HERVÉ SCHAUER CONSULTANTS
Cabinet de Consultants en Sécurité Informatique depuis 1989
Spécialisé sur Unix, Windows, TCP/IP et Internet

Security Day 2011

Pentests:
Exposing real world attacks

Renaud Dubourguais <Renaud.Dubourguais@hsc.fr>
Jean-Baptiste Aviat <Jean-Baptiste.Aviat@hsc.f>

Hervé Schauer Consultants

- **Information security consulting company since 1989**
- **Fully independent intellectual expertise services**
  - Free of any distribution, integration, outsourcing, staff delegation or third-party investors biases
- **Services: consulting, research, audit, penetration tests, training**
- **Field of expertise**
  - OS Security : Windows, Unix ,Linux and embedded components
  - Application security
  - Network security
  - Organizational security
- **Consultants certifications :**
  - CISSP, ISO 20000-1 Lead Auditor, ISO 27001 Lead Auditor, ISO 27001 Lead Implementor, ISO 27005 Risk Manager, ITIL, ProCSSI, GIAC GCFA

What is a pentest?

- **Simulation of a real attack on:**
  - Infrastructure by exploiting badly designed firewall rules, exposed services, ...
  - Exposed Web applications by testing user inputs, application bugs, …
- **Mainly from two point of view:**
  - Blackbox, without information about the remote infrastructure, just a URL
  - Greybox, with a user account
- **Various purposes:**
  - Security assessment
  - Decision makers awareness
  - Technical staff awareness

Security assessment (1/3)

- **Assess the global security level of your infrastructure:**
  - Applications
  - Network
  - Websites...

- **Technical skills needed:**
  - Dedicated to real hackers
  - Or accessible to script kiddies ?

Security assessment (2/3)

- **Pentest** should not to be mistaken with v**ulnerability scanning** or vulnerability assessment.

  Vulnerability scanning (Qualys, Rapid7, Nessus...) is cheap and automated but :

  - Results are not **confirmed** by a **human** assessor
  - Does not necessarily **prove** that a vulnerability is there and actually **exploitable** (lots of 'might/could be vulnerable' in reports)
  - Can not look for for tricky vulnerabilities in **web applications** in an efficient and useful way
  - Can not **bounce** (from a compromised system to a vulnerable one) to prove that more systems are at risk
  - Has no notion of **business risk** (all vulnerabilities considered the same)
  - Are tools for regulatory and compliance, but not the ones used by hackers to penetrate systems
- This presentation is about **real pentests**, simulating **real-world attacks**

Security assessment (3/3)

- **Issues usually summarized in a table:**

Vulnerability or significant element		Exploitation complexity	Associated risk	Criticity	Recommendation
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Technical staff awareness

- **Provide technical details about the intrusion in order to:**
  - Reproduce attacks
  - Check vulnerability corrections

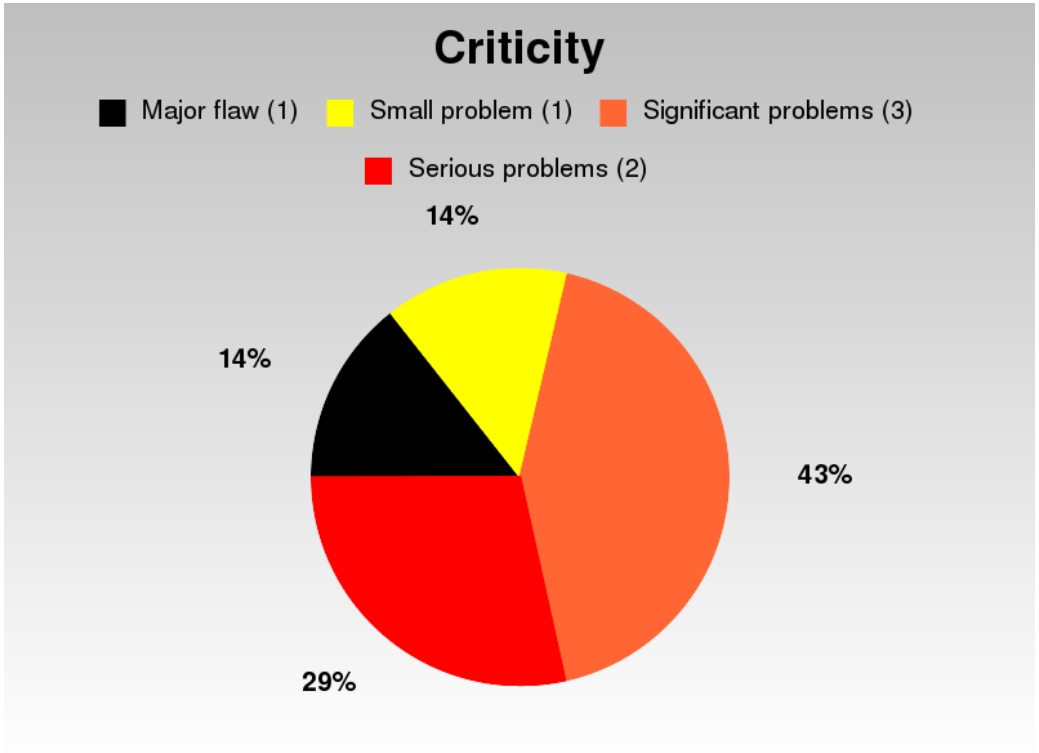
- **Give concrete recommendations for each vulnerability:**
  - Best pratices to fix it
  - And both:
    - State of the art practices
    - Pragmatic options to fix the issues

```
  memcpy(new->pktrtp.pcap.pkt, pktrtp->pcap.pkt, pktrtp
                      >pcap.hdr.caplen);
  new->pktrtp.len = pktrtp->len;


  if (rtp_stream->pkts.lh_first == NULL)
    {
      LIST_INSERT_HEAD(&rtp_stream->pkts, new,l);
    }
  else
    {
      if (before)
        {
          LIST_INSERT_BEFORE(before, new, l);
        }
      else
        {
          if (after)
            LIST_INSERT_AFTER(after, new, l);
          else FATAL("buffer not empty and before,after
NULL");
        }
    }
```

