

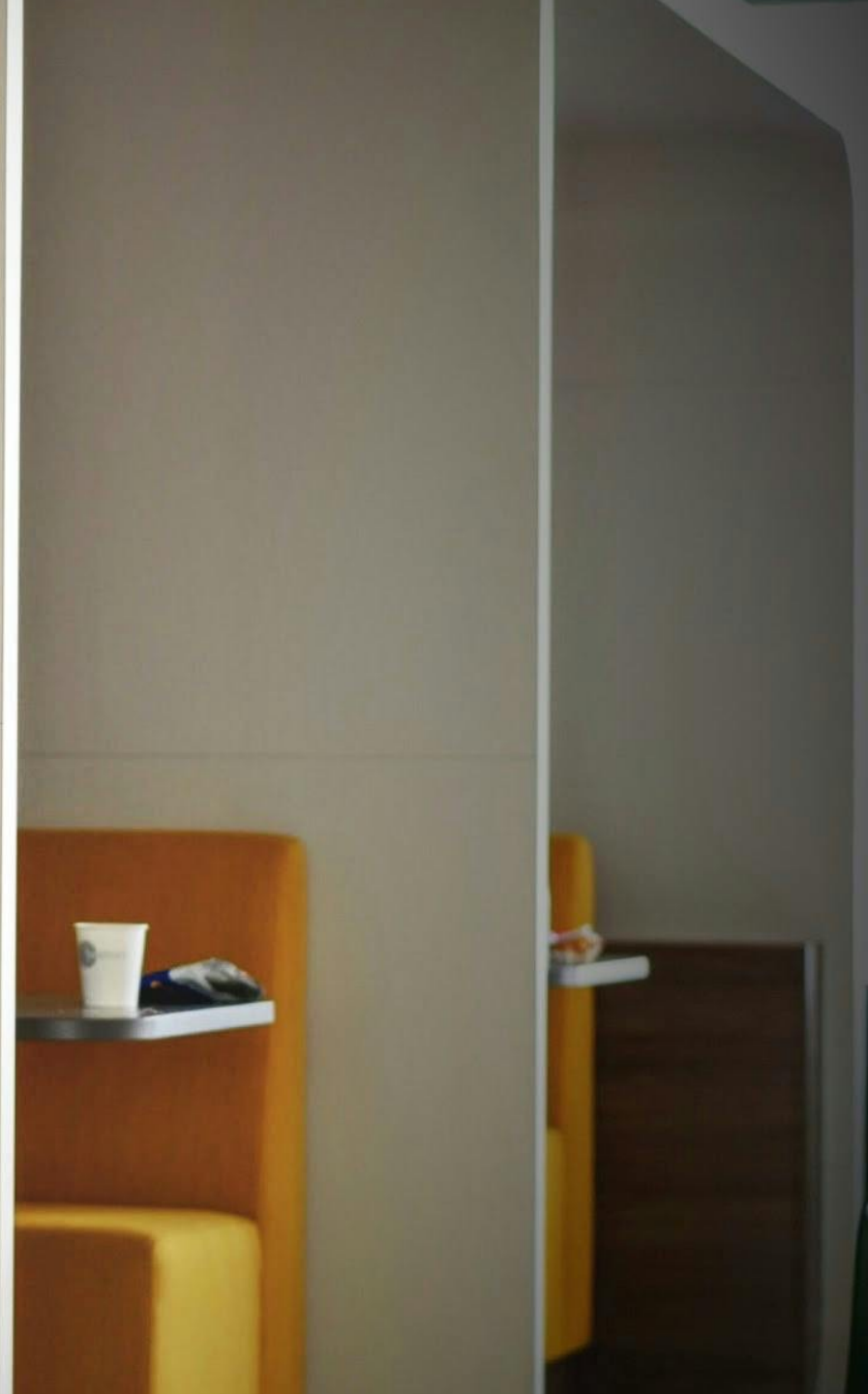


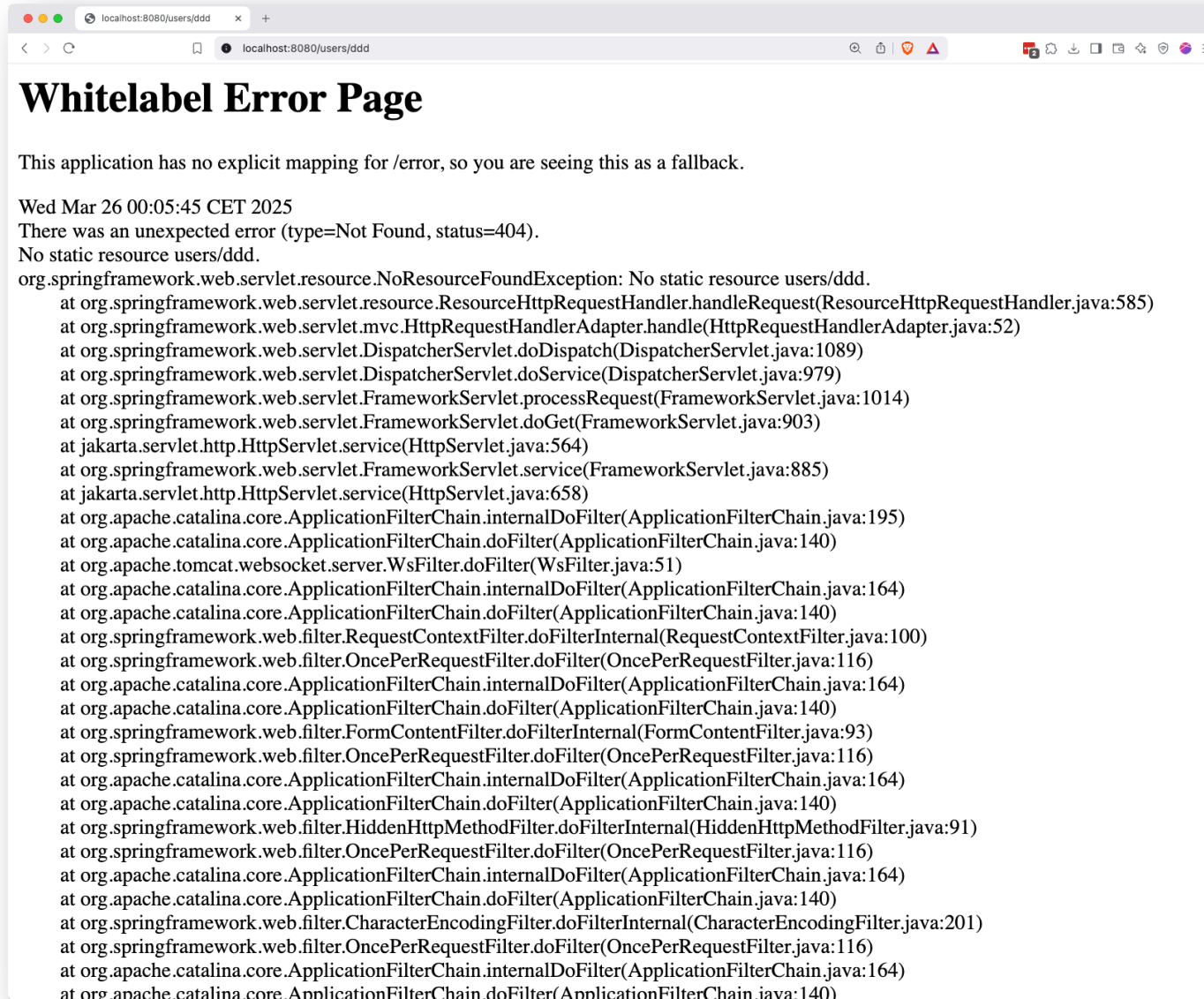
```
Code Editor
function render(reactElement, containerDOMElement) {
  // Your code here!
  // 1. create a DOM element
  const domElement = document.createElement(reactElement.type);

  // 2. update properties
  domElement.innerHTML = reactElement.children;
  for (const key in reactElement.props) {
    const value = reactElement.props[key];
    domElement.setAttribute(key, value);
  }

  // 3. put it in the container
  containerDOMElement.appendChild(domElement);
}

const reactElement = {
  type: 'a',
  props: {
    href: 'https://wikipedia.org/',
  },
  children: 'Read more on Wikipedia',
};
```



