

ENHANCING CYBERSECURITY SKILLS BY CREATING SERIOUS GAMES

ITiCSE'18, Larnaca, Cyprus
Tuesday 3rd July, 2018

Valdemar Švábenský
Jan Vykopal, Milan Cermak,
Martin Laštovička
Masaryk University, Czech Republic



KYPO
BY CSIRT-MU

What we did



Two courses



Undergrads



CS faculty



Cybersecurity



Games



Open day



Why we did it



Workforce shortage



Need for hands-on training



Importance of adversary thinking



What we achieved



Cybersecurity

+



Game design



Understanding

+



Practical result



Awareness

+



New collaborators



Presentation outline

- Example game, background
- Courses design after 3 semesters of innovation
- Case study of student projects
- Our experience and lessons learned



Capture the flag (CTF) game

Kali-attacker / 10.10.20.2

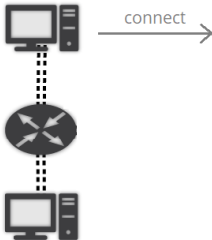


HTTP-server / 10.10.10.2

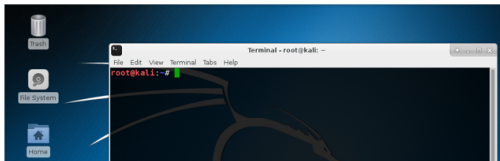


Capture the flag (CTF) game

Kali-attacker / 10.10.20.2

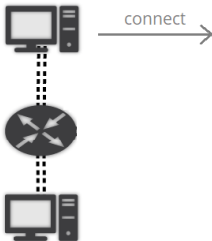


HTTP-server / 10.10.10.2

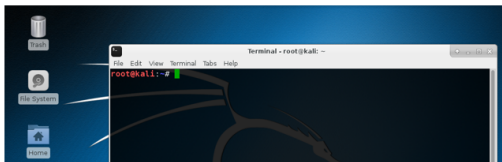


Capture the flag (CTF) game

Kali-attacker / 10.10.20.2



HTTP-server / 10.10.10.2



Level 1

Task: Scan the HTTP server.

Flag format: The number of the highest open port.

Points available: 6/8

Need help?

Hint 1: What tool to use

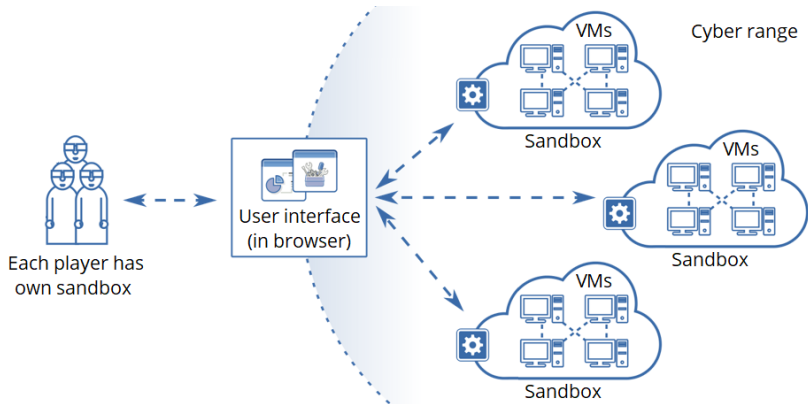
Hint 2: How to use the tool

Show Hint 1 (-2 points)







Use nmap.



KYPO – Cyber Exercise & Research Platform



Our courses

	Focus	Students	Project
Intro course	 Attack	 Small teams	 Game
Follow-up course	 Defense	 Individuals	 Tutorial



Structure and content of the courses

- Practical experience from a cybersecurity team CSIRT-MU
 - <https://csirt.muni.cz>

Week	1-6	7-10	11	12	18
Intro course	Security basics, hands-on labs	Project work, consultations	Test run	Open day	Final result
Follow-up course	Project work, consultations				
Assessment	Formative			Summative	



Open day



Case study: Open day 2017 – Overview



18 students



7 games



3 tutorials



3 hours



41 sessions



41 surveys



Case study: Open day 2017 – Results



Playing time [min]

30 expected
5-70 actual
40 average
40 median



Educational value

5 × Huge
27 × High
9 × Medium
0 × Small
0 × Small



Overall quality

7 × Excellent
23 × Very good
10 × Good
1 × Sufficient
0 × Poor



Lessons learned: Successes



Learning by teaching



Practical result



Awareness



New collaborators



Lessons learned: Challenges



Instructor effort



Technical infrastructure



**Creating games has a strongly beneficial
impact on cybersecurity education and R&D.**

 www.kypo.cz/en/kypolab

 @csirtmu

Valdemar Švábenský

svabensky@ics.muni.cz

