

# **STI MSI/MSE 2023/2024**

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## **Practical Assignment #1**

- VPN scenarios using OpenVPN
- Two-factor user authentication
- X.509 certification authorities and OCSP
  - Web server with X.509 certificate

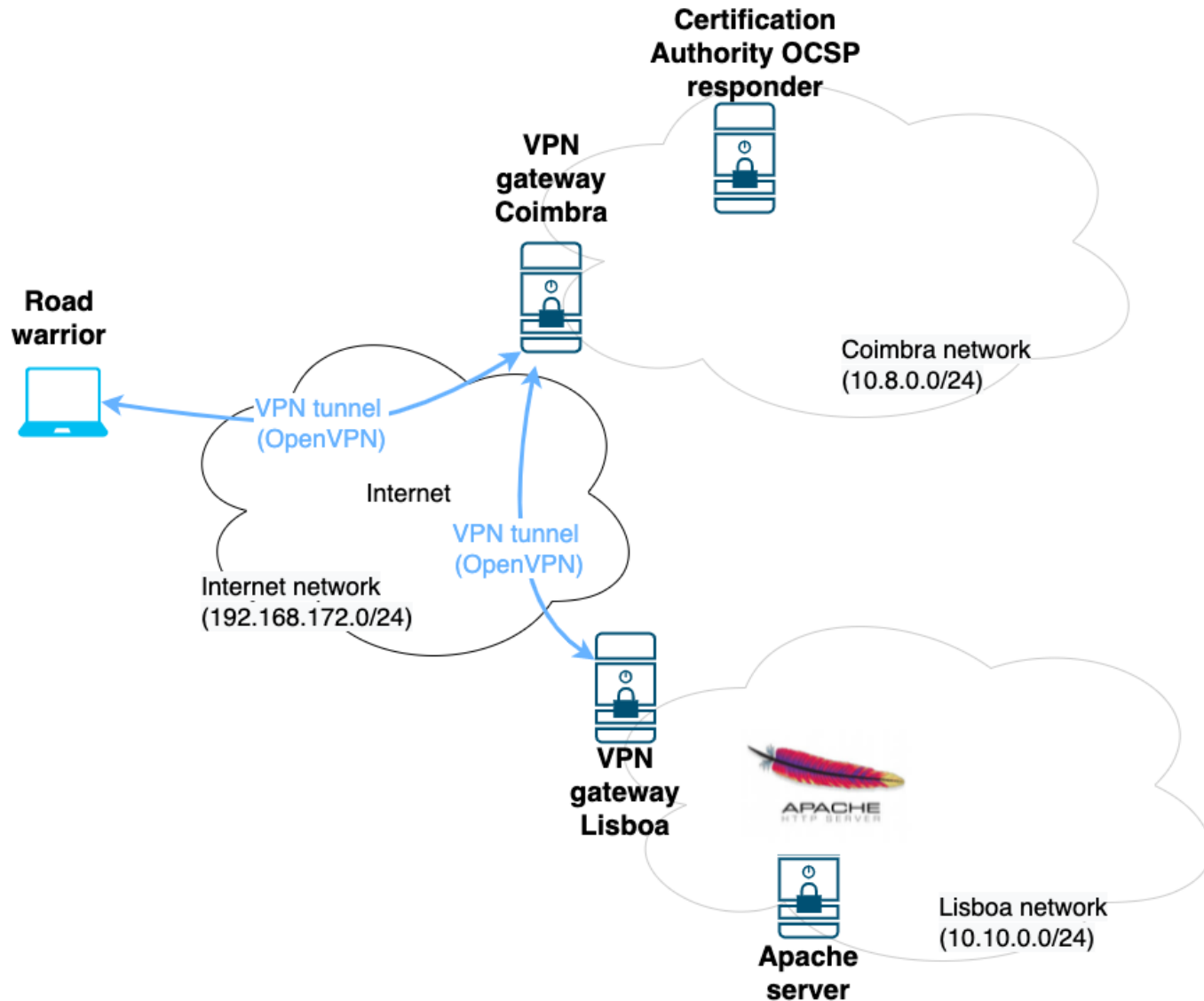
# Important:

- Groups with max 2 members
- Deadline 17/March/2024
- Work must be defended by all members of group
- Inform the teacher regarding the group members by email: [bmsousa@dei.uc.pt](mailto:bmsousa@dei.uc.pt)

