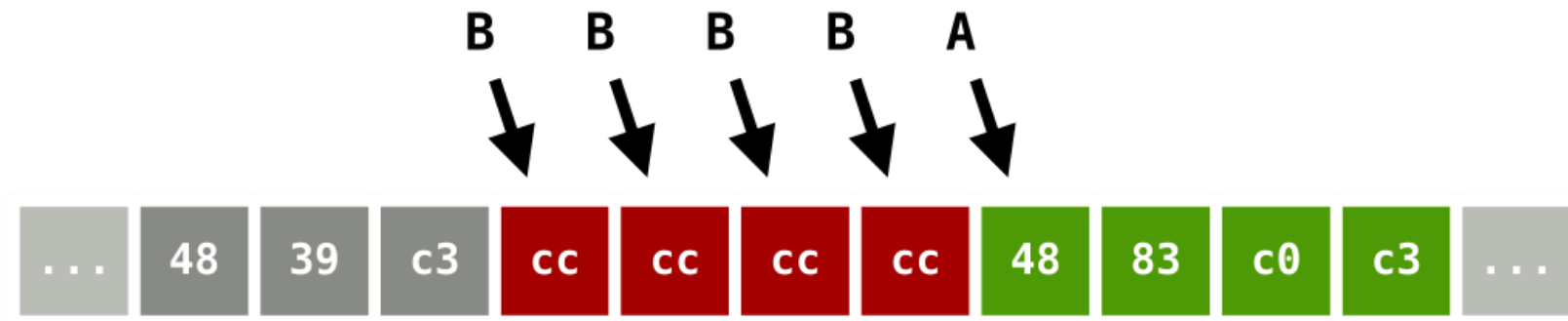
Trap-Sled



NOP-Sled



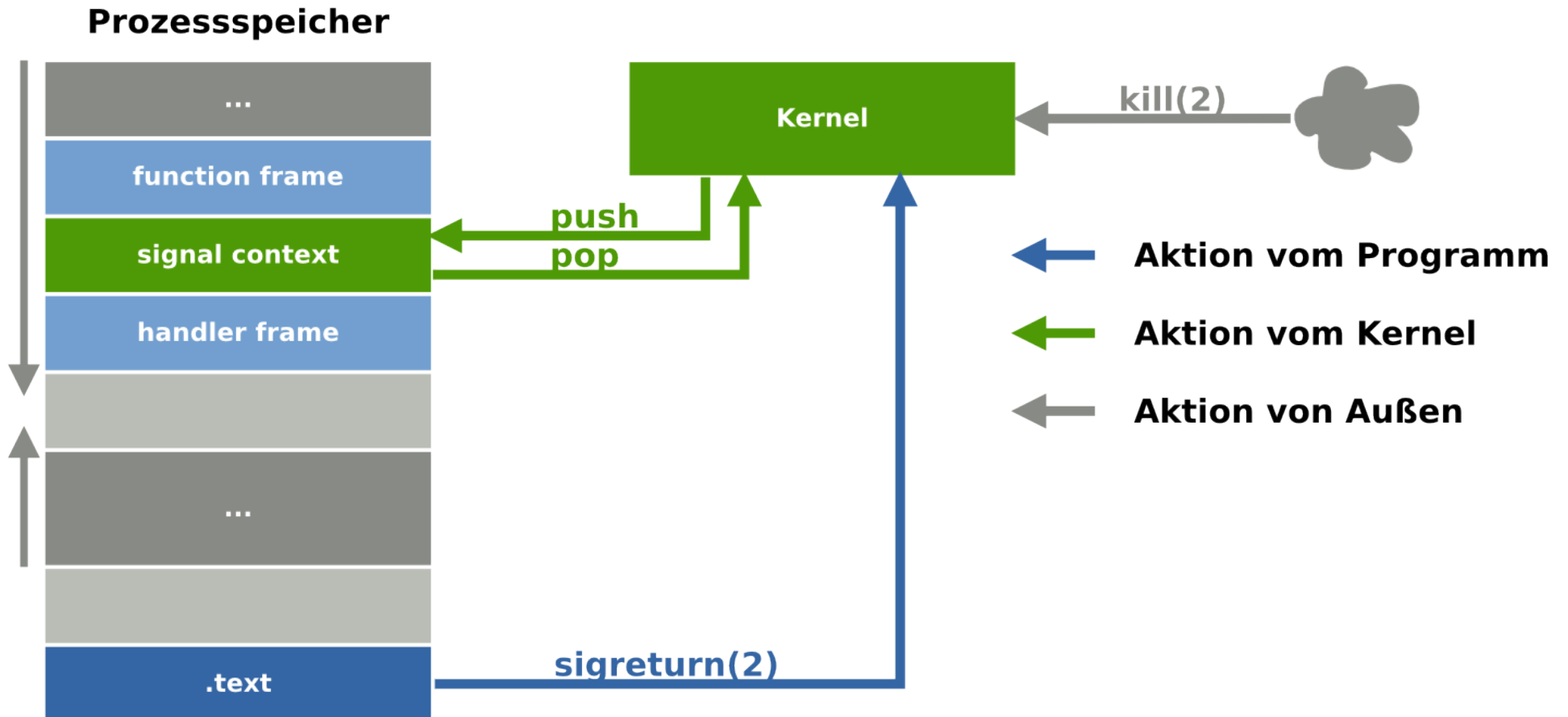
Trap-Sled



