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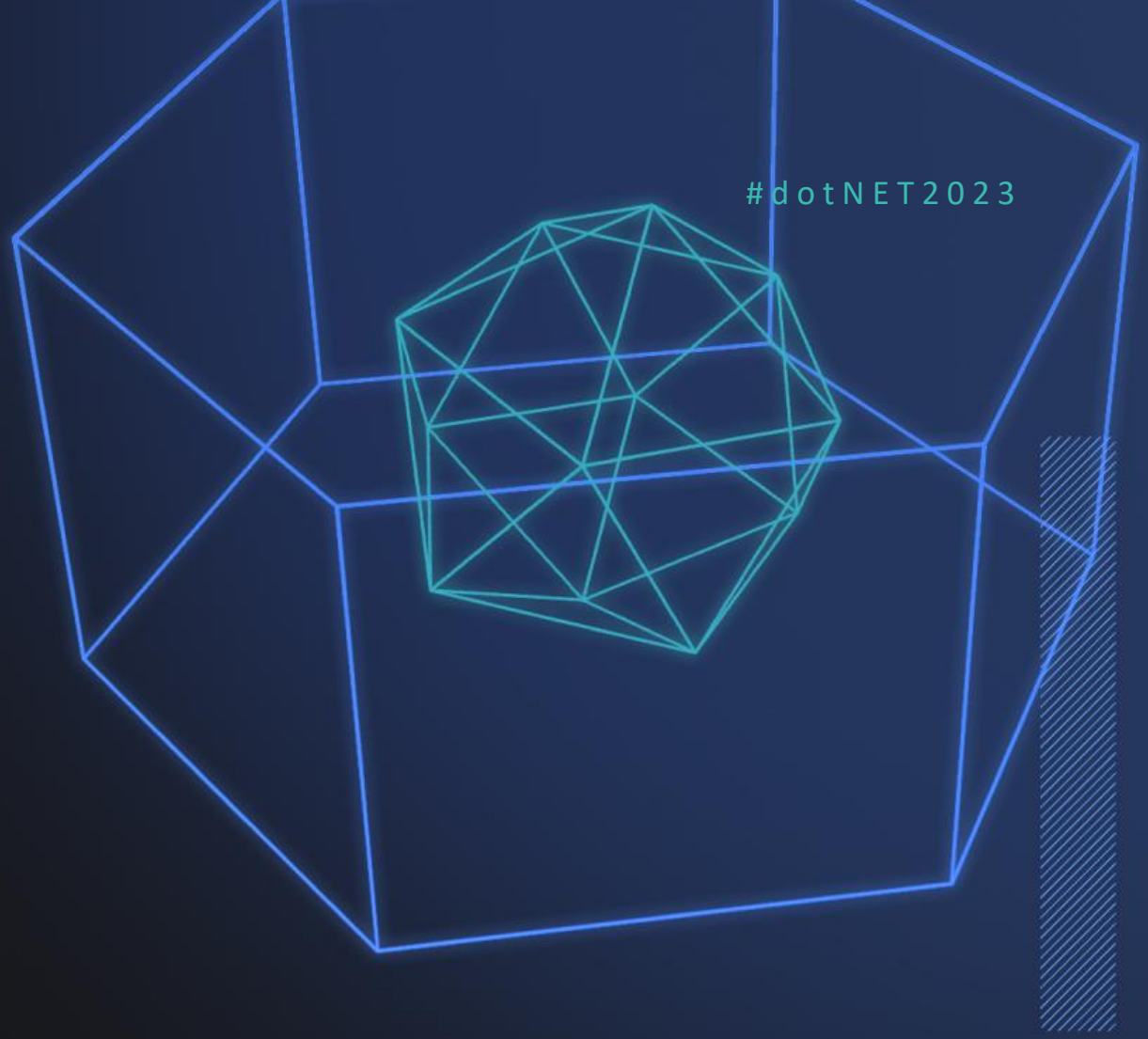

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Desarrollo Seguro para Muggles

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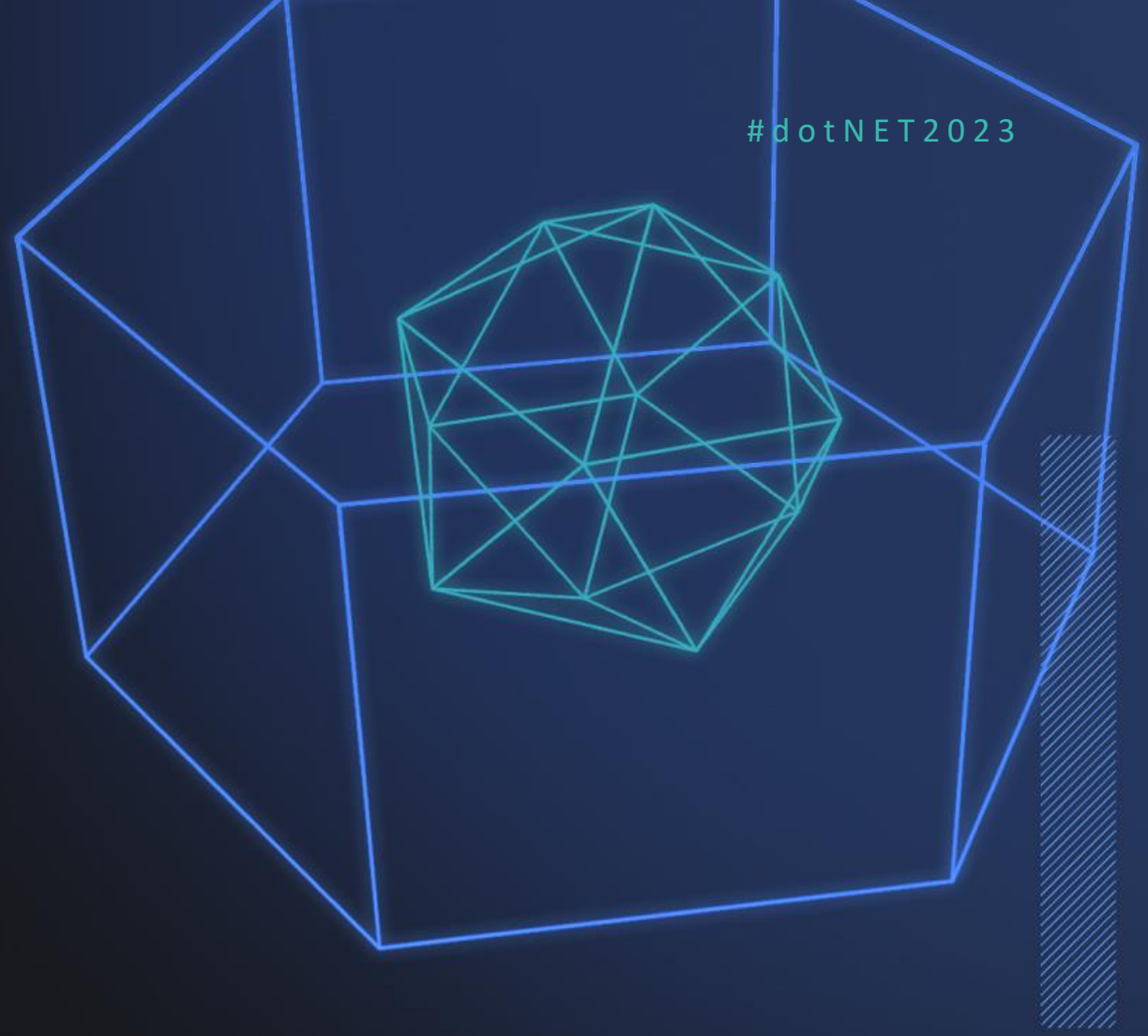
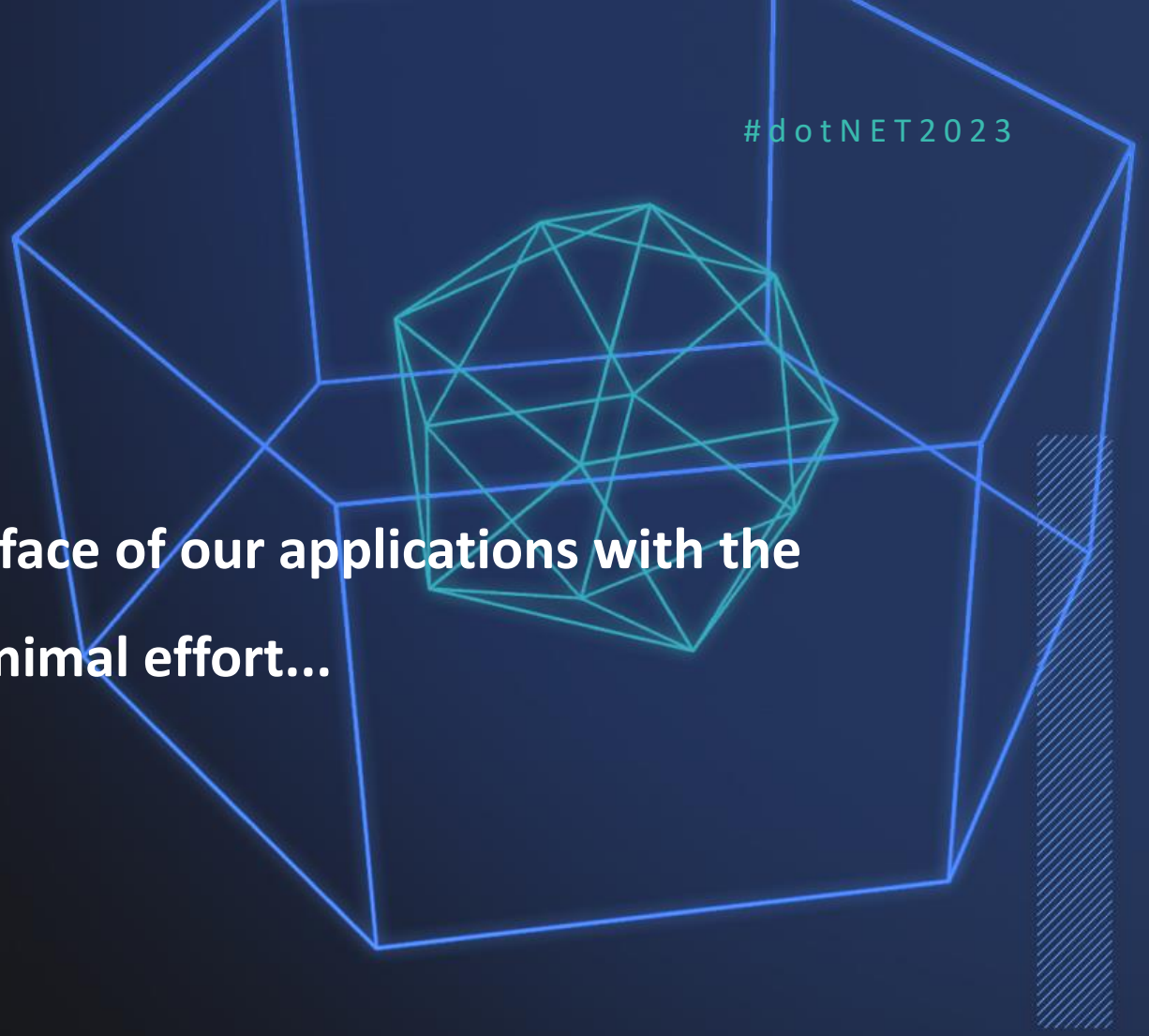