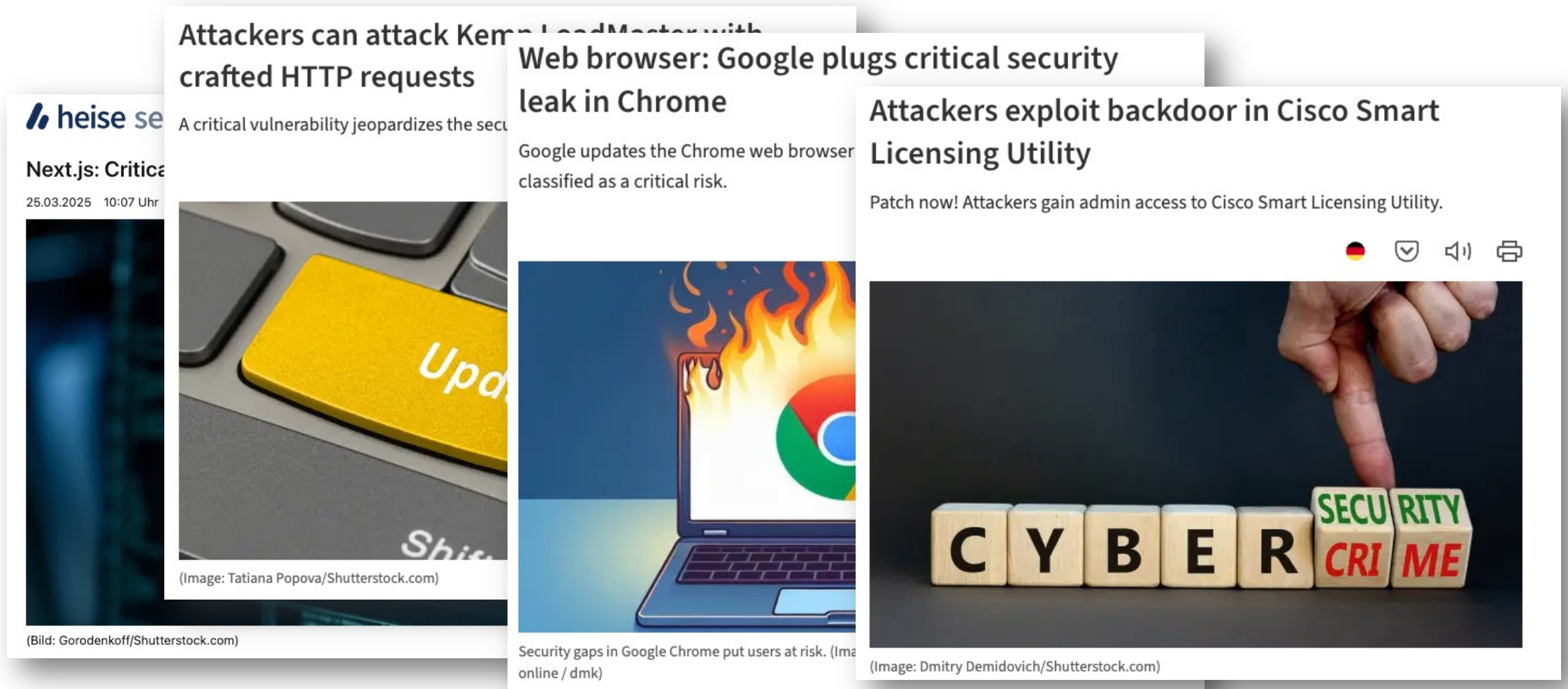


```
Whitelabel Error Page

This application has no explicit mapping for /error, so you are seeing this as a fallback.

Wed Mar 26 00:05:45 CET 2025
There was an unexpected error (type=Not Found, status=404).
No static resource users/ddd.
org.springframework.web.servlet.resource.NoResourceFoundException: No static resource users/ddd.
    at org.springframework.web.servlet.resource.ResourceHttpRequestHandler.handleRequest(ResourceHttpRequestHandler.java:585)
    at org.springframework.web.servlet.mvc.HttpRequestHandlerAdapter.handle(HttpRequestHandlerAdapter.java:52)
    at org.springframework.web.servlet.DispatcherServlet.doDispatch(DispatcherServlet.java:1089)
    at org.springframework.web.servlet.DispatcherServlet.doService(DispatcherServlet.java:979)
    at org.springframework.web.servlet.FrameworkServlet.processRequest(FrameworkServlet.java:1014)
    at org.springframework.web.servlet.FrameworkServlet.doGet(FrameworkServlet.java:903)
    at jakarta.servlet.http.HttpServlet.service(HttpServlet.java:564)
    at org.springframework.web.servlet.FrameworkServlet.service(FrameworkServlet.java:885)
    at jakarta.servlet.http.HttpServlet.service(HttpServlet.java:658)
    at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.java:195)
    at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:140)
    at org.apache.tomcat.websocket.server.WsFilter.doFilter(WsFilter.java:51)
    at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.java:164)
    at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:140)
    at org.springframework.web.filter.RequestContextFilter.doFilterInternal(RequestContextFilter.java:100)
    at org.springframework.web.filter.OncePerRequestFilter.doFilter(OncePerRequestFilter.java:116)
    at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.java:164)
    at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:140)
    at org.springframework.web.filter.FormContentFilter.doFilterInternal(FormContentFilter.java:93)
    at org.springframework.web.filter.OncePerRequestFilter.doFilter(OncePerRequestFilter.java:116)
    at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.java:164)
    at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:140)
    at org.springframework.web.filter.HiddenHttpMethodFilter.doFilterInternal(HiddenHttpMethodFilter.java:91)
    at org.springframework.web.filter.OncePerRequestFilter.doFilter(OncePerRequestFilter.java:116)
    at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.java:164)
    at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:140)
    at org.springframework.web.filter.CharacterEncodingFilter.doFilterInternal(CharacterEncodingFilter.java:201)
    at org.springframework.web.filter.OncePerRequestFilter.doFilter(OncePerRequestFilter.java:116)
    at org.apache.catalina.core.ApplicationFilterChain.internalDoFilter(ApplicationFilterChain.java:164)
    at org.apache.catalina.core.ApplicationFilterChain.doFilter(ApplicationFilterChain.java:140)
```

