

# Common Security Issues

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# Security Principles

- Network Security is a very very big issue, can not full covered in this course
- CSO: Chief Security Officer
  - Required position for an IT-related public offering company in Taiwan
- Security is time-consuming
  - One Time Password
  - Forced splitting internet and intranet
    - EC sites in Taiwan
  - Long password
- KISS: Keep it simple and stupid

# Network Security Threats

- Virus / Trojans
- Adware / Spam
- Phishing / Fraud
- Hijacking
- Social Engineering / APT
- Denial of Service Attacks
- .....

# Example

- [駭客挾持BGP，竄改加密錢包DNS，盜走價值17萬美元的以太幣 | iThome](#)
- [研究：中國電信長期挾持經過美國與加拿大的流量 | iThome](#)
- [微軟緊急修補 Exchange Server 漏洞，背後功臣是來自台灣資安團隊](#)
  - An exploit not found for 11 years (since Exchange 2010)

# The ideas

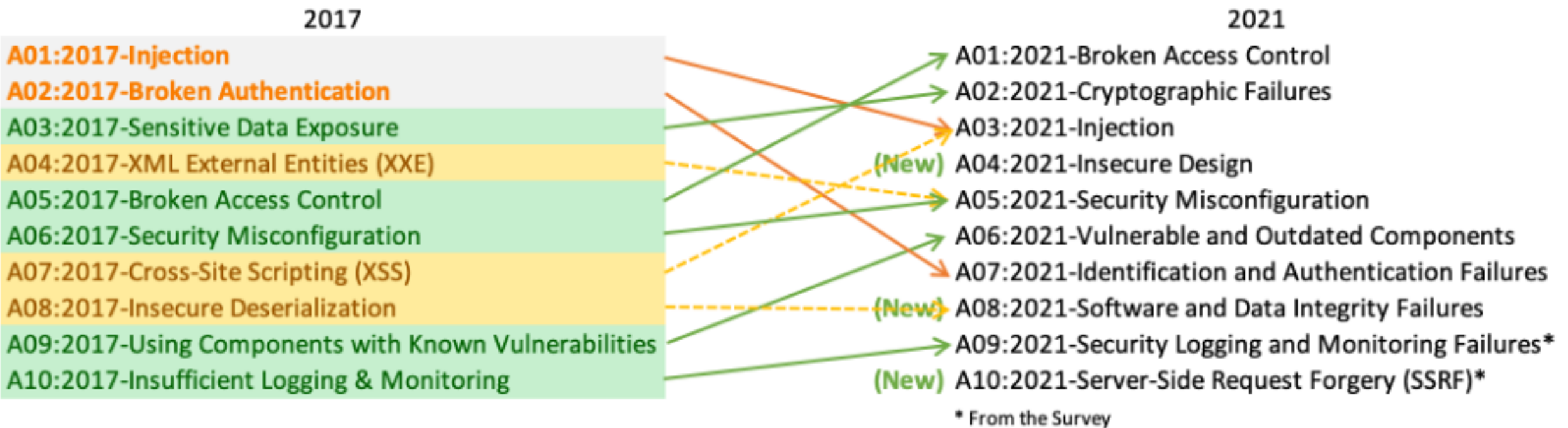
- Multiple layers of protection
  - DMZ
  - Splitting permission of users
    - Principle of least privilege
  - Protected Network (e.g. VPN)
- Intrusion Detection
  - Firewalls
  - WAF
- Auditing
  - Logging

# OWASP

- The Open Web Application Security Project
- <https://owasp.org/>

# OWASP Top 10 Security Risks

- Published every 3 years, the latest is 2021 version
  - <https://owasp.org/www-project-top-ten/>



# Injection

- Improper escaping of input
- Cause data leak or data loss
- Examples
  - SQL injection
  - Javascript injection
    - XSS (Cross-site Scripting)
- Question: How to avoid it?



# CVE: Common Vulnerabilities and Exposures

- CVE® is a list of entries for publicly known cybersecurity vulnerabilities.
- Subscribe the RSS feed
- <https://cve.mitre.org/>

# SSL Server Test

- Test the SSL configuration and potential risks
- <https://www.ssllabs.com/ssltest/>

The screenshot displays the Qualys SSL Labs report for the domain **www.cs.nycu.edu.tw**. The overall rating is **A+**. The report includes a navigation menu, a breadcrumb trail, and a summary section with a bar chart showing scores for Certificate, Protocol Support, Key Exchange, and Cipher Strength. Three informational banners are located at the bottom of the summary section.