Agenda

- The State of Security Today
- Most common security errors
- Tips & Tooling



Our main objective

Reducing significantly the attack surface of our applications with the right mindset, tips, tooling and a minimal effort...

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The State of Security Today

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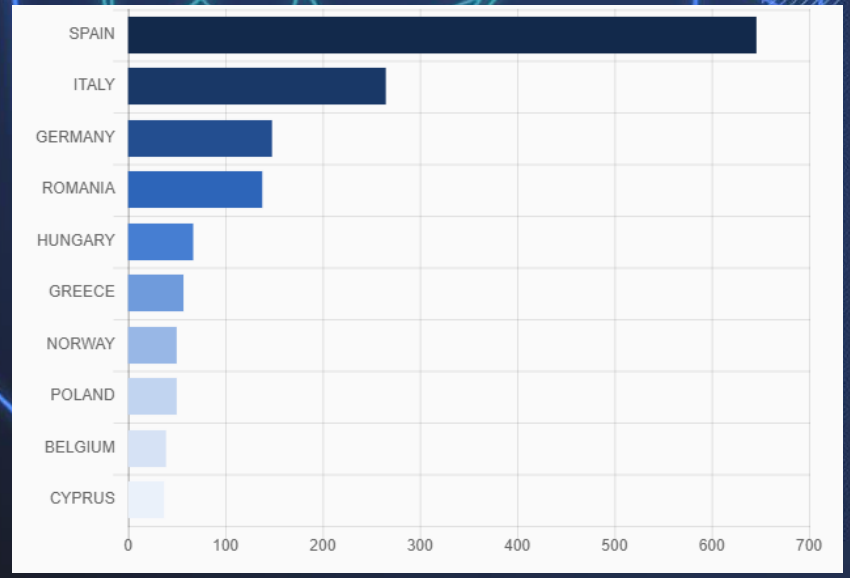
The State of Security

- Security numbers
  - **91.8%** orgs **compromised**
  - **85%** of applications with security issues
  - A 1:100 relation for security team vs developers
  - Allocate **11.9%** **of IT budget to security**
- Impact
  - Ransomware attacks **cost $750,000** average
  - GDPR fines issued in Spain are almost €15 M (€59 M acc.)
  - 15.128 complaints in 2022 and raising (AEPD)

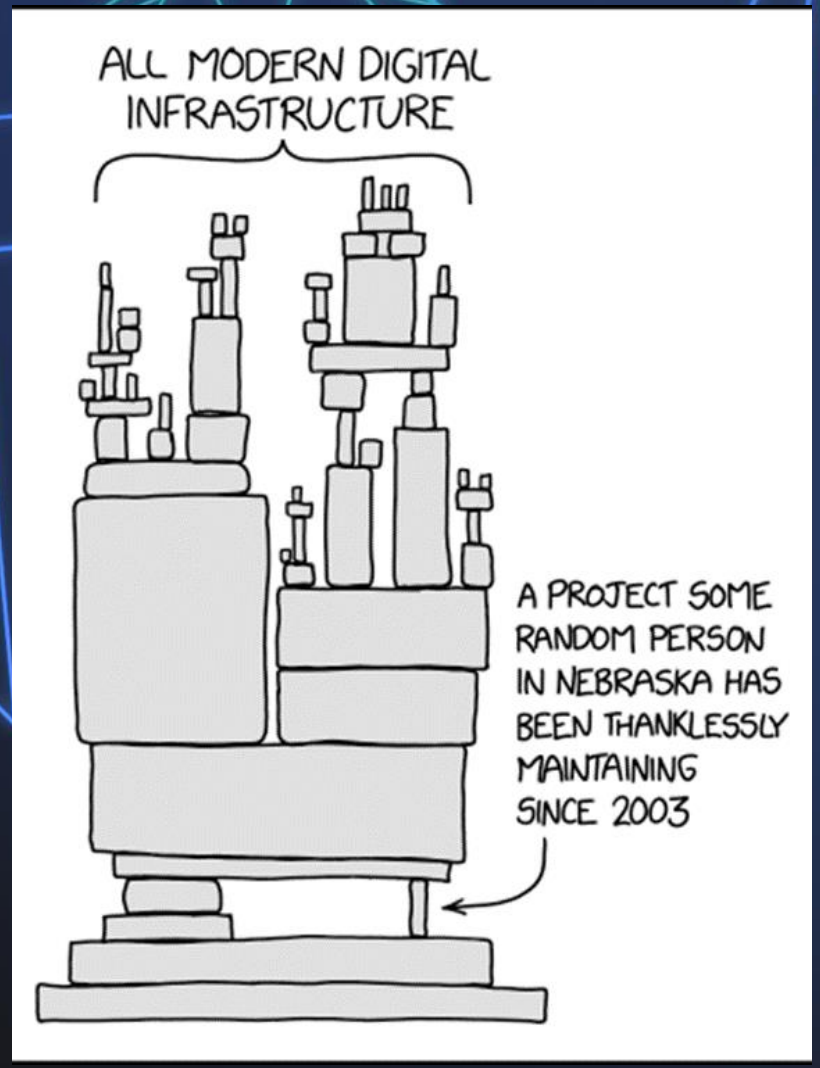


Sources: CyberEdge Group (CDR Report), Sophos State of Ransomware Report, Hiscox Report, enforcementtracker.com, GitHub, Verizon