Cyberattack news everyday



Source: heise.de

Hoai Viet Nguyen

Severe (small) vulnerability affecting millions of living entities



Source: Star Wars: Episode IV A New Hope

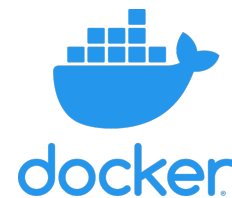
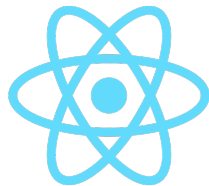
Hoai Viet Nguyen

CEX: Secure Coding with DevSecOps-Tools in Gitlab

Technology
Arts Sciences
TH Köln

Reasons for vulnerabilities

- Mistakes happen during the development process
- Time pressure
- Lack of know-how and awareness
- Complexity



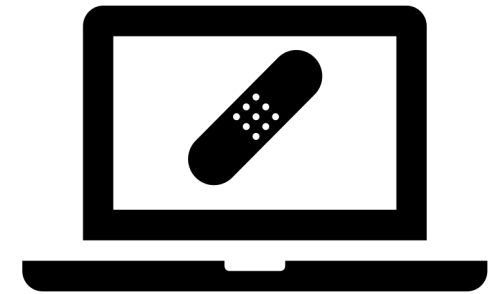
Test, test, test to find bugs

