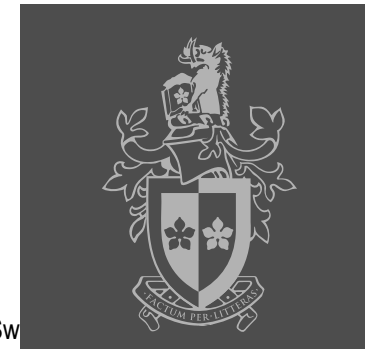
SWINBURNE UNIVERSITY OF TECHNOLOGY

COS10011/60004
Creating Web Applications

Web Security



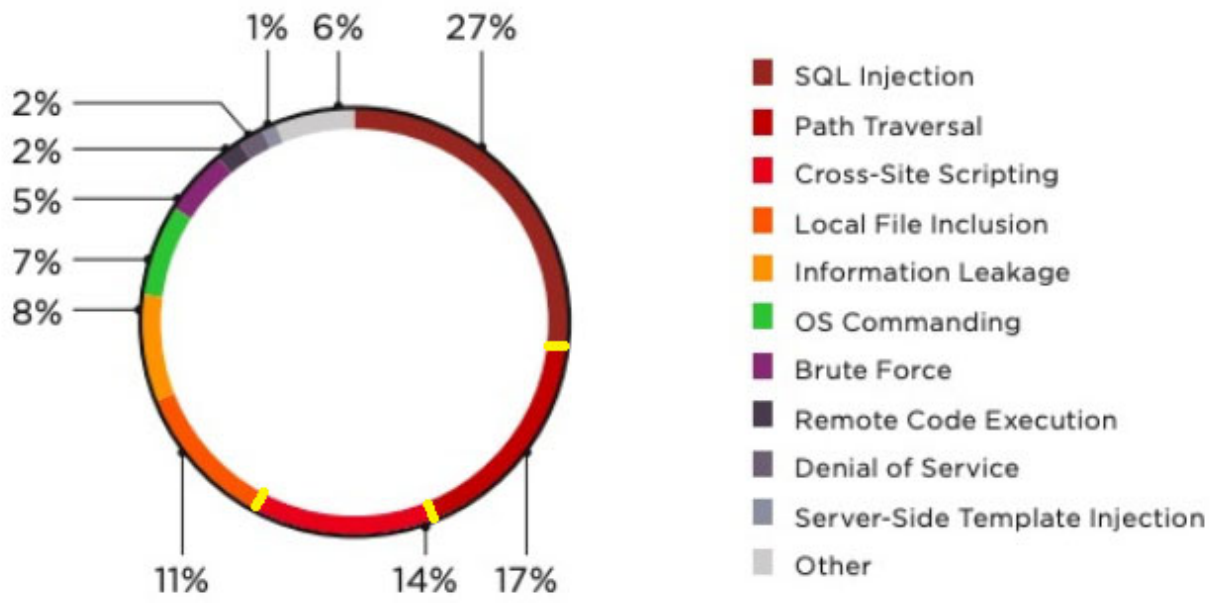
Fundamental problem

- The Internet was not designed with security as a primary goal

1. Everything is on the Internet
2. Everyone can access the Internet
3. We can upload stuff onto the Internet
4. Web/software developers are not good at testing

- Many ways to attack and/or take control of a Web site

Top 10 web application attacks

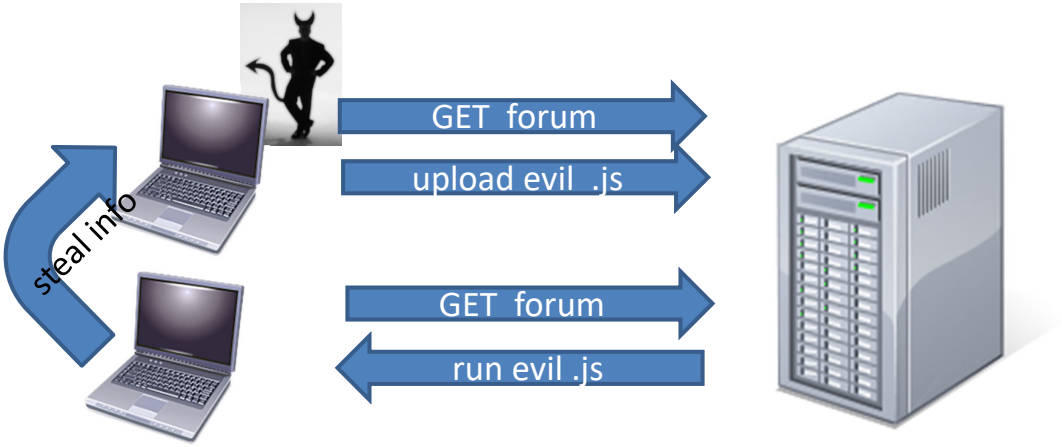


Reference: Attacks on web applications: 2018 in review

https://www.ptsecurity.com/ww-en/analytics/web-application-attacks-2019/

Cross-site scripting (XSS)

- Attacker uploads evil .js to innocent server (forum/blog/twitter/whatever). It is stored (in db).
- Victim goes to web page on server. receives .js
- Script steals info from victim and sends it to Attacker