The State of Security Today

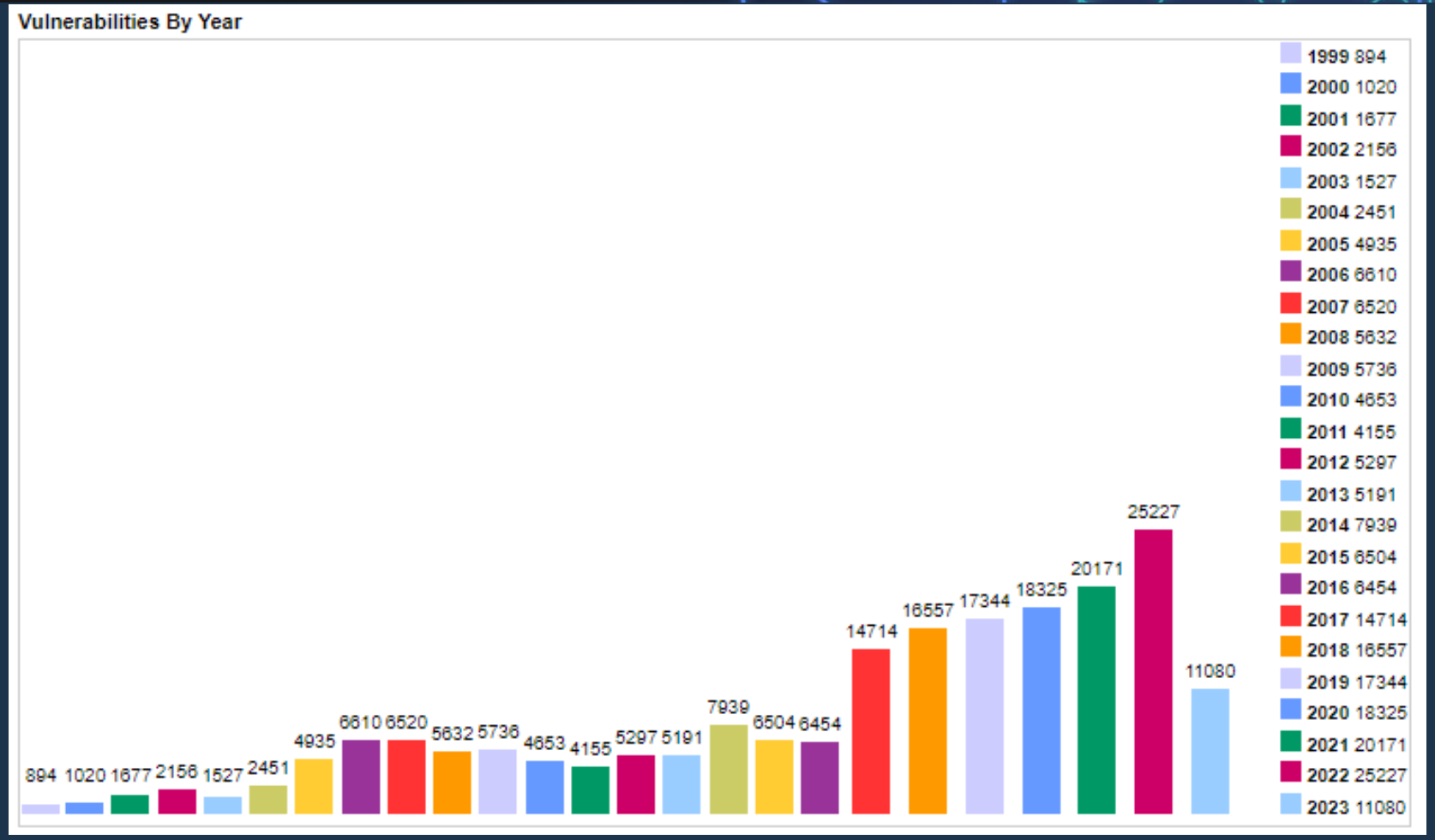
"The internet Relies on People Working for Free…"

- cURL
  - 1 main developer
- OpenSSL
  - Heartbleed vulnerability
- Log4j
  - Log4Shell vulnerability
- faker.js, colors.js, core.js, left-pad



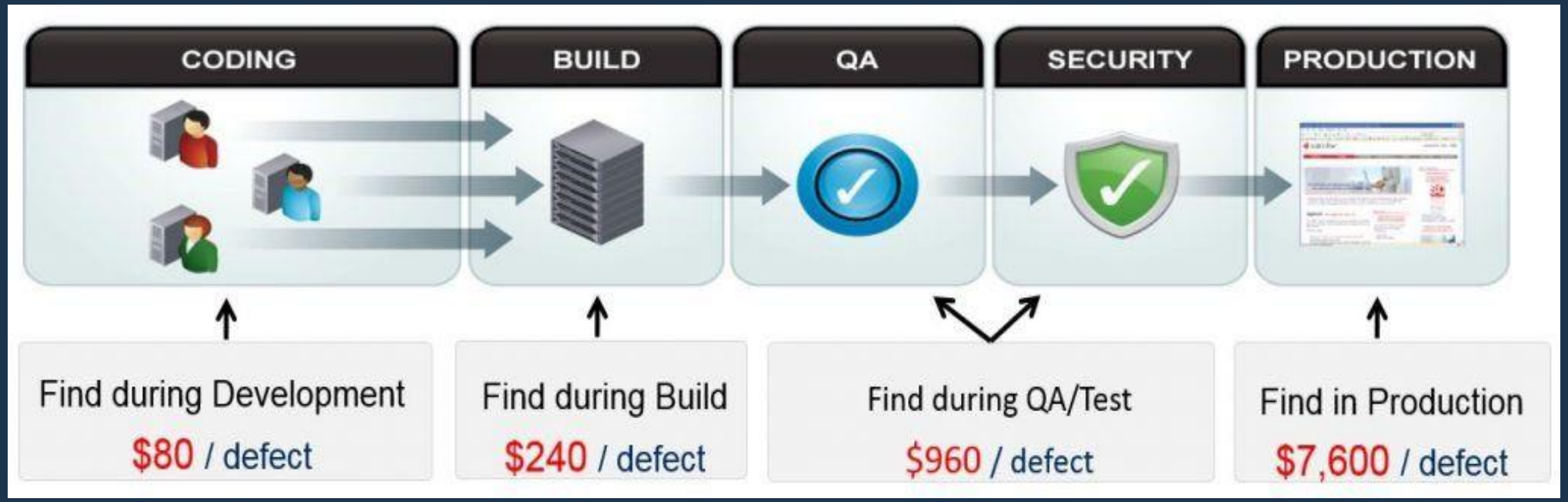
Source: **https://xkcd.com/2347/**

More lines of code -> More potential vulns.



