Binary Exploitation Lab

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Motivation

IoT Bugs

Top 10 IoT Bugs

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1. Insecure Web Interface

Default usernames and passwords

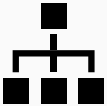
Top 10 IoT Bugs

1. Insecure Web Interface
2. Insufficient Authentication

Weak passwords

Top 10 IoT Bugs

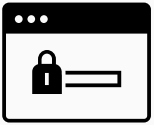
1. Insecure Web Interface
2. Insufficient Authentication
3. Insecure Network Services



Unnecessary ports open

Top 10 IoT Bugs

1. Insecure Web Interface
2. Insufficient Authentication
3. Insecure Network Services
4. Lack of Transport Encryption



SSL/TLS not available

Top 10 IoT Bugs

1. Insecure Web Interface
2. Insufficient Authentication
3. Insecure Network Services
4. Lack of Transport Encryption
5. Privacy Concerns

Collected information not properly protected

Top 10 IoT Bugs

1. Insecure Web Interface
2. Insufficient Authentication
3. Insecure Network Services
4. Lack of Transport Encryption
5. Privacy Concerns
6. Insecure Cloud Interface

Interfaces with security vulnerabilities

Top 10 IoT Bugs

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6. Insecure Cloud Interface
7. Insecure Mobile Interface

No account lockout mechanisms

Top 10 IoT Bugs

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3. Insecure Network Services
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6. Insecure Cloud Interface
7. Insecure Mobile Interface
8. Insufficient Security Configurability

Encryption is not available

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9. Insecure Software/Firmware

Updates are not signed

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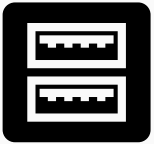
10. Poor Physical Security



Unnecessary external ports like USB

Summary

The 90s called...

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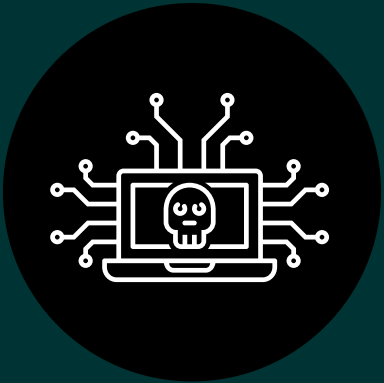
...they want their bugs back!



Let’s try it!

Infrastructure

There are 6 different hacklets

Name	Difficulty	Type	IP	Access Point
Admin Panel	□□□□□		192.168.3.235	Expl0it

Memory corruption

Puzzling

Binary/Reversing

Python

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Time Server	■■■■☐		192.168.3.102	M0reExpl0it

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Time Server	■■■■☐		192.168.3.102	M0reExpl0it
Power Plant	■■■■■		192.168.3.241	Expl0it

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- Highscore can be found here: `http://192.168.3.191/hs` (Expl0it)

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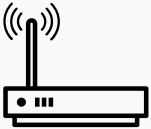

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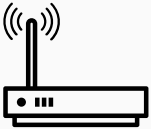
- All IoT devices/hacklets are in an internal network
- They are not connected to the internet



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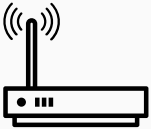
- Connect to the routers `Expl0it` or `M0reExpl0it` to start hacking



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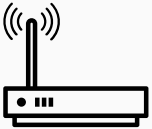
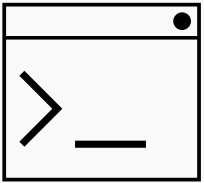
- The password is `iotiotiot` (3x "iot")



How to Connect

- Hacklets are accessible over the network



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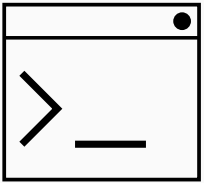

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  - PuTTY
  - Terminal, `netcat`, `telnet`
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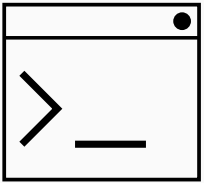

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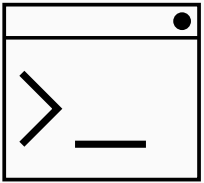
- For example on Linux/Mac in the shell:

```
telnet 192.168.3.235 8888
```



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- Download a hacklet to analyze it: `http://192.168.3.191` (Expl0it)
- Connect to the hacklet
- Remember today's talk of Ahmad Sadeghi
  - What happens if I enter a lot of text?
  - Does it crash? Can I exploit that?
  - Is there maybe a different interface?

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- Watch out for dangerous functions (e.g. `strcpy`)

Questions?

Bonus: Running hacklets locally

It can be useful to run hacklets locally

- Install `qemu`
- Download Raspbian Image + Kernel + Starter from `http://192.168.3.191`
- Execute `chmod +x ./run.sh` and run `./run.sh`
- Remote shell to QEMU: `ssh localhost 2222`
- Connect to hacklet: `netcat localhost 8888`