Decision makers awareness

- **Pentests are not relevant only to technical staff**
- **Decision makers want to know:**
  - Do we have vulnerabilities ?
  - Are they easy to exploit ?
  - Are they easy to fix ?
  - How good (or bad) are they related to other similar companies ?



Case study

Single information provided to the pentesters :

http://www.equivalency.co.uk

At first sight

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Mauris vitae nisl nec metus placerat perdiet est. Phasellus dapibus semper consectetuer hendrerit.

CATEGORIES

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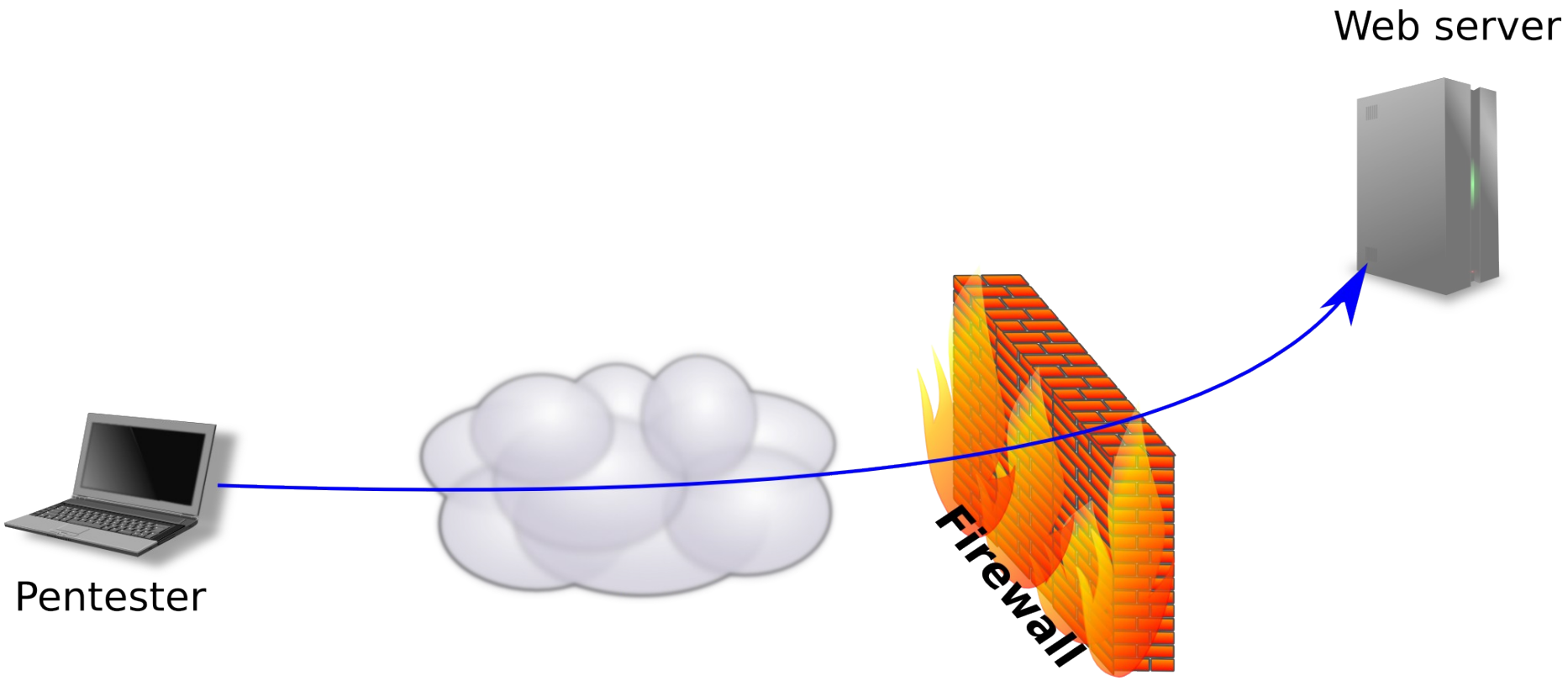
- Consectetuer adipiscing elit
- Metus aliquam pellentesque
- Suspendisse iaculis mauris
- Urnanet non molestie semper
- Proin gravida orci porttitor