Sources: cvedetails.com (as of day 19/06/2023)

Everyone wants to shift left security…



Source: IBM (2010)

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Common Errors

Common Errors

Broken Access Control – Top 1

- Sequential Ids (enumeration-based attacks)
- Access to other roles, users... (guards / authorization / inverse proxy)
- Frontend vs Backend validation (Authentication / Authorization)

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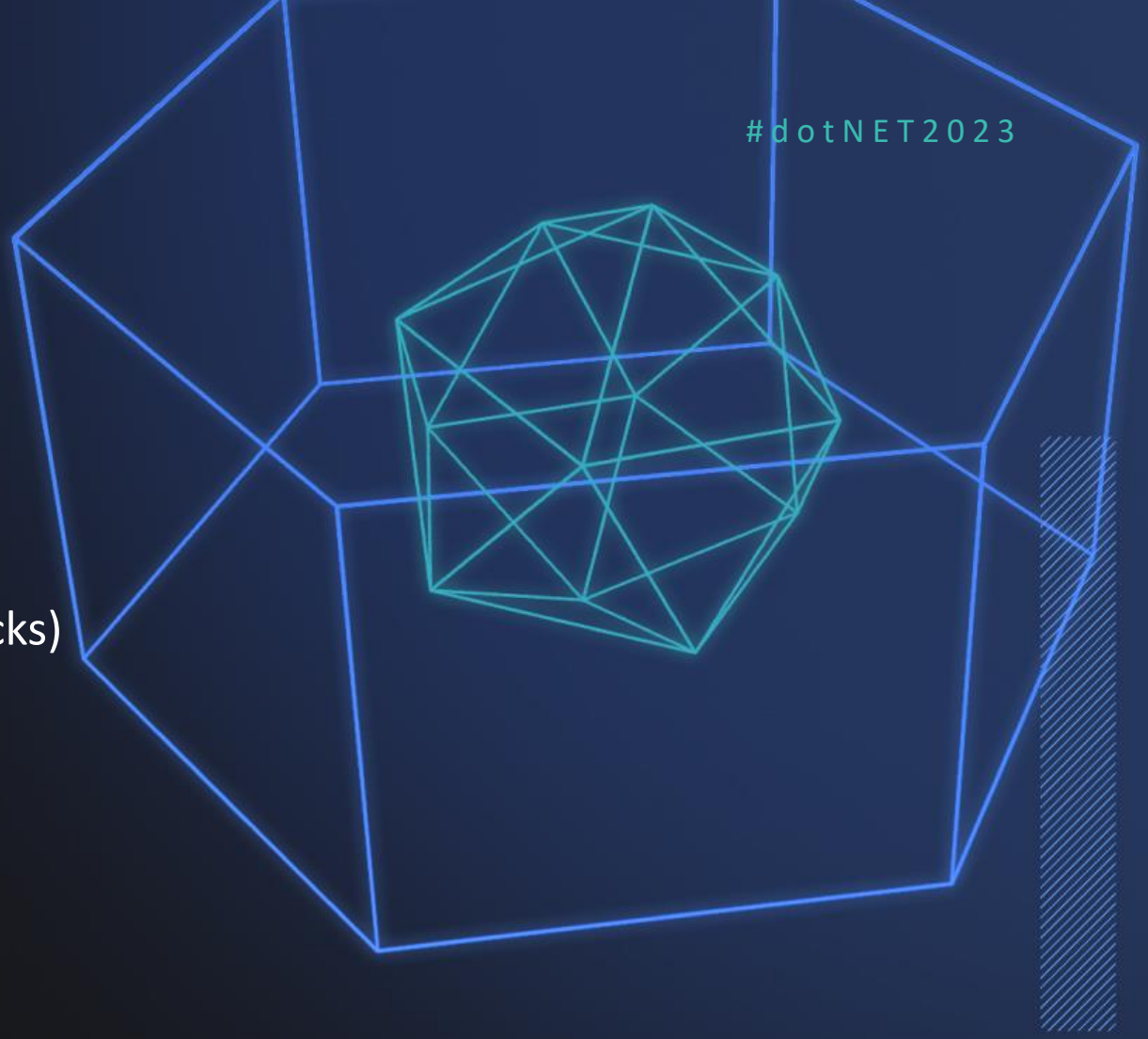
Demo time!

Common Errors

HTTP Headers: CSP, CORS, HSTS

- Frame ancestors (anti-clickjacking, phishing attacks)
- CORS, making sure we respond to legit origins
- HSTS, ensuring connections through HTTPS
- Only loading what we need...
  - Loading libraries (XSS + External vuln. library)
- Transition to CSP: CSP Report Only



MDN web docs

moz://a

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Demo time!

Common Errors

CSRF, SSRF, Injections...

- Always validate user input (both in frontend and backend)
- Perform sanitization
- Parse everything
- Take care with regex...
- Use your framework's support for these kind of security threats

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Demo time!

Common Errors

Cookies

- SameSite, Strict or Lax?
- Secure?
- HTTPOnly?
- **Do NOT allow to manage cookies via JavaScript**

URL http://www.dotnetconfspain.com	Same *Site*	Same *Origin*
http://www.dotnetconfspain.com:80	☑	☑
http://dotnetconfspain.com	☑	✗
http://dotnetconfspain.com:8080	☑	✗
http://plain.dotnetconfspain.com	☑	✗
https://www.dotnetconfspain.com	✗	✗
http://www.dotnetconfspain.es	✗	✗

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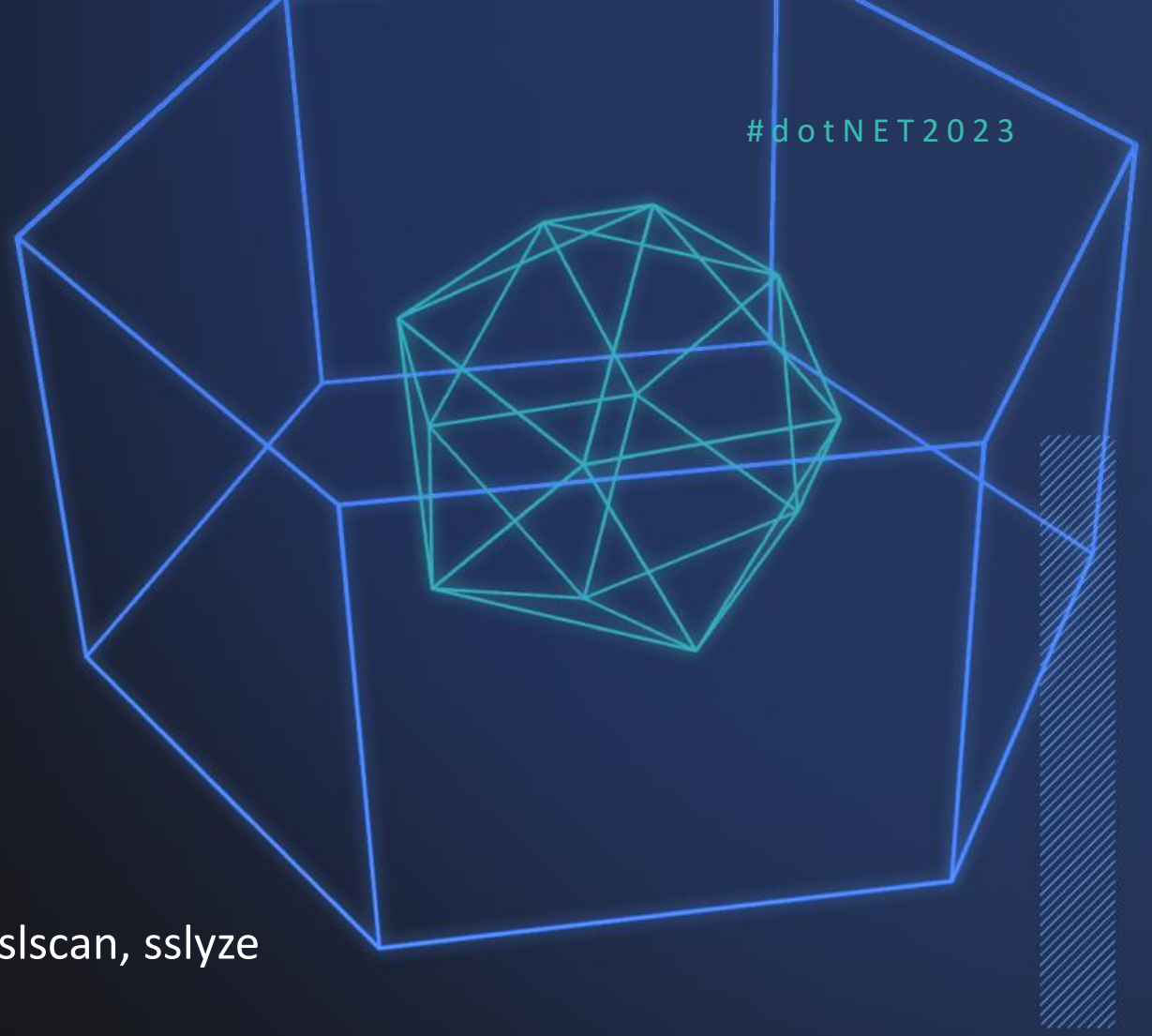
Demo time!