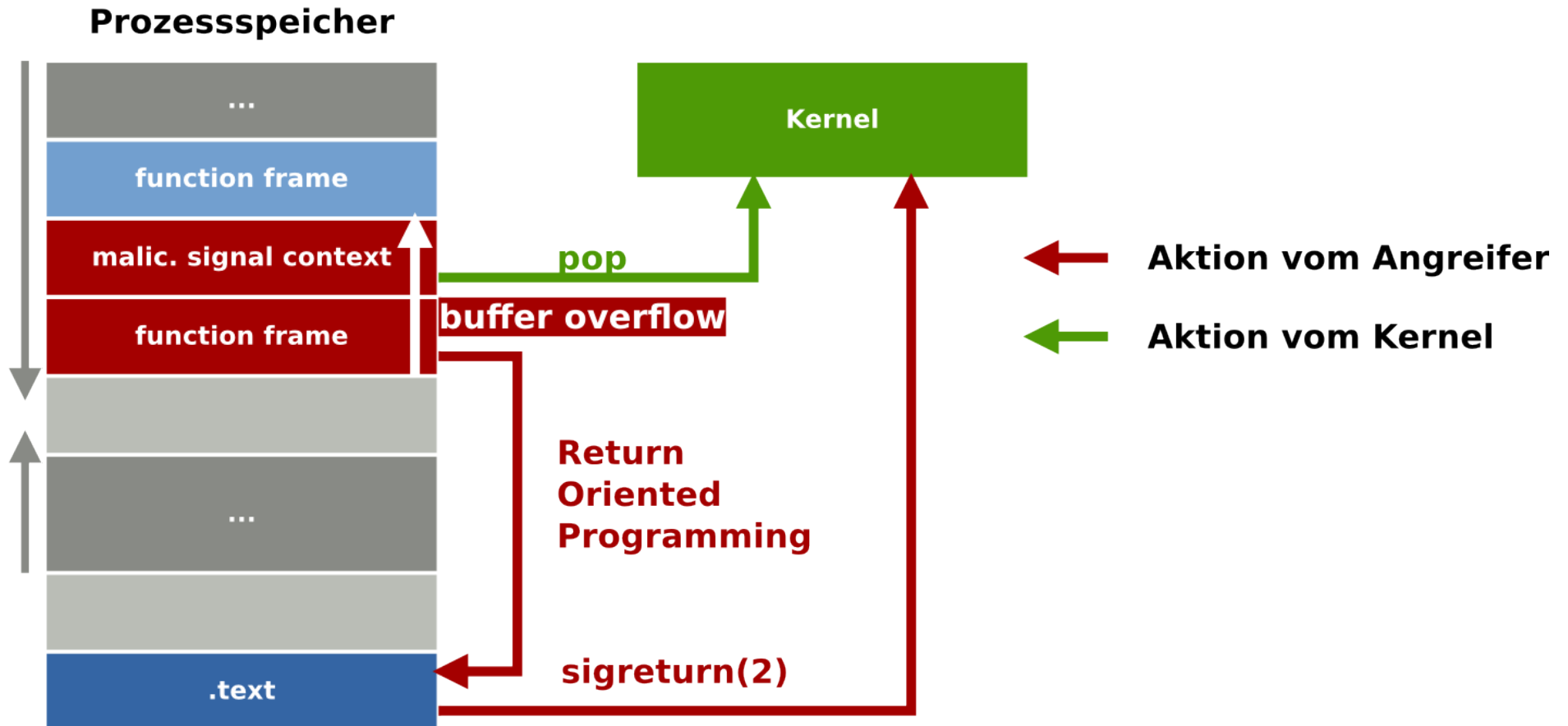
Signal Return-Oriented-Programming



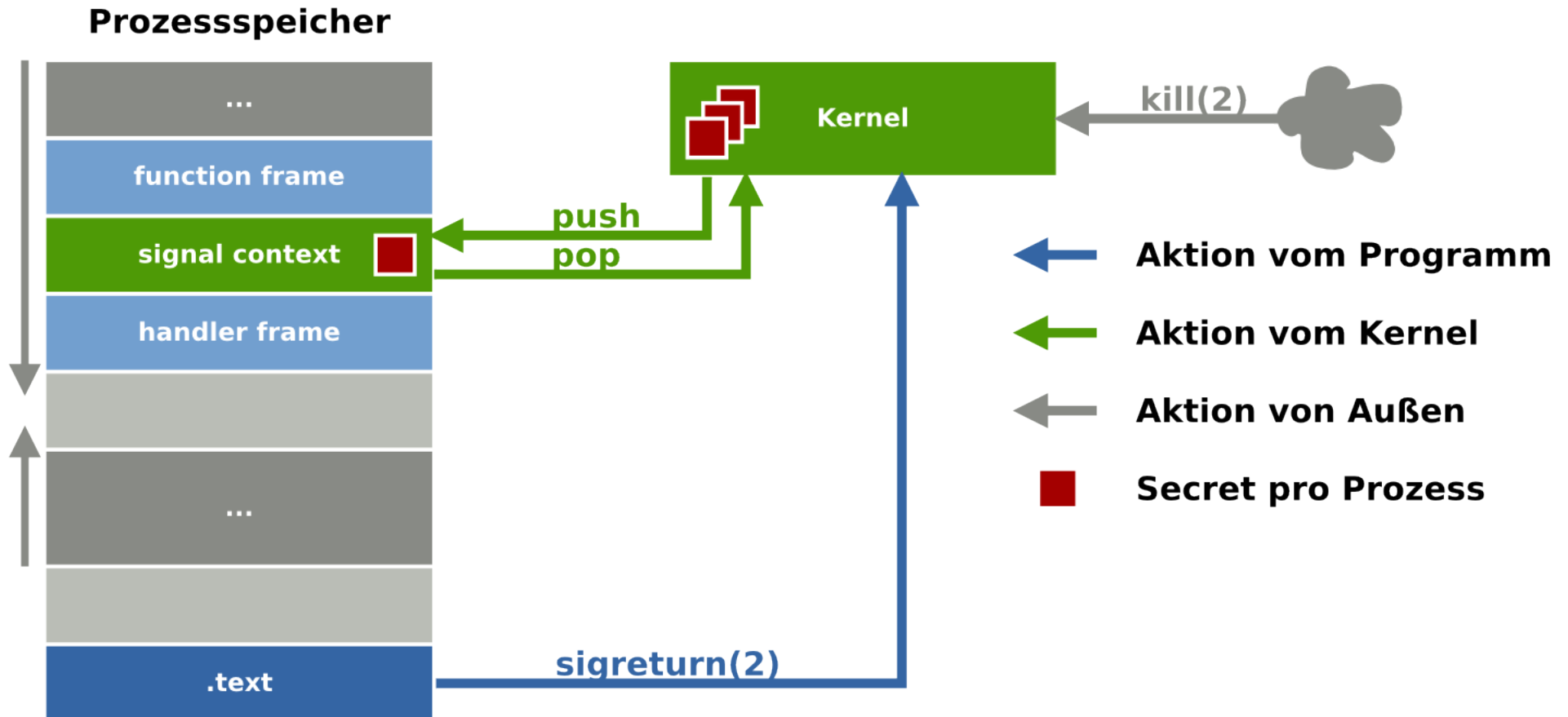
Signal Return Oriented Programming



Signal Return Oriented Programming



Signal Return Oriented Programming



Fragen?