SQL injection

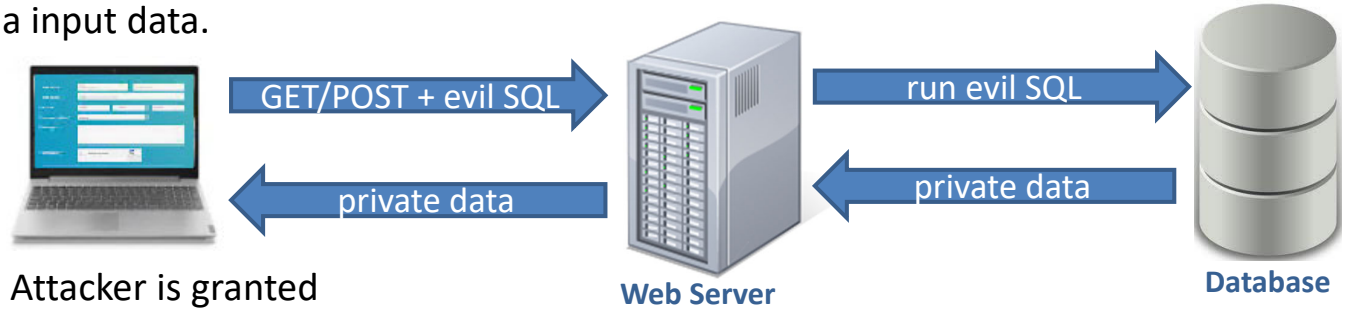
- SQL injection is a code injection technique, in which malicious SQL statements are inserted into an entry field for execution.

- SQL injection attacks allow attackers to
  - dump the database contents to the attacker,
  - modify the data,
  - become administrators of the database server,
  - ...

SQL injection

1) Attacker injects malicious SQL query via input data.

2) Malicious SQL query is executed by the database.

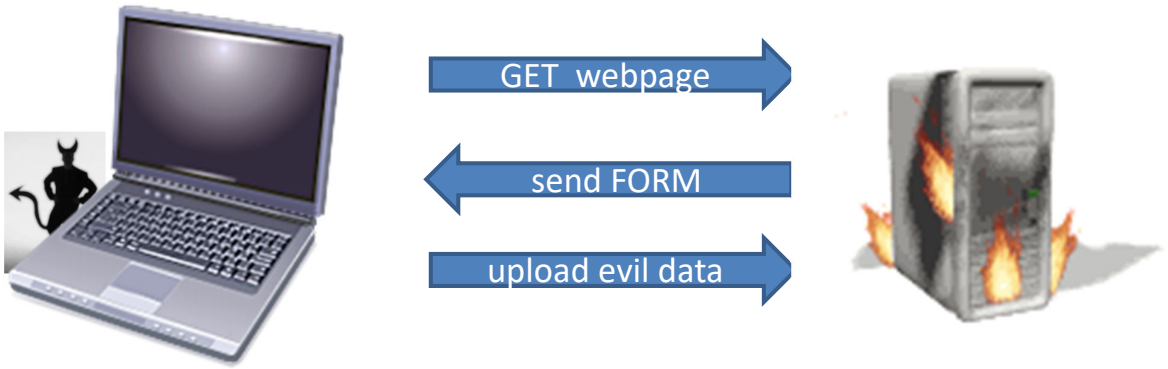


4) Attacker is granted access potentially act as database administrator.

3) DBMS returns unauthorised (private) data to attacker.

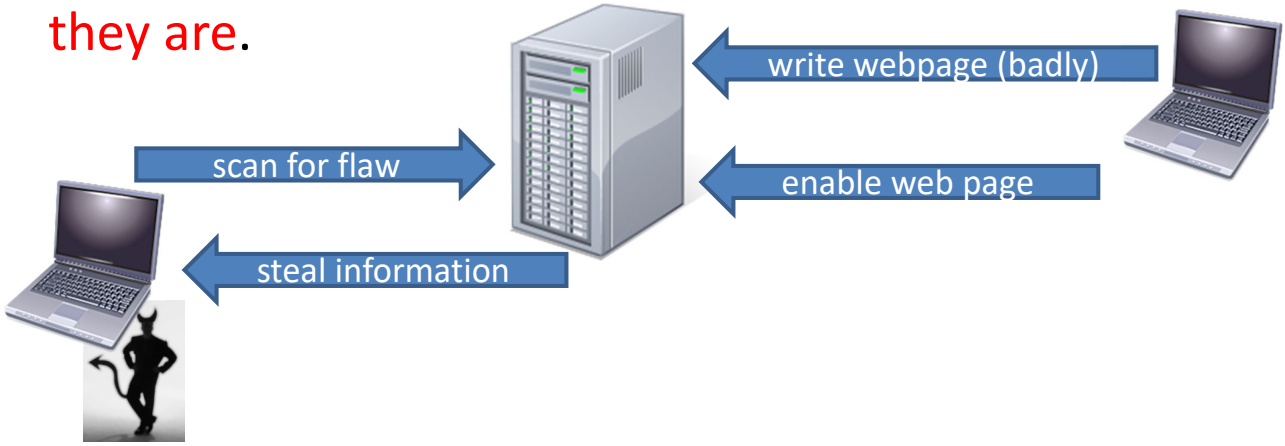
Denial of Service

- Attackers flood the server with excessive requests and data.
- Some services or resources become unavailable to its intended users.



Directory traversal, .htaccess

- Web developer can't get script to work. Turns off security.
- Gets it working, puts on Internet
- Attacker scans servers, finds flaw
- Loads pages which are "not" on the internet – but they are.



Fundamental solutions

1. Don't let people upload *any thing invalid* into your web sites
   - Filter, Sanitise, Validate
2. Don't trust the software you use
   - It will have bugs/vulnerabilities
3. Web development does not stop when you deliver the product
   - Test, Monitor, Patch

Solutions

- Filter/validate/sanitise on the server:
  - php scripts
  - db functions
- Limit permissions on server
  - read-only, Apache user owns files
  - have a back-up
  - configure web server carefully.
- Web development does not stop when you deliver the product
  - Test, Monitor, Patch