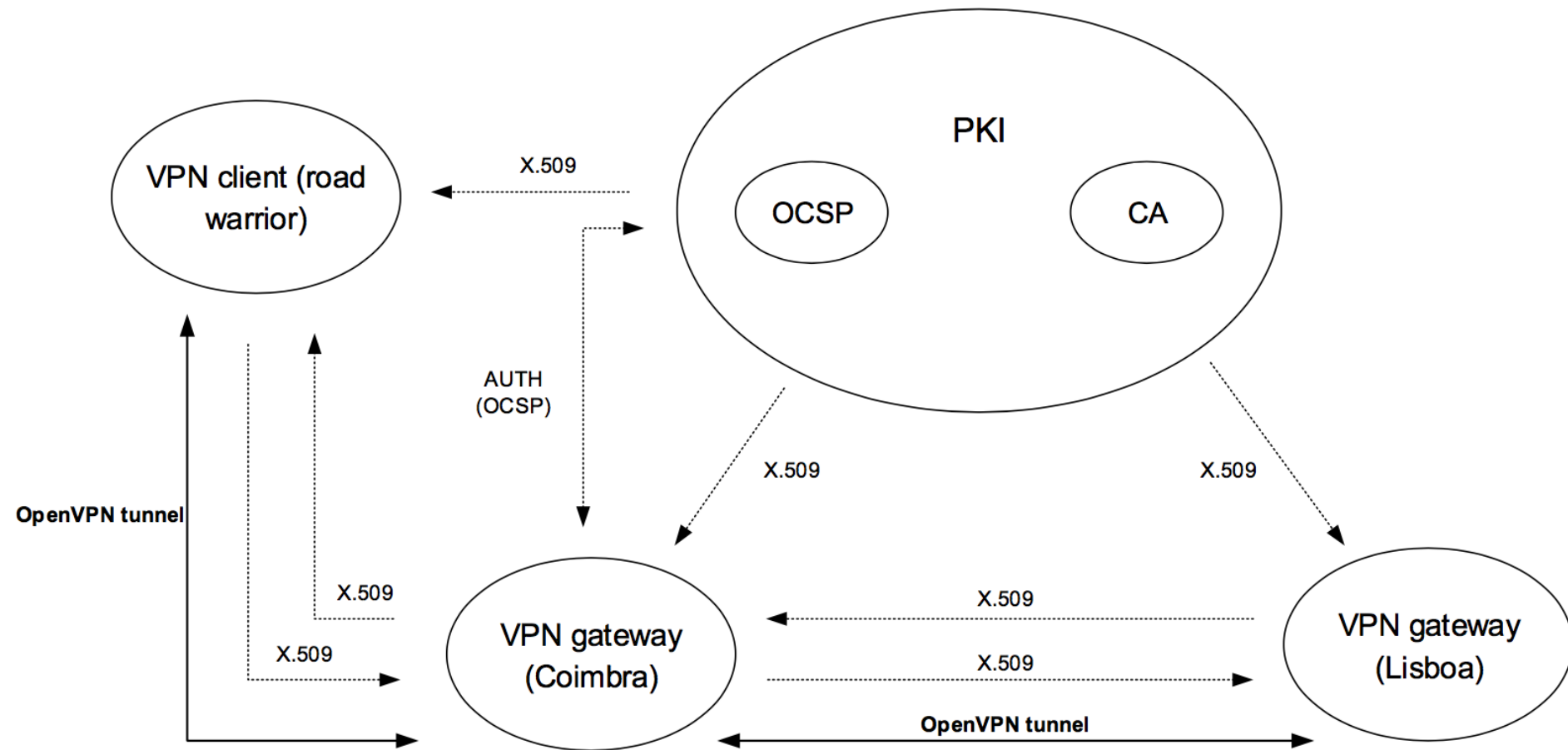
# Rules for PAs

- The Lab projects for **MSI students** include:
  - **Three** practical assignment projects:
    - **PA1:** Certificates + Open VPN, 3 points, delivery in 17/March'24
    - **PA2:** NFtables with NAT, 3 points, delivery in 21/April'24
    - **PA3:** Web Application Firewall, 3 points, delivery in 19/May'24
  - **Defences are mandatory** and occur in the end of the semester
  - **Only students of MSI** Groups are allowed (recommended 2, maximum 3)
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- The Lab projects for **MSE students** include:
  - **Two** practical assignment projects:
    - PA2: NFtables with NAT + Certificates, 4.5 points, delivery in 21/April'24
    - PA3: Web Application Firewall, 4.5 points, delivery in 19/May'24
  - **Defences are mandatory** and occur in the end of the semester
  - **Only students of MSE** Groups are allowed (recommended 2, maximum 3)

# Scenario

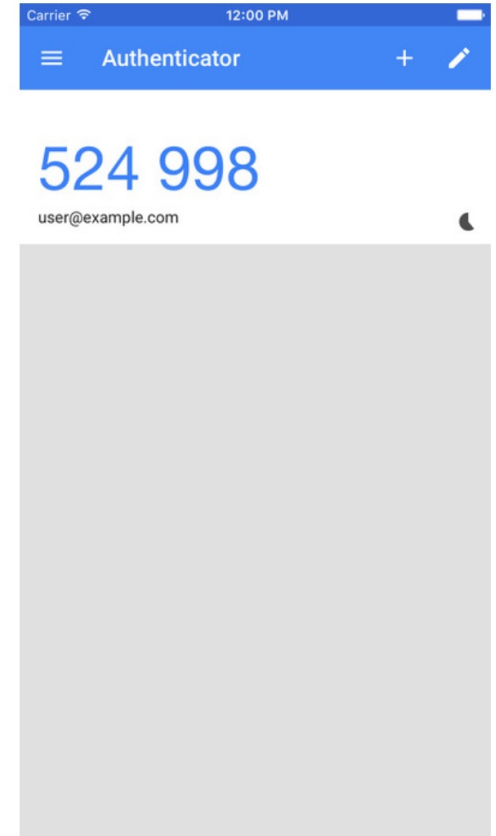


# Certification authority and OCSP



# Two-factor user authentication

- The user (road warrior) sends a valid account password plus a one-time authentication token to the OpenVPN server
- Generation of a one-time password (according to the TOTP protocol) using, for example, the Google Authenticator app



# Practical Considerations

- 3 Virtual Machines:
  1. Road Warrior
  2. Coimbra VPN Server
  3. Lisbon VPN Server
- Services can be binded to the IP in virtual interfaces of VPN Servers belonging to the respective network:
  1. OCSP
  2. Web Server

# Practical Considerations - Routing

- VPN Server of Coimbra
  1. Needs to push routes to the Road Warrior
  2. Needs routing information to the routes of Lisboa network
  3. Need to have IP forwarding activated  
e.g., `sysctl -w net.ipv4.ip_forward=1`
- VPN Server of Lisbon:
  1. Needs routing information to the routes of Coimbra network