Common Errors

Cryptography bad practices…

- **Do NOT use custom cryptography solutions…**
- Breaking weak keys in seconds… (Video)
- Key strength (How?)
- Salts + pepper
- Verify the certificate chain: SSL Labs, testssl.sh, sslscan, sslyze

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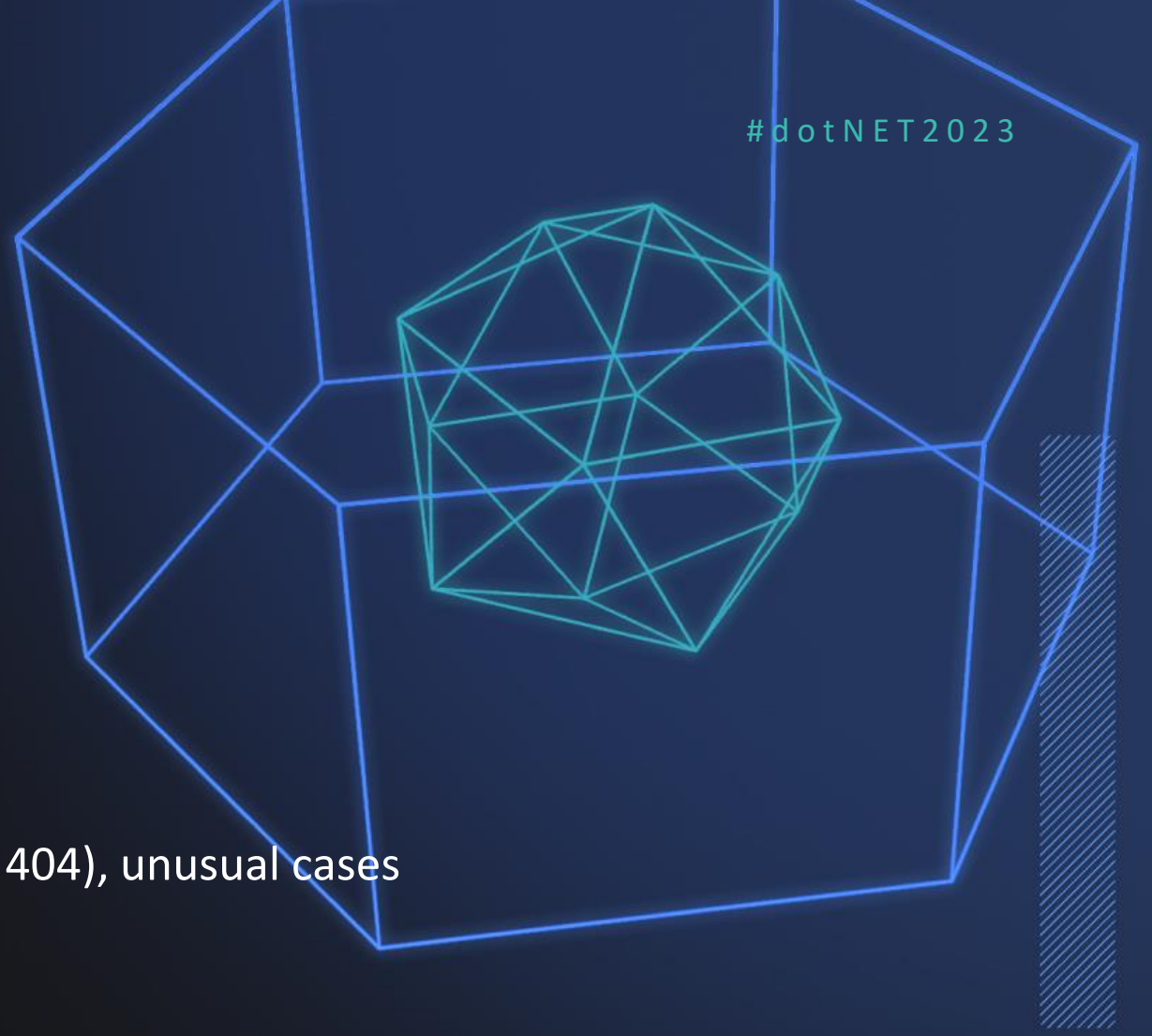
Demo time!



Common Errors

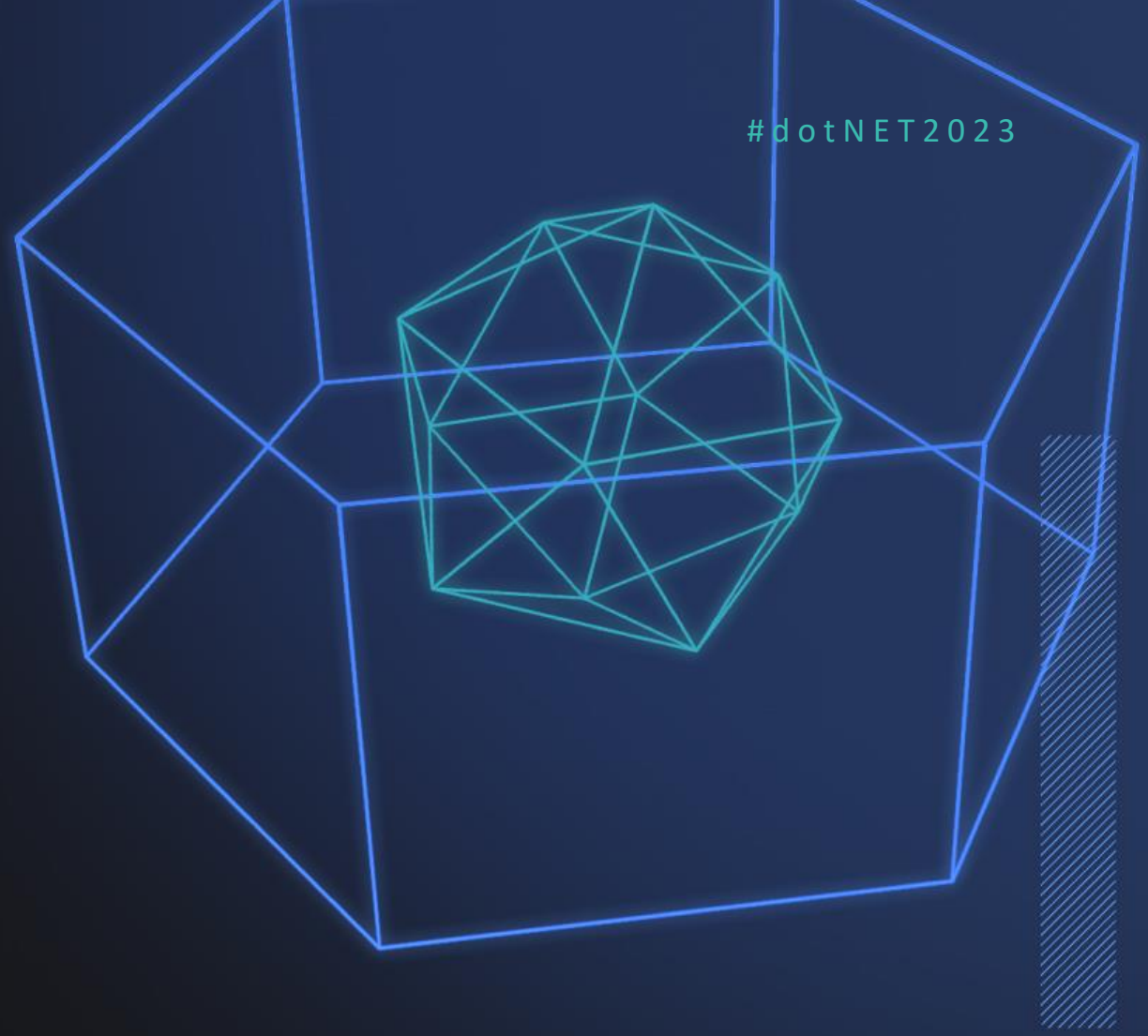
Insecure configurations

- Only expose publicly the minimum needed
- Read through documentation with detail
- Know your infrastructure
- Monitor, get insights and alerts (errors 401, 500, 404), unusual cases

Common Errors

Outdated components

- Keep your dependencies updated!
- Audit the dependencies & keep track of them
- Are your dependencies actively maintained?
- Do they respond to security issues?
- Supply chain security



Vulnerabilities report!

