



Welcome to

9. Information Flow

KEA Kompetence Computer Systems Security 2019

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Slides are available as PDF, kramse@Github
9-information-flow.tex in the repo security-courses

unfinished, will be updated later

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

Information Flow Policies



Define the way information moves throughout a system

Describes the authorized paths along which that information can flow

- Preserve confidentiality
- Preserve integrity

Can be done using labels representing security class, as in Bell-PaPadula Model

Firewall Flow Controls



Confinement and isolation



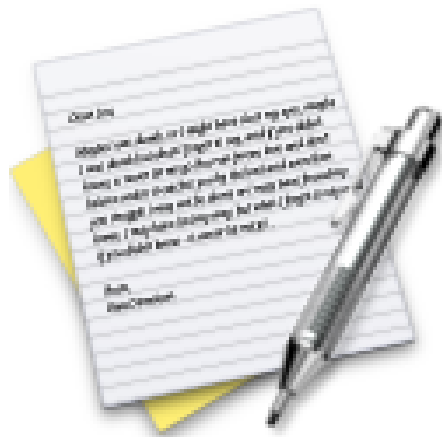
Virtual Machines and Sandboxes



Covert Channels



Exercise

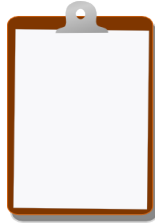


Now lets do the exercise

Research Virtual Machine Escapes 20min

which is number **20** 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