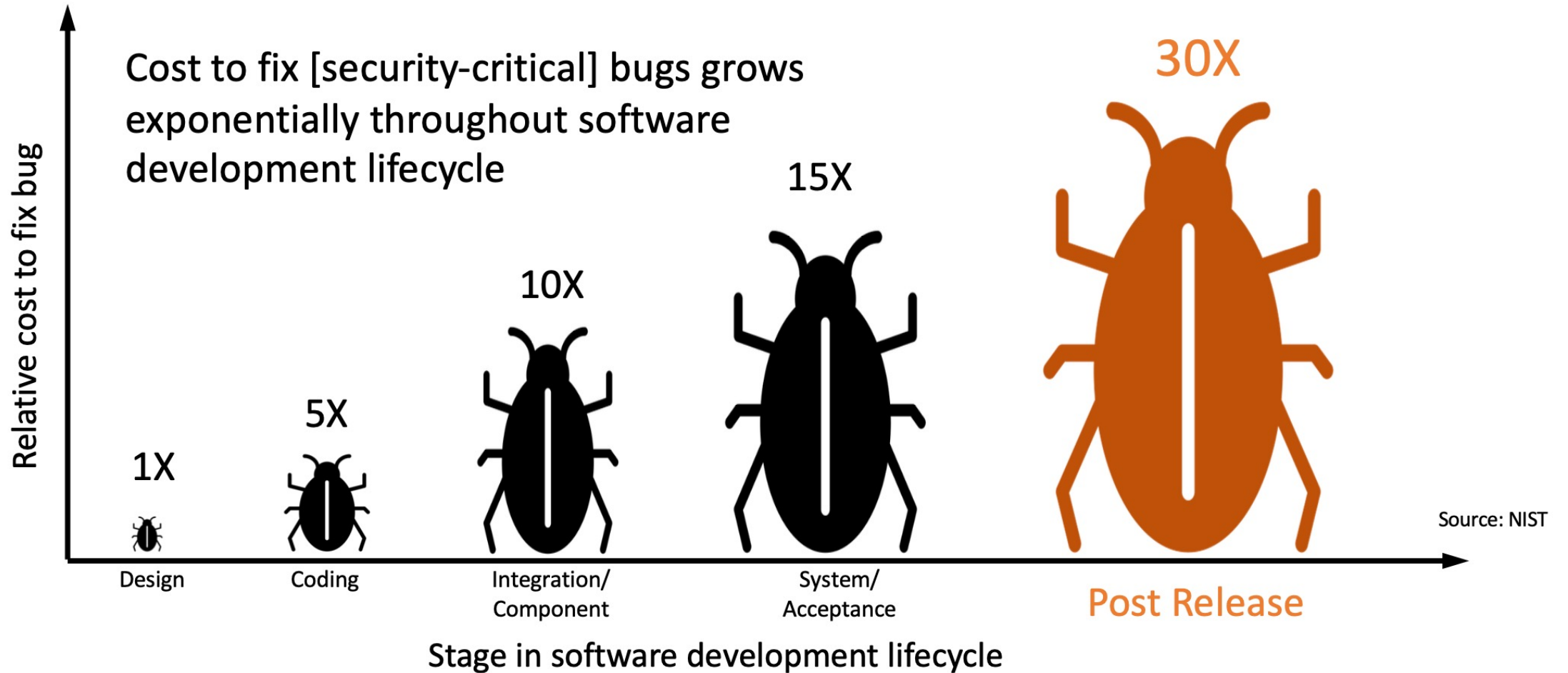
- Unit test
- Integration test
- Acceptance test
- Load test
- ...
- Penetration test



Penetration testing challenges

- **Time limitation:** only 2 weeks for testing, but attackers have infinite amount of time
- **Fighting the symptoms instead of addressing the root cause**
- **High costs for fixing of vulnerabilities at the end of SDLC**

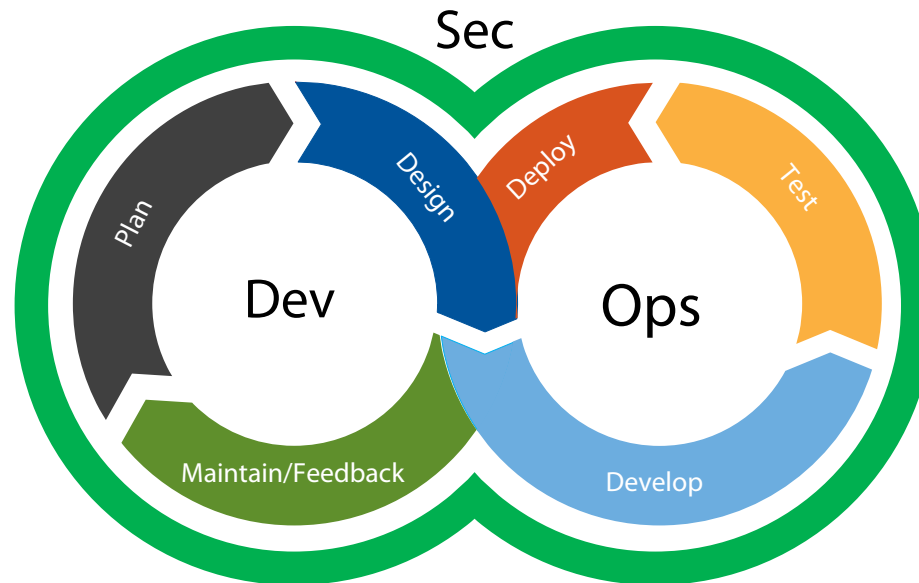




Source: J. Davidson: DevSecOps: Delivering Reliable and Secure Software Systems via Automated Bug Finding and Hardening, Keynot, IEEE SecDEV 2022

