





Welcome to

## 9. Information Flow

KEA Kompetence Computer Systems Security 2019

Henrik Lund Kramshøj [hlk@zencurity.com](mailto:hlk@zencurity.com) @kramse  

Slides are available as PDF, [kramse@Github](https://github.com/kramse/kramse@Github)  
9-information-flow.tex in the repo security-courses

# Plan for today



## Subjects

- Firewall Flow Controls
- Confinement and isolation
- Virtual Machines and Sandboxes
- Covert Channels

## Exercises

- Research VM escapes

# Reading Summary



Bishop chapter 17: Information Flow

Bishop chapter 18: Confinement Problem

Capsicum: practical capabilities for UNIX

Removing ROP Gadgets from OpenBSD

# Firewall Flow Controls



# Confinement and isolation



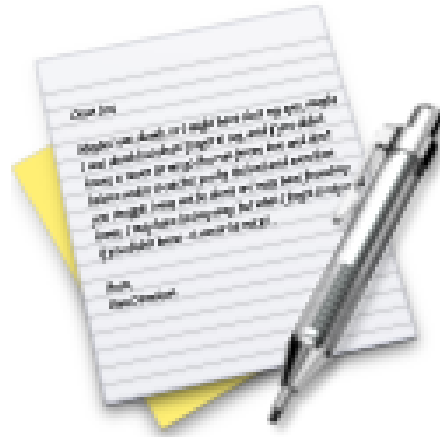
# Virtual Machines and Sandboxes



# Covert Channels



# Exercise



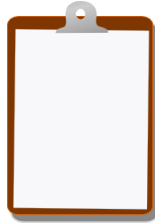
Now lets do the exercise

## VM escapes

which is number **18** in the exercise PDF.



## For Next Time



Think about the subjects from this time, write down questions

Check the plan for chapters to read in the books

Most days have less than 100 pages, but some days may have more!

Visit web sites and download papers if needed

Retry the exercises to get more confident using the tools