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all about security

Web Application Attacks in practice

or how the modern real application attack looks like

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Achieving anonymity

To achieve the maximum anonymity, the attacker has various choices:

- Buy an anonymous VPN or anonymous proxies using BTC/LTC or prepaid credit cards (cash4web)
- Use Tor/I2P anonymization networks
- Hack any Internet vulnerable server (there are millions)
- Use anonymous shell accounts (freeshell.eu)

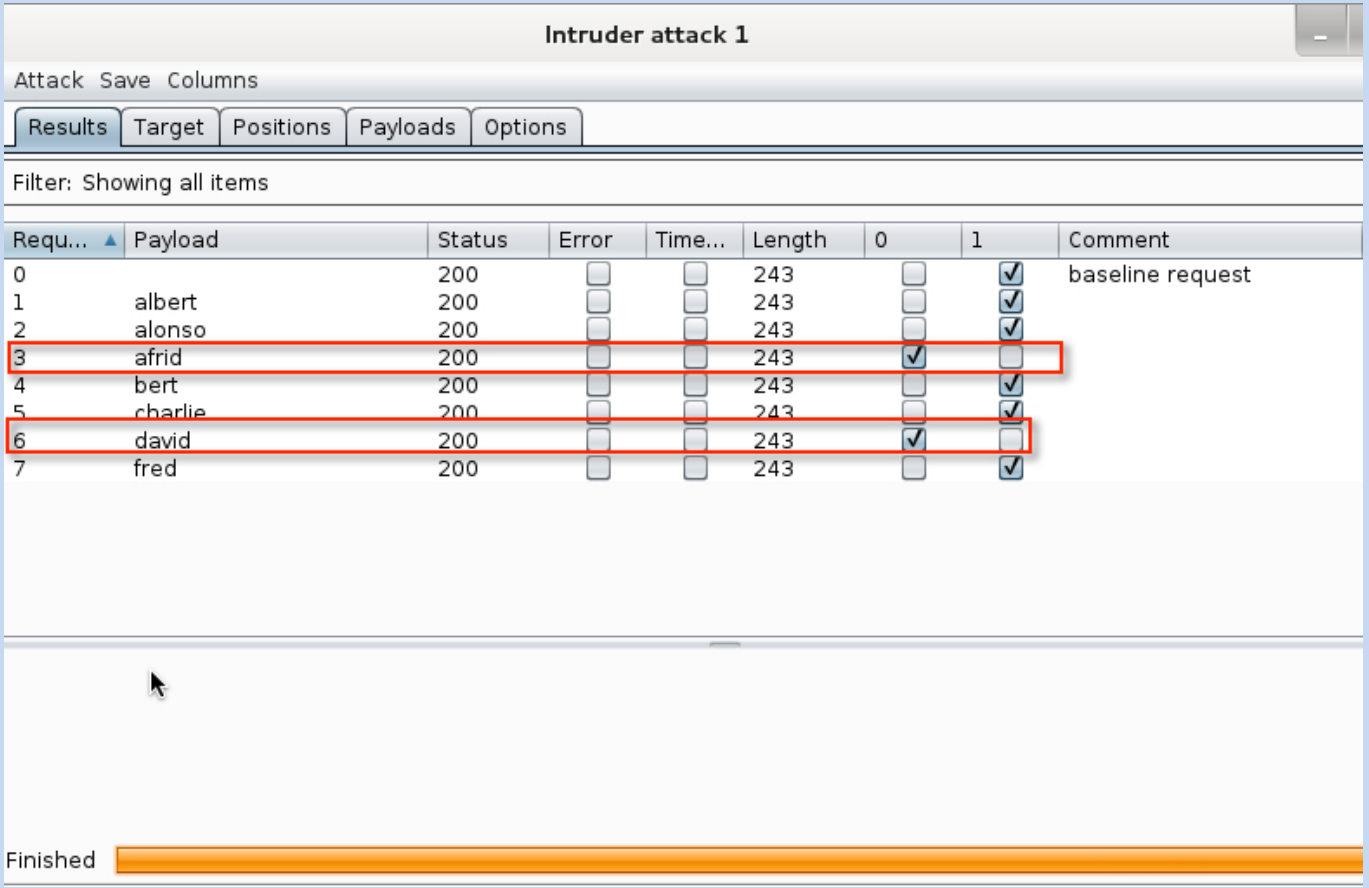
The attacker has to be aware of

- Sanitizing its “browser footprint”
- DNS leaks (using TOR internal DNS resolver)
- Traffic analysis (**T**raffic **C**onfirmation attack)
- Eavesdropping by Tor exit nodes