**Qualys. SSL Labs** Home Projects Qualys Free Trial Contact

You are here: [Home](#) > [Projects](#) > [SSL Server Test](#) > [www.cs.nycu.edu.tw](#)

**SSL Report: www.cs.nycu.edu.tw (140.113.235.48)**

Assessed on: Sun, 14 Mar 2021 19:10:46 UTC | [Hide](#) | [Clear cache](#) [Scan Another »](#)

### Summary

Overall Rating

**A+**

Metric	Score
Certificate	100
Protocol Support	100
Key Exchange	90
Cipher Strength	90

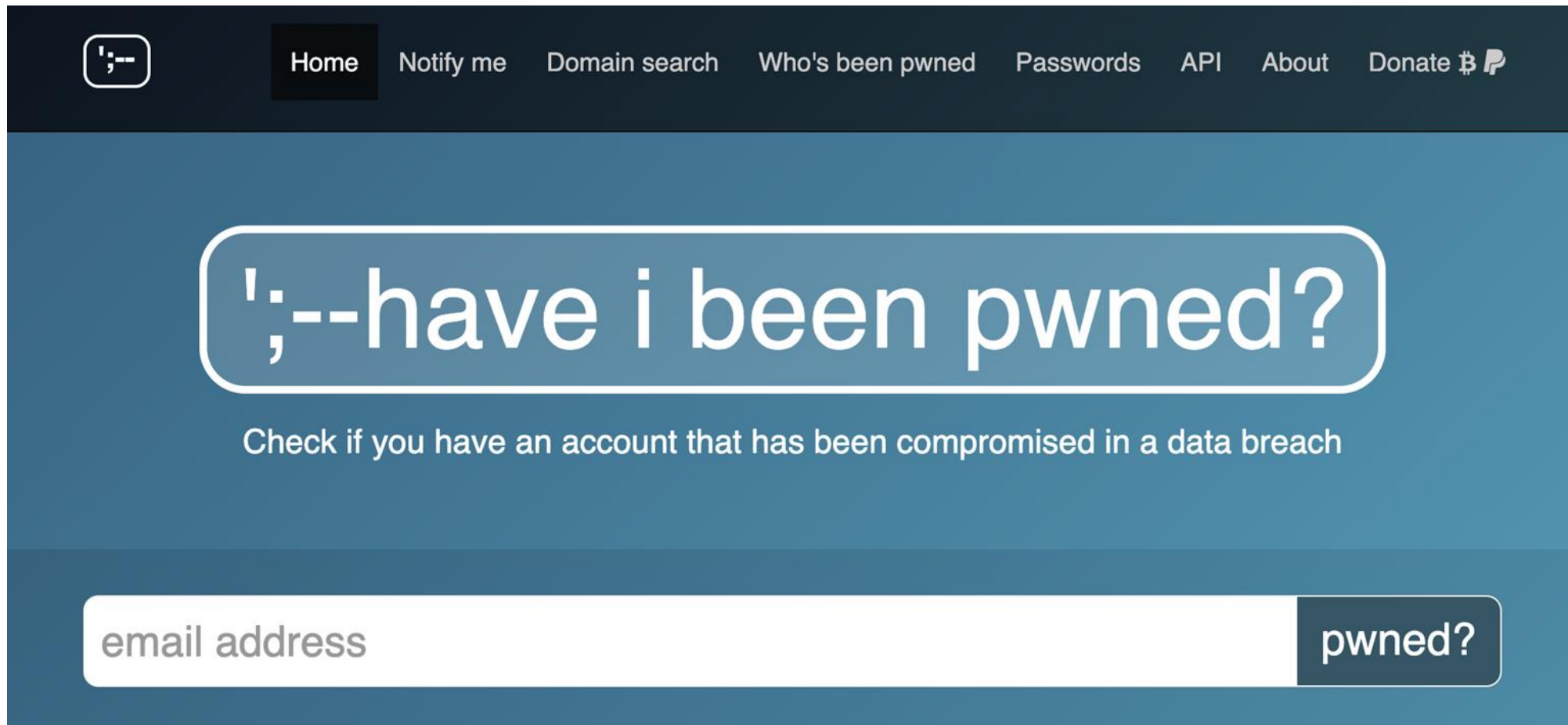
Visit our [documentation page](#) for more information, configuration guides, and books. Known issues are documented [here](#).

This site works only in browsers with SNI support.

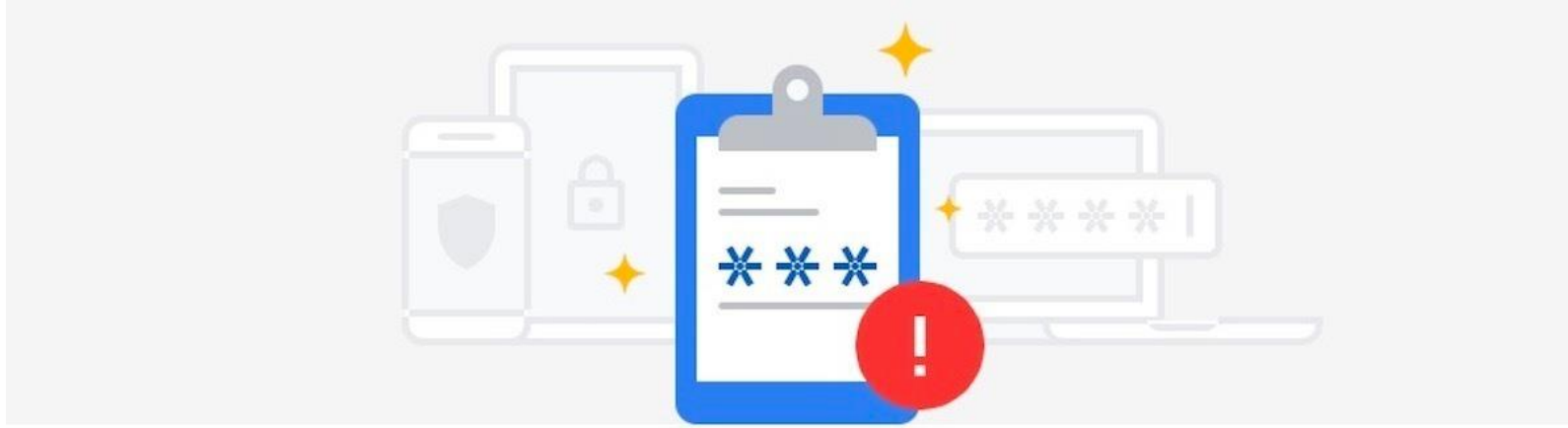
HTTP Strict Transport Security (HSTS) with long duration deployed on this server. [MORE INFO »](#)

