



AARHUS UNIVERSITET

# Microservices and DevOps

DevOps and Container Technology

Security 101 – The Big Picture

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# Security is so important...

- ... that I have completely ignored it in all my courses 😊
  - Why?
    - You need a system in order to secure it
      - MSDO is about ‘crafting the system’ – so it ‘happens before’
    - Security is a quality attribute in conflict with all others I teach
      - Modifiability – loose coupling
      - Availability – allow access always
      - Performance
      - Etc
    - And ... I have never dug deep into it 😊
- Security is tight coupling  
Security is the opposite  
Security ...

- According to Bass et al. *Software Architecture in Practice*
- Concerned with *ability to protect data and information from unauthorized access while still providing access to people/systems that are authorized*

- Lots of *tactics*

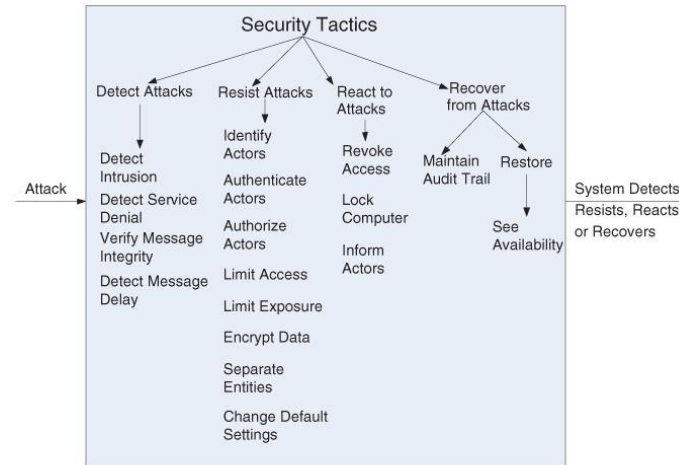


Figure 9.3. Security tactics

# Disclaimer

- I am no expert...
  - Only worked on it since Spring 2021 to be frank
    - Not a core practice when teaching and prototyping with no real data
- MSDO take on the vast subject area is... limited...
  - Pedagogical point
    - *You have to be able to construct a system in order to have something to protect*
    - *MSDO is about constructing that system...*

# Our Focus is *Resisting*

- Authorize Actors
- Encrypt Data
- Limit Access

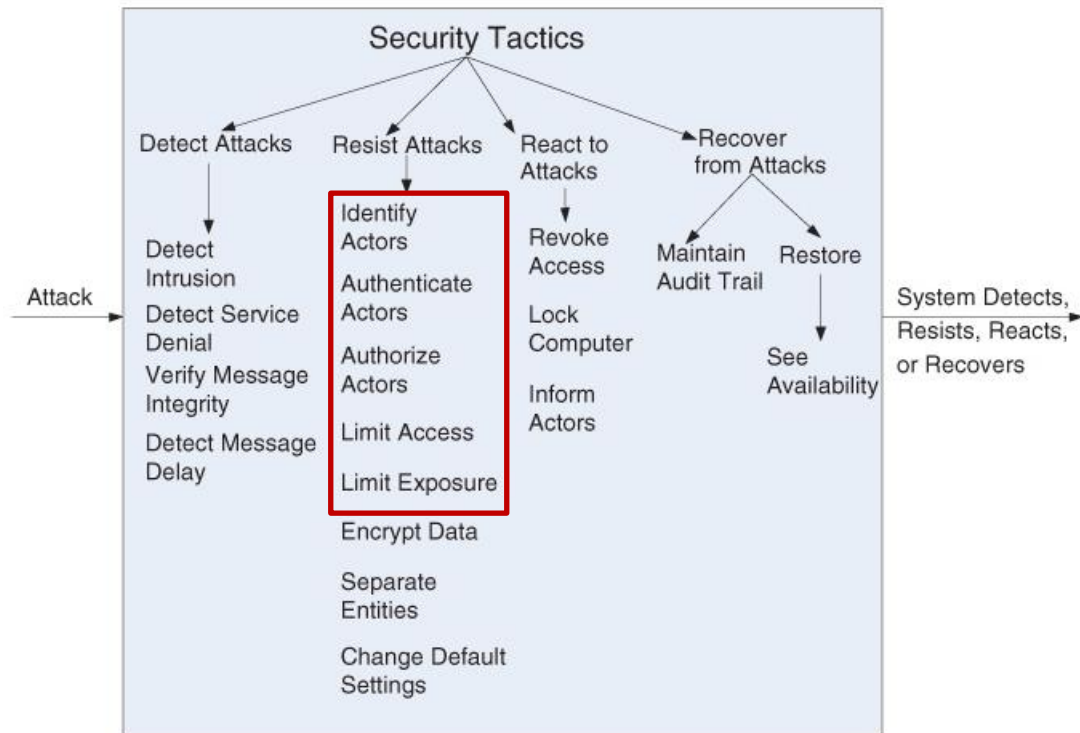


Figure 9.3. Security tactics

# ... Using Standard Tech

- Security is one of the places in which you *do not want to invent or code your own thing...*
  - As you *will* get it wrong!
    - (Even standard things like SSL etc., get it wrong...)
- Authentication and Authorization
  - We will look at OAuth 2.0
- Encryption
  - We will look at encryption, TLS, HTTPS
- Limit Access
  - We will look at key handling and *least privileged principle*

# Note: They are Disjoint

- You can
  - Encrypt data but allow access to everyone (no authentication)
  - Authorize only real users but not encrypt data
- Only together do we achieve some level of security...
- But... In practice
  - The OAuth protocol works excellent over insecure HTTP
    - Yeah, you send passwords on public network in clear text ☹
    - ... But from a learning perspective, it works
  - Secure transmission, HTTPS, is cumbersome...
    - Hard couplings and key management ...



# So in MSDO...

- We actually start in the “wrong end”
- *Authorization using OAuth 2.0 protocol first*
  - (or rather, an adaption of it...)
- *Encryption using TSL later*