Username enumeration

- The application is vulnerable to username enumeration (= different application's response where valid login and invalid password and invalid login and invalid password are provided)
- It can be even time difference (just in few milliseconds)
- **Note:** We have no credentials, no logins, no passwords - let's find existing ones using the wordlist of commonly used English usernames

Username enumeration II



Password enumeration

- We have valid logins, so can brute-force valid passwords now
- The problem is the account is blocked for a define time period after 3 incorrect passwords, so we will use in-breadth search instead of in-depth search (most applications are unable to detect it) – login1, password1, login2, password2, login3, password3, etc.)

We are 'in', looking for vulnerabilities

- We have revealed the valid combination of login and password and are 'in'
- Unfortunately no SQL/LDAP injections vulnerabilities, nor classical XSS vulnerabilities have been revealed
- But it seems the Java server allows XXE/XML injection

XXE/XML Injection

- Naive XML parsers that blindly interpret the DTD of the user supplied XML documents
- Let's try to construct the injection string:

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<!DOCTYPE foo [
  <!ELEMENT foo ANY >
  <!ENTITY xxe SYSTEM "file:///etc/passwd"
>]><foo>&xxe;</foo>
```

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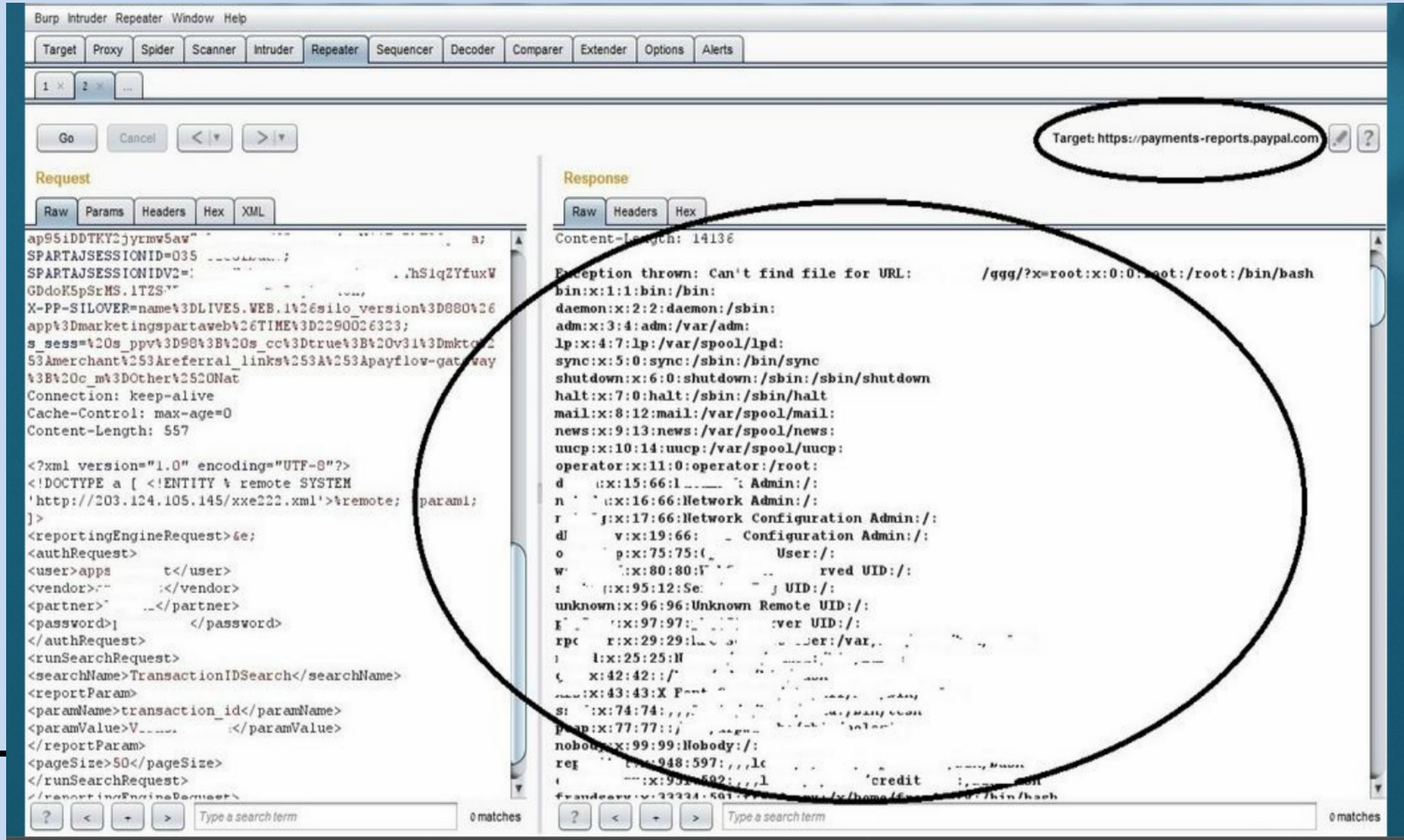

XXE/XML Injection

Potential Impact:

- Local file access
- SSRF and remote file includes
- Denial of Service
- Possible remote code execution

The attacker's interests

The attacker is **mainly interested in**:

- Any sensitive information (credit card numbers, usernames, passwords, certificates, keys, ..)
- Administrator/root passwords / hashes (in order to escalate his privileges, access to admin web interface or gain full database access)
- Anything that can be sold on black markets :)

Cracking the hashes

Hashes are **invaluable source** for the attacker doing cracking by using:

- Big word-lists/dictionaries
- Brute-forcing (this can be very time consuming)