Guessing the infrastructure...



After browsing for a few minutes

WELCOME TO EQUIVALENCY

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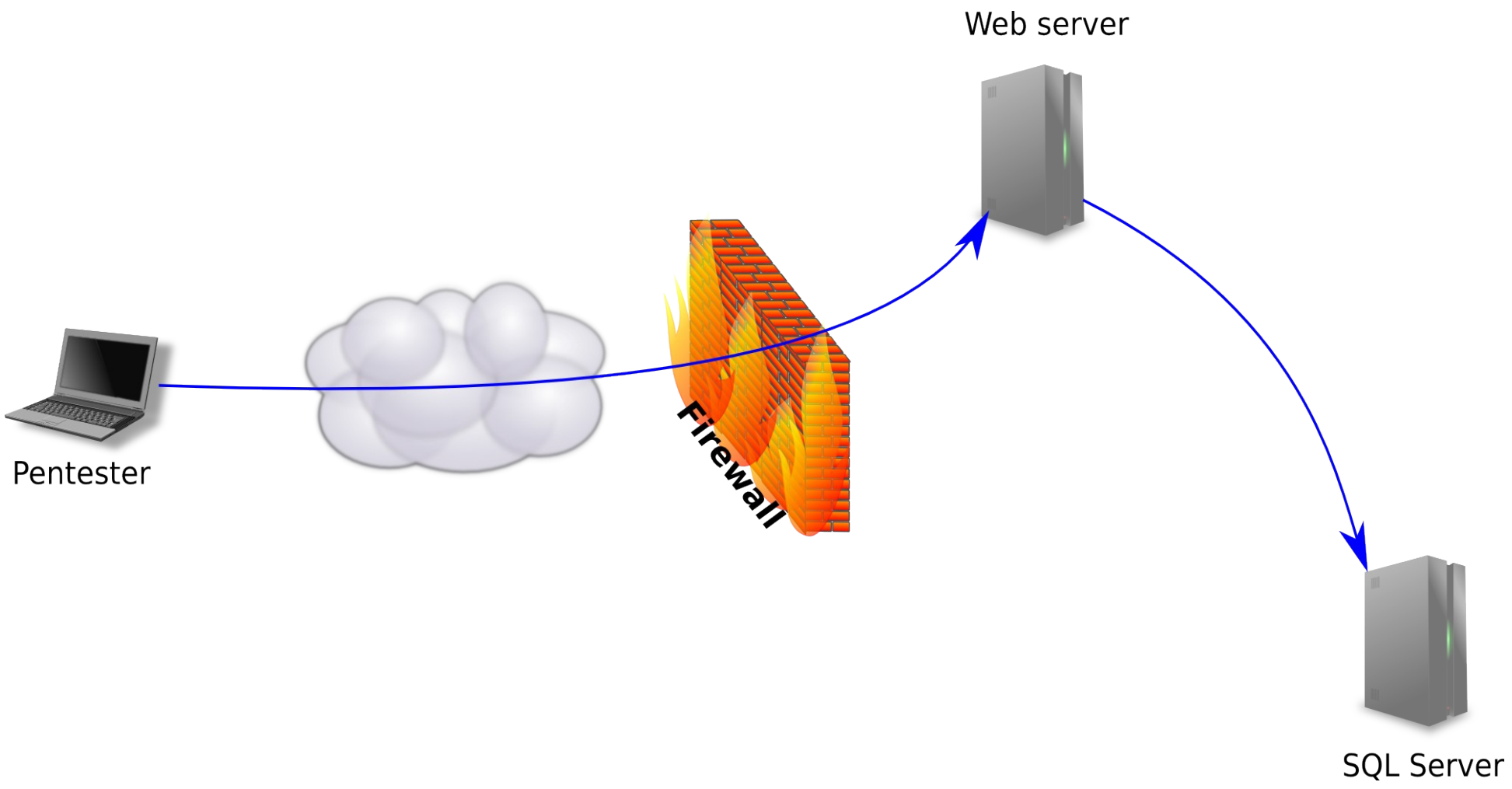
SQL Error: Syntax error (missing operator) in query expression 'SELECT id, username FROM cmd_users WHERE [...]'.