# Have I been pwned?

- Test if your email & password leaked
- <https://haveibeenpwned.com/>



The screenshot shows the homepage of the 'Have I Been Pwned' website. At the top, there is a dark navigation bar with a logo on the left and several menu items: 'Home', 'Notify me', 'Domain search', 'Who's been pwned', 'Passwords', 'API', 'About', and 'Donate' with a Bitcoin icon. The main content area has a blue background. In the center, there is a large white rounded rectangle containing the text 'have i been pwned?' in a white, lowercase, sans-serif font. Below this, a smaller line of white text reads 'Check if you have an account that has been compromised in a data breach'. At the bottom, there is a white input field with the placeholder text 'email address' and a dark button labeled 'pwned?' to its right.



## Check your passwords

A data breach on a site or app exposed your password. Chrome recommends checking your saved passwords now.



Close

Check Passwords

# Static analysis

- A testing methodology that analyzes source code to find security vulnerabilities
- Human review needed
  - Can not find authentication problems, access control issues, insecure use of cryptography
  - Large number of false positives
    - Difficult to “prove” that an identified security issue is an actual vulnerability.
- [https://owasp.org/www-community/Source\\_Code\\_Analysis\\_Tools/](https://owasp.org/www-community/Source_Code_Analysis_Tools/)

Dependencies

Dependents

**⚠ We found potential security vulnerabilities in your dependencies.**

[Dismiss](#)


Some of the dependencies defined in your `package.json` have known security vulnerabilities and should be updated.

Only the owner of this repository can see this message.


[Learn more about vulnerability alerts](#)

These dependencies have been defined in `sarkartanzil.github.io`'s manifest files, such as `package.json`

 Dependencies defined in `package.json` **11**

>  [jquery / jquery](#)

**⚠** Known security vulnerability in `^ 1.11.3`

>  [twbs / bootstrap](#)

`^ 3.3.7`

>  [BrowserSync / browser-sync](#)

`^ 2.13.0`

>  [FortAwesome / Font-Awesome](#) font-awesome

`^ 4.6.3`

>  [gulpjs / gulp](#)

`^ 3.9.1`

>  [scniro / gulp-clean-css](#)

`^ 2.0.10`

# DoS: Denial of Service Attacks

- Make a network resource unavailable to its intended users by temporarily or indefinitely disrupting services of a host connected to the Internet
- Methods
  - Software bugs
  - Bad designed / implemented
  - protocol
    - SYN Flooding
    - Amplification Attacks
- Exhaust all resources

UDP-based Amplification Attacks

Protocol	Bandwidth Amplification Factor
<a href="#">Memcached</a>	50000 (fixed in version 1.5.6) <sup>[61]</sup>
NTP	556.9 (fixed in version 4.2.7p26) <sup>[62]</sup>
CharGen	358.8
DNS	up to 179 <sup>[63]</sup>
QOTD	140.3
Quake Network Protocol	63.9 (fixed in version 71)
BitTorrent	4.0 – 54.3 <sup>[64]</sup> (fixed in libuTP since 2015)
CoAP	10 – 50
ARMS	33.5
SSDP	30.8
Kad	16.3
SNMPv2	6.3
Steam Protocol	5.5
NetBIOS	3.8

# DDoS: Distributed Denial of Service (1)

- The incoming traffic flooding the victim originates from many different sources
  - Maybe the source behaves normally
- Difficult to block all attacking source





# DDoS (2)

- Botnet
  - Comprised computers with malicious software (zombies)
  - Launch attacks if the botnet owner gets paid
- Clean Pipe
  - Multiple layers of filter of DDoS traffic
  - Lots of IDSs & IPSs
  - “Wash” traffic and direct clean traffic to servers
    - False positive

# Conclusion

- Safe design lowers the security risk
  - Multiple layers of protection
  - Encrypt matters
- Logging and auditing
- Keep systems updated
  - Vulnerabilities feed
  - Human review