- npm audit

```
36 vulnerabilities (2 low, 11 moderate, 20 high, 3 critical)

To address issues that do not require attention, run:
  npm audit fix

To address all issues (including breaking changes), run:
  npm audit fix --force
```

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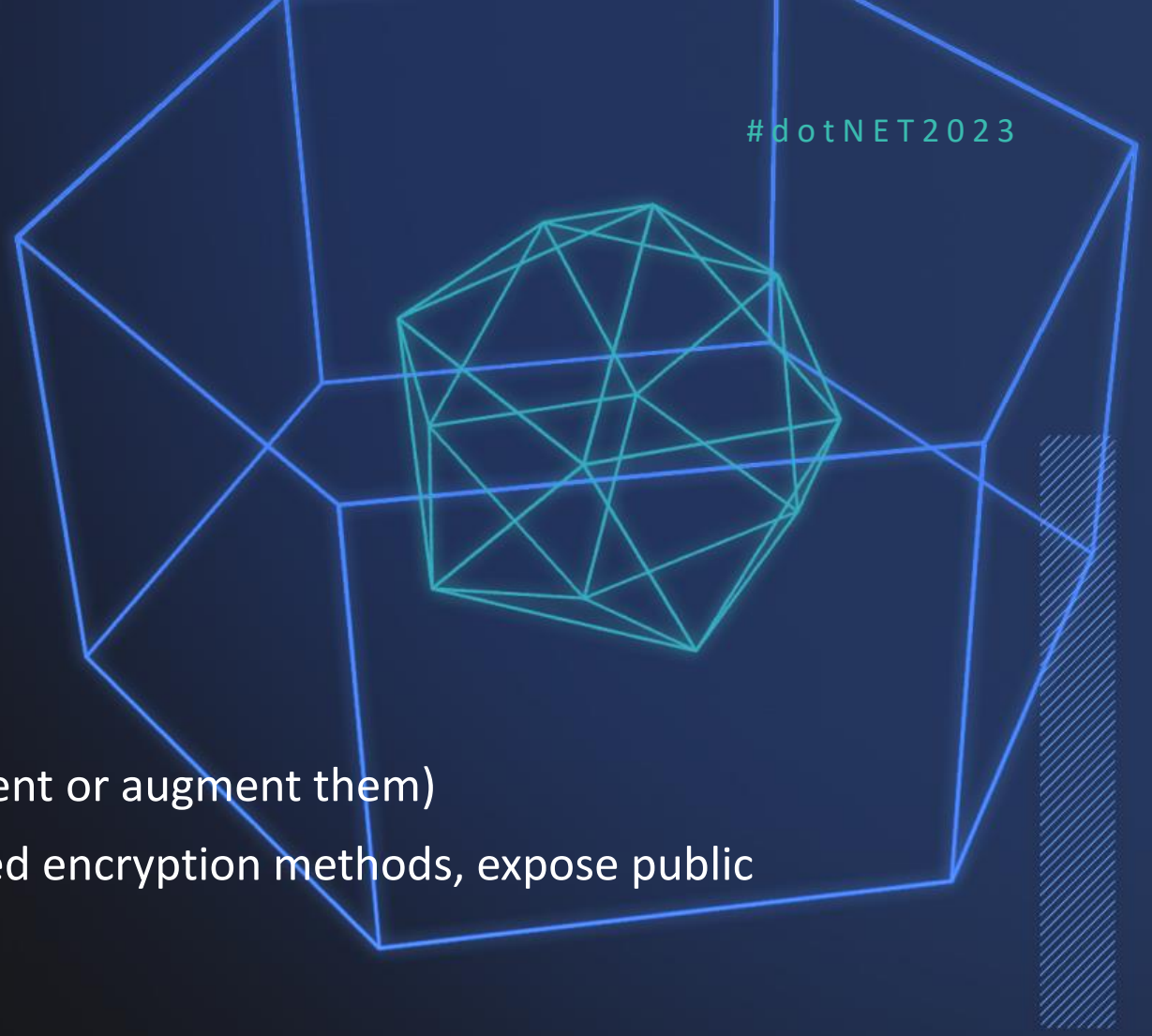
Vulnerabilities report!

- NuGet

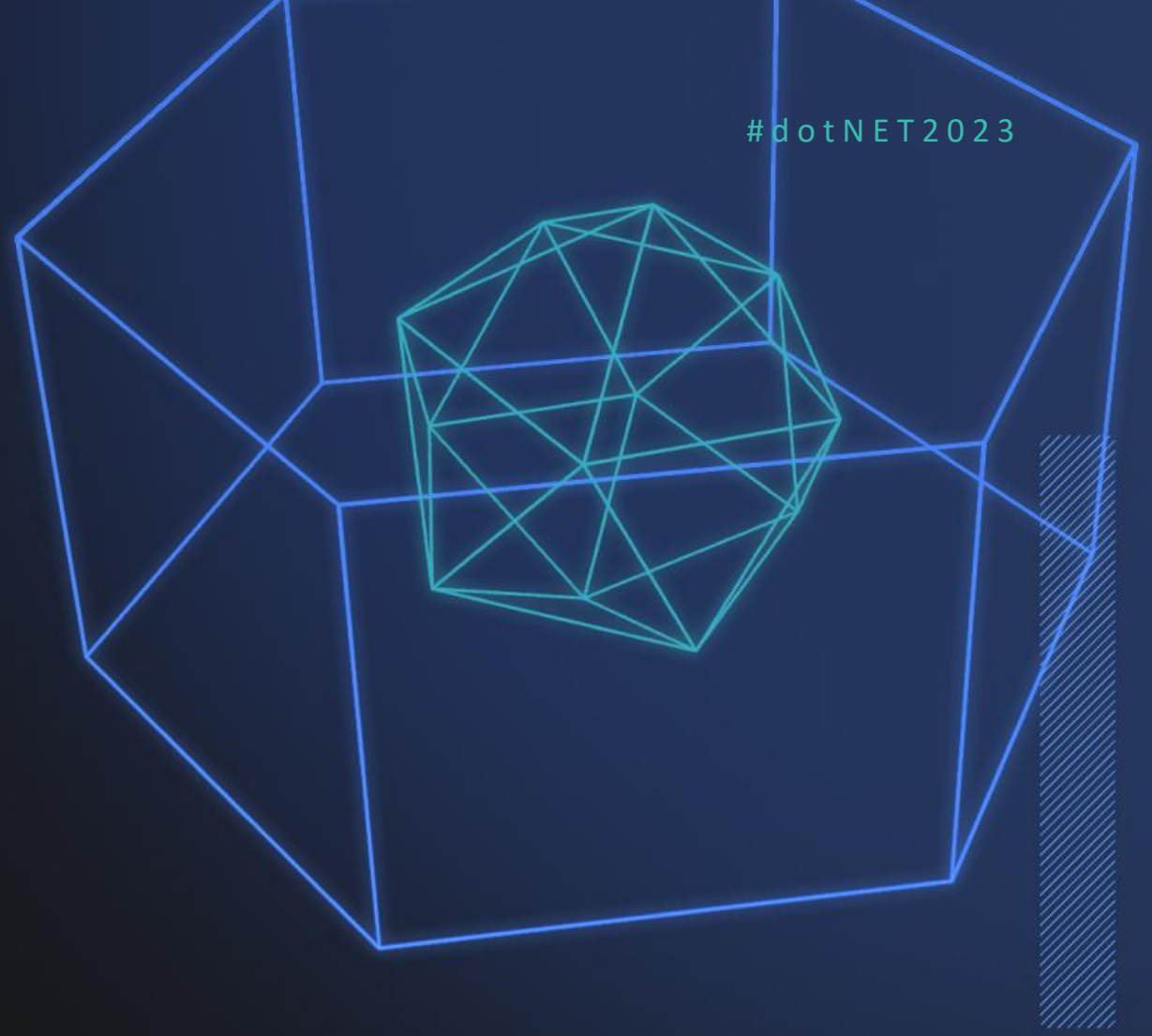
```
> dotnet list package --vulnerable --include-transitive

The following sources were used:
   https://api.nuget.org/v3/index.json

Project `                  .Host` has the following vulnerable packages
   [net6.0]:
   Top-level Package              Requested   Resolved   Severity   Advisory URL
   > Apache.Avro                  1.10.2      1.10.2     High       https://github.com/advisories/GHSA-868x-rg4c-cjqg
   > Auth0.AuthenticationApi      6.5.3       6.5.3      High       https://github.com/advisories/GHSA-c9cg-q8r2-xvjq
   > Azure.Storage.Blobs          12.9.1      12.9.1     Moderate   https://github.com/advisories/GHSA-64x4-9hc6-r2h6
   > Azure.Storage.Queues         12.9.0      12.9.0     Moderate   https://github.com/advisories/GHSA-64x4-9hc6-r2h6

   Transitive Package                                   Resolved   Severity   Advisory URL

   > Microsoft.AspNetCore.Authentication.JwtBearer      3.1.2      Moderate   https://github.com/advisories/GHSA-q7cg-43mg-qp69
   > NuGet.Common                                       6.3.1      High       https://github.com/advisories/GHSA-6qmf-mmc7-6c2p
   > NuGet.Protocol                                     6.3.1      High       https://github.com/advisories/GHSA-6qmf-mmc7-6c2p
   > System.Security.Cryptography.Pkcs                  6.0.1      High       https://github.com/advisories/GHSA-555c-2p6r-68mm
   > System.Text.RegularExpressions                     4.3.0      High       https://github.com/advisories/GHSA-cmhx-cq75-c4mj
```