READ MORE | COMMENTS

What does it look like now?



SQL Injection issue

- **Possibility to extract database information:**
  - Using a custom script
  - No sensitive information on such a website
  - Except for the user accounts authorized to edit content

Demonstration

In the vulnerabilities summary...

- Looks like an SQL injection flaw !

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Weak passwords policy

- **Retrieved accounts passwords are encrypted**
  - To be precise : they are 'hashed' ('one-way encryption')
- **If some of them are simple:**
  - They can be retrieved !

Demonstration

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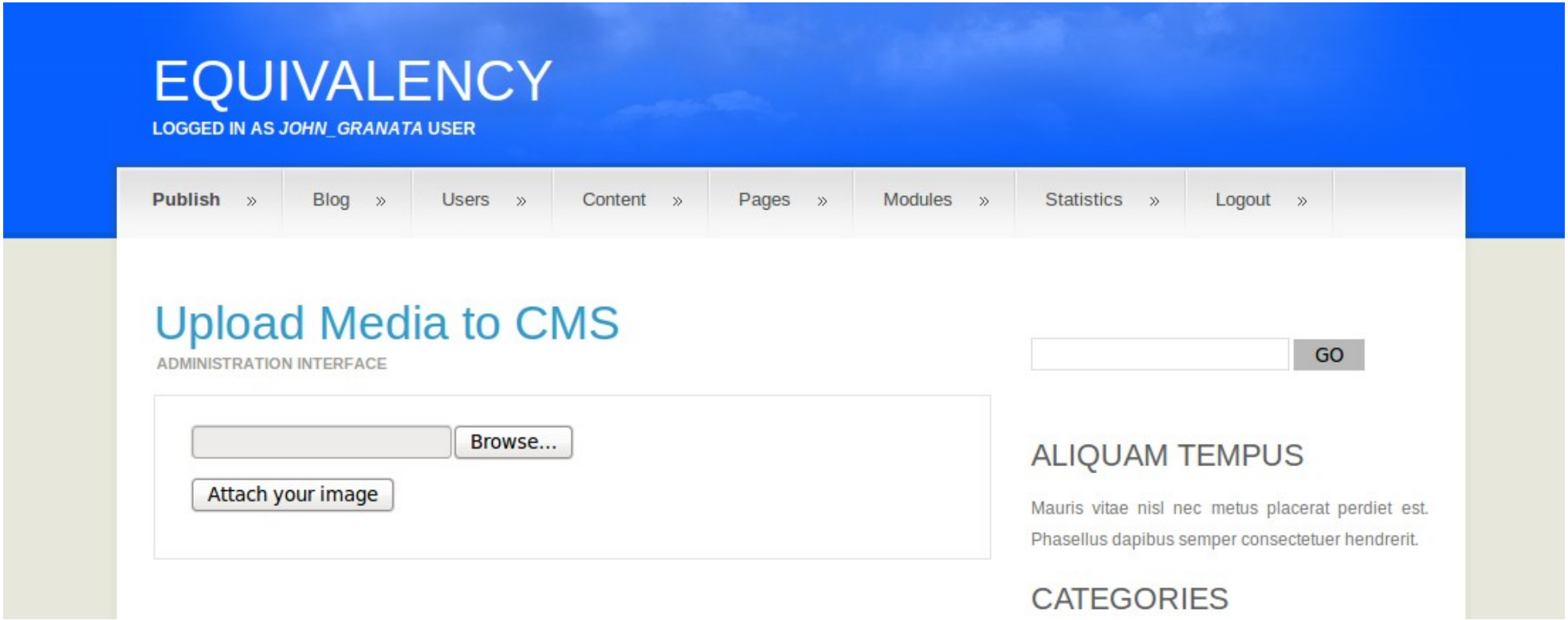
No filtering on file extensions (1/2)