- Offline or online rainbow tables (for all hashes which do not use salt including DES, LM, NTLM, MD5, SHA1, SHA256, SHA512, ...)

Exploiting of local system

- Possibility to use own SQL statements (**execute privileges** or **reading/writing local files** or **run own system commands**) or make TCP/Unix sockets (SSRF) almost always leads to gaining the local system user access (apache, www-data, webuser, ..)
- Consequently, exploiting the kernel is obviously easy if the system is unpatched for few months (there are many public available local root exploits for recent Linux kernels)

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Care about your kernel and local system security (e.g. use on-the fly kernel patching)

Cleaning the traces

- After the successful attack, web server / WAF /IPS / IDS logs are full of SQL injection attempts
- When the attacker gains local root/admin, it is usually easy to clean his traces (modify web server / WAF / IPS / IDS logs, remove suspicious entries from the database, ...)

Backdooring

- Nowadays, the best way of backdooring is to use LKM rootkits – they are stealthy, non-detectable, and completely immune against file-system checksums/hashing (like Tripwire)
- Compromised server can be used as another attacker proxy, or sold as a part of botnet on the hacker's blackmarkets

Summary

- Security should be always "**multi-layered**", the attacker almost always exploits the weakest chain
- Write secure code, validate all inputs / outputs, prefer whitelisting instead of blacklisting, use 3rd layered database architecture
- Care about your local system security

LFI- Local File Inclusion

- Parameter lang is not correctly handled
- Filtering regexp is applied, but not recursively!
- We can include any file (!)

LFI- Local File Inclusion II

- Is there any file on the filesystem we have control over its content?
- Yes, there is! PHP Session /var/lib/php5/sess_XXXXX
- Let's read it

LFI- Local File Inclusion III

- Let's run any system command!
- Let's put there
- <?php system($_REQUEST[cmd]); ?>

LFI- Local File Inclusion IV

- And let's backdoor the system!
- Weevely3 is used