Common Errors

Authentication

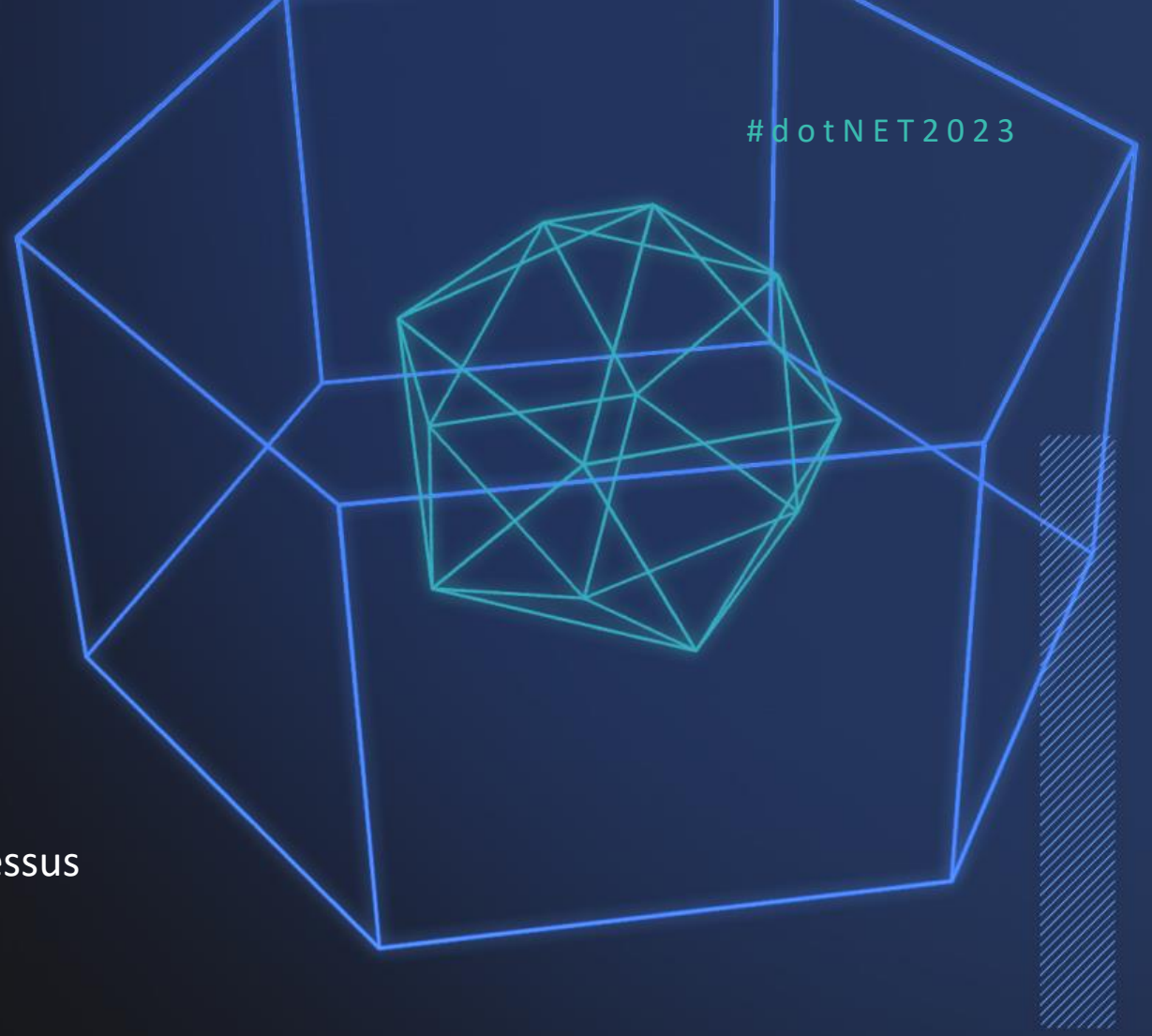
- Minimum privilege principle
- Short-lived tokens
- Follow standards as they are (do not try to reinvent or augment them)
- Always validate signatures, use the recommended encryption methods, expose public keys