DevSecOps

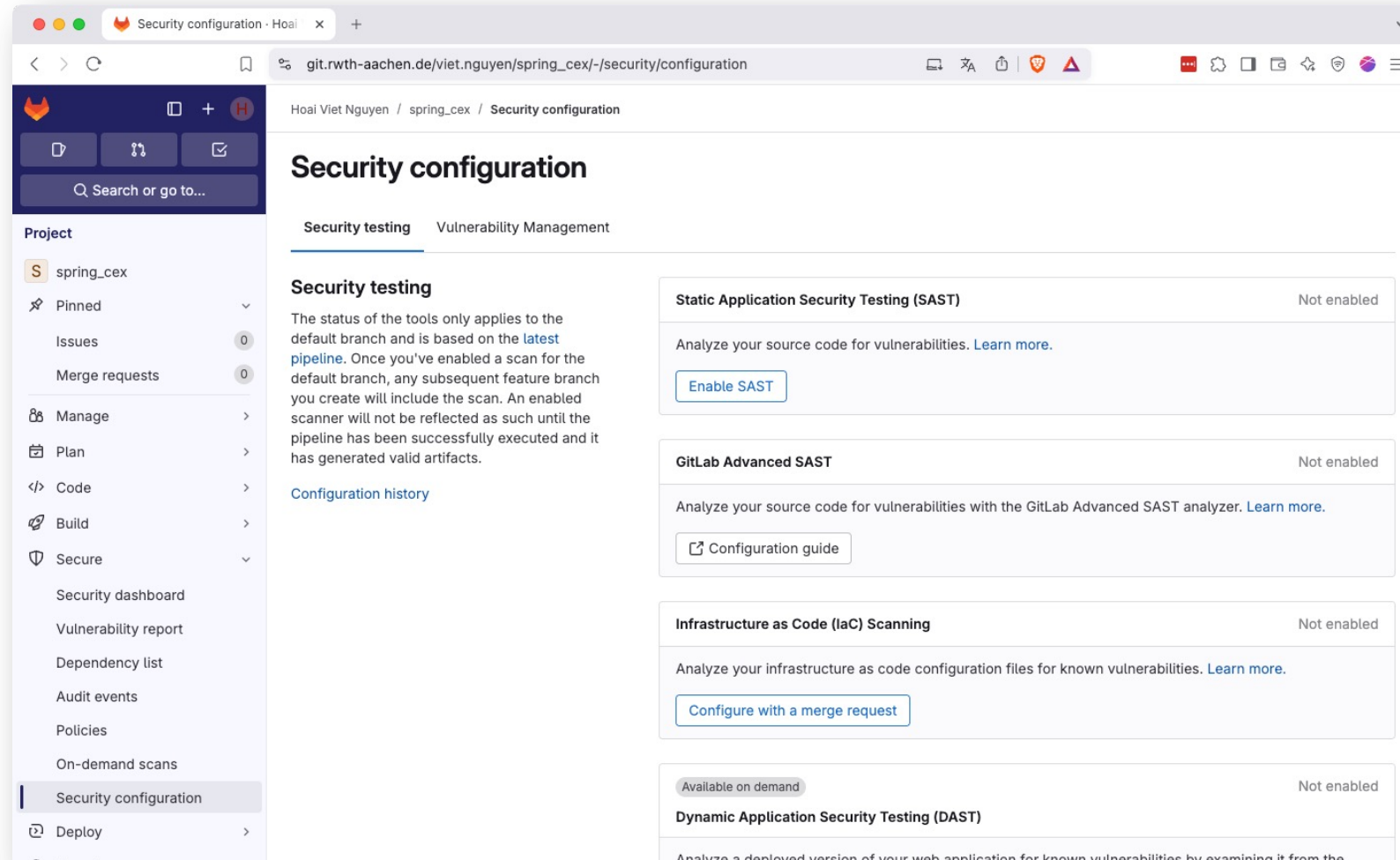
- Combining development (Dev), security (Sec) and IT operations (Ops)
- Sharing knowledge through teamwork
- Using security tools in CI/CD pipeline



Secure Coding Tools for DevSecOps

- **Dynamic Application Security Testing (DAST)**
- **Static Application Security Testing (SAST)**
- **Software Composition Analysis (SCA)**
- **Container Scanning**
- **Fuzzing**
- **...**

Security testing in Gitlab Enterprise Edition



Research questions

- What security tools for secure coding/DevSecOps exist in general?
- What security tools are available in GitLab to support developers in implementing and deploying secure software?
- How can these tools be integrated into a CI/CD pipeline?
- To what extent do these tools help developers detect and fix vulnerabilities?

Thanks for listening



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