Some tips

Let's start shifting left with some tips

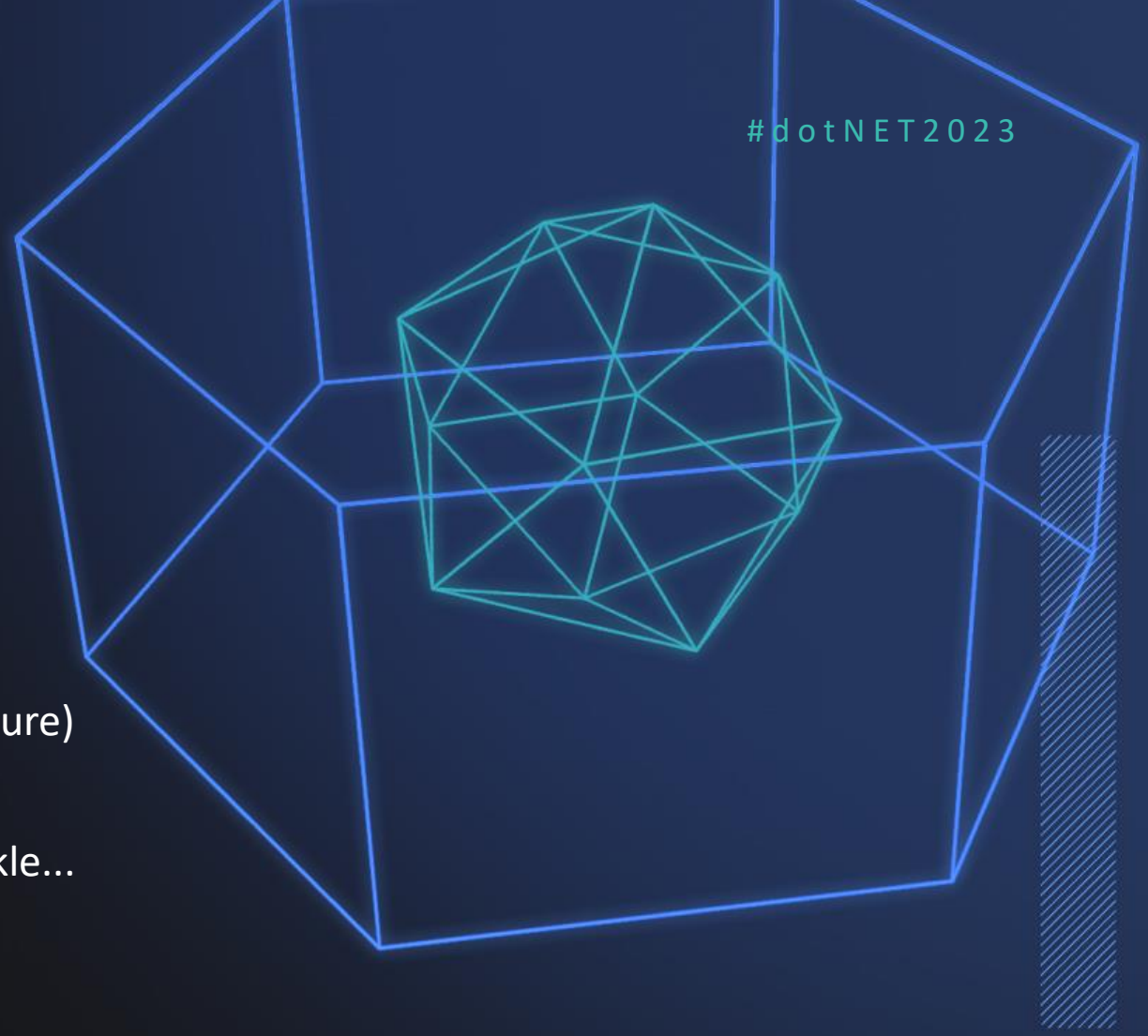
- Minimum privilege principle
- Understand/Evaluate your attack surface
  - Threat modelling can help
- Test for all cases (authentication/authorization)
- Do NOT assume anything
  - Defense in depth
- Review all secondary applications, third party code and libraries
- Protect resources, variables and secrets
- Do NOT issue commands directly to the operating system



Tooling

Static Analysis vs Dynamic analysis

- Static Analysis:
  - Sonar, Snyk, Trivy (OSS)
- Dynamic Analysis:
  - Burp Suite, OWASP ZAP, OpenVAS, Acunetix, Nessus



Tooling

IaC, Containers, Git, Secrets…

- IaC:
  - tfsec, terrascan, checkov, template-analyzer (Azure)
- Containers:
  - Trivy, Snyk Container, Docker Scout, grype, Dockle...
- Git:
  - TruffleHog, gitleaks, stacs (YARA), GHAS...
- Secrets Management:
  - Cloud native solutions, HashiCorp Vault, Blackbox.

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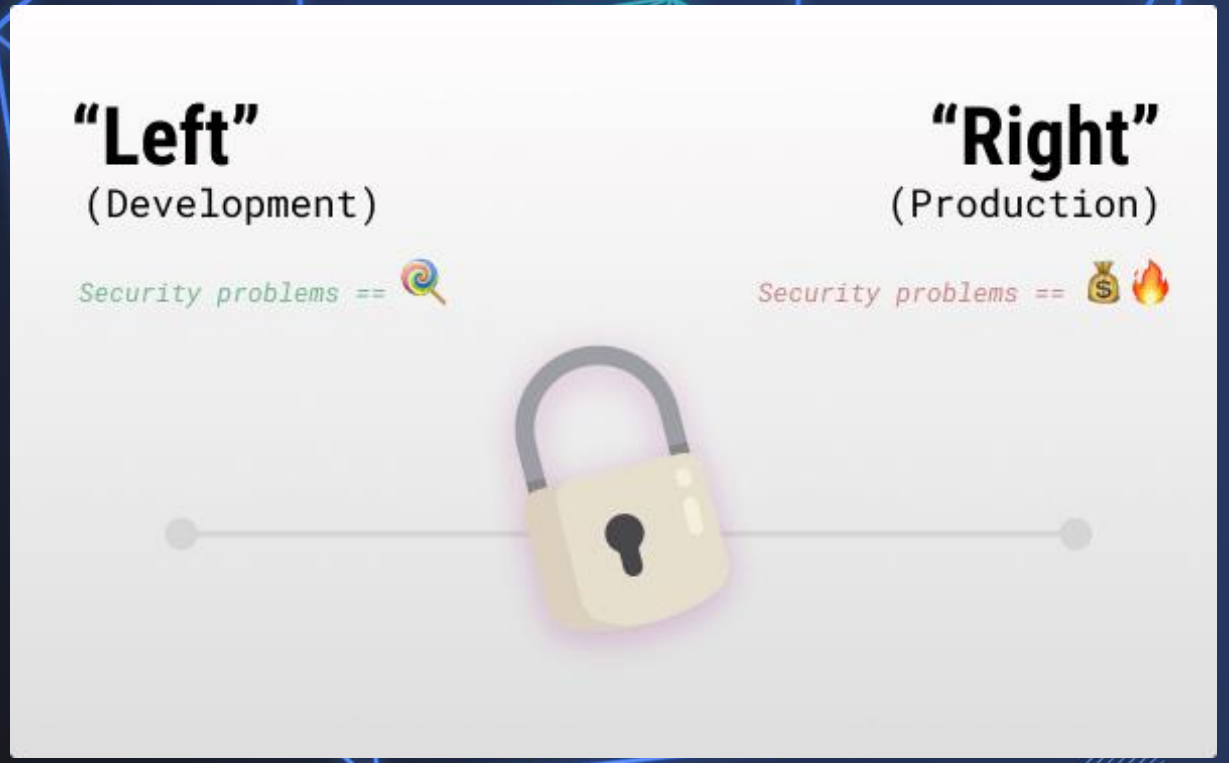
Demo time!

Conclusions...

- Current security “performance”
- Most common security problems
- Tips & tools to protect ourselves



Note

- There is no “silver bullet” against attacks
- “Shifting Security Left” is a mindset, not a tool

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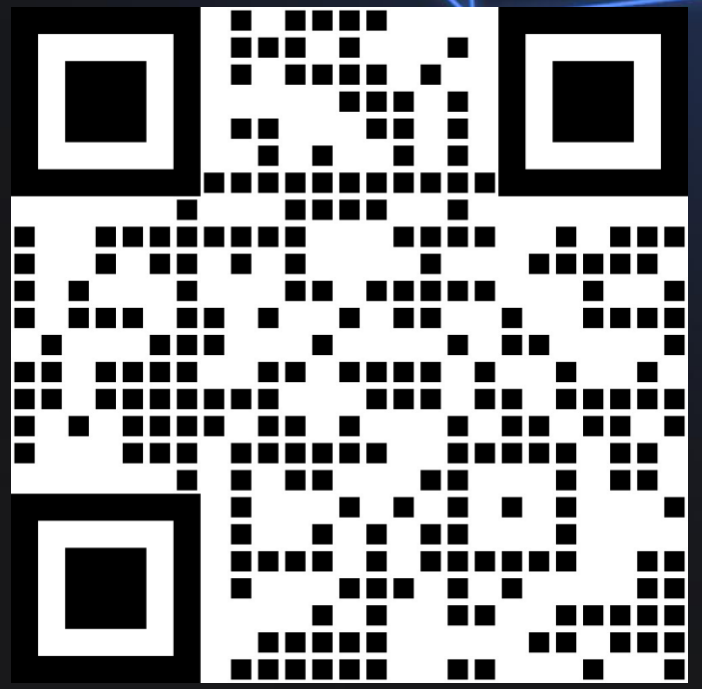
Thank you!



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