- **Editing users are allowed to upload images**



No filtering on file extensions (2/2)

- **Instead of uploading an image:**
  - Let's upload an executable ASP script
- **Which can act as an interface to the operating system**
  - Public webshells are easy to found (c99.php, r57.php, …)
  - HSC consultants developed their own webshell

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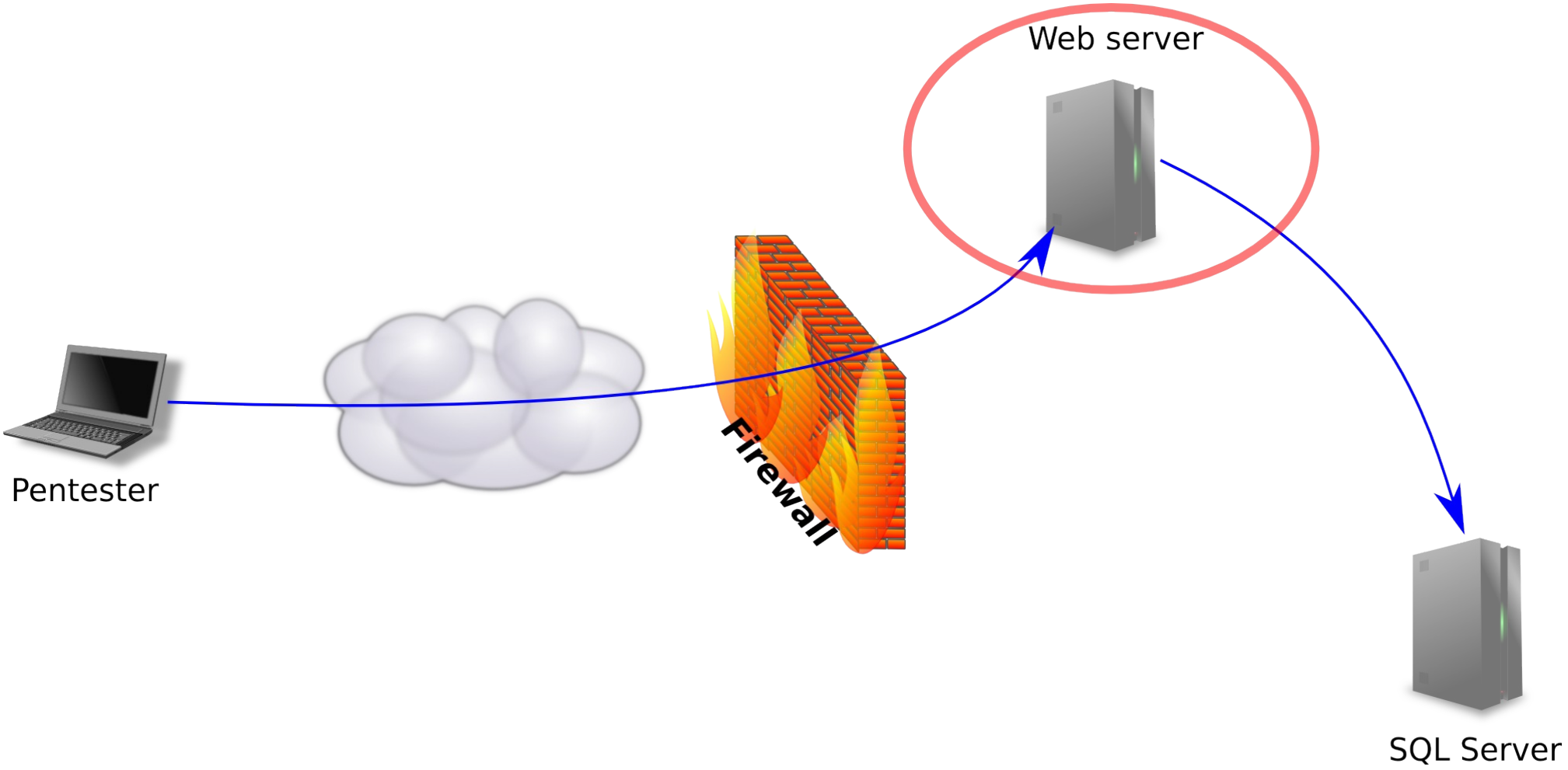

Bounce to the SQL Server

- **LocalSystem user can extract hashes from the system**
  - Public tools exist (fgdump.exe)
  - But also private tools (forestdump for HSC)
- **Such hashes can be broken**
  - Using 'Rainbow tables'
- **If a local account is shared accross servers:**
  - We can bounce to them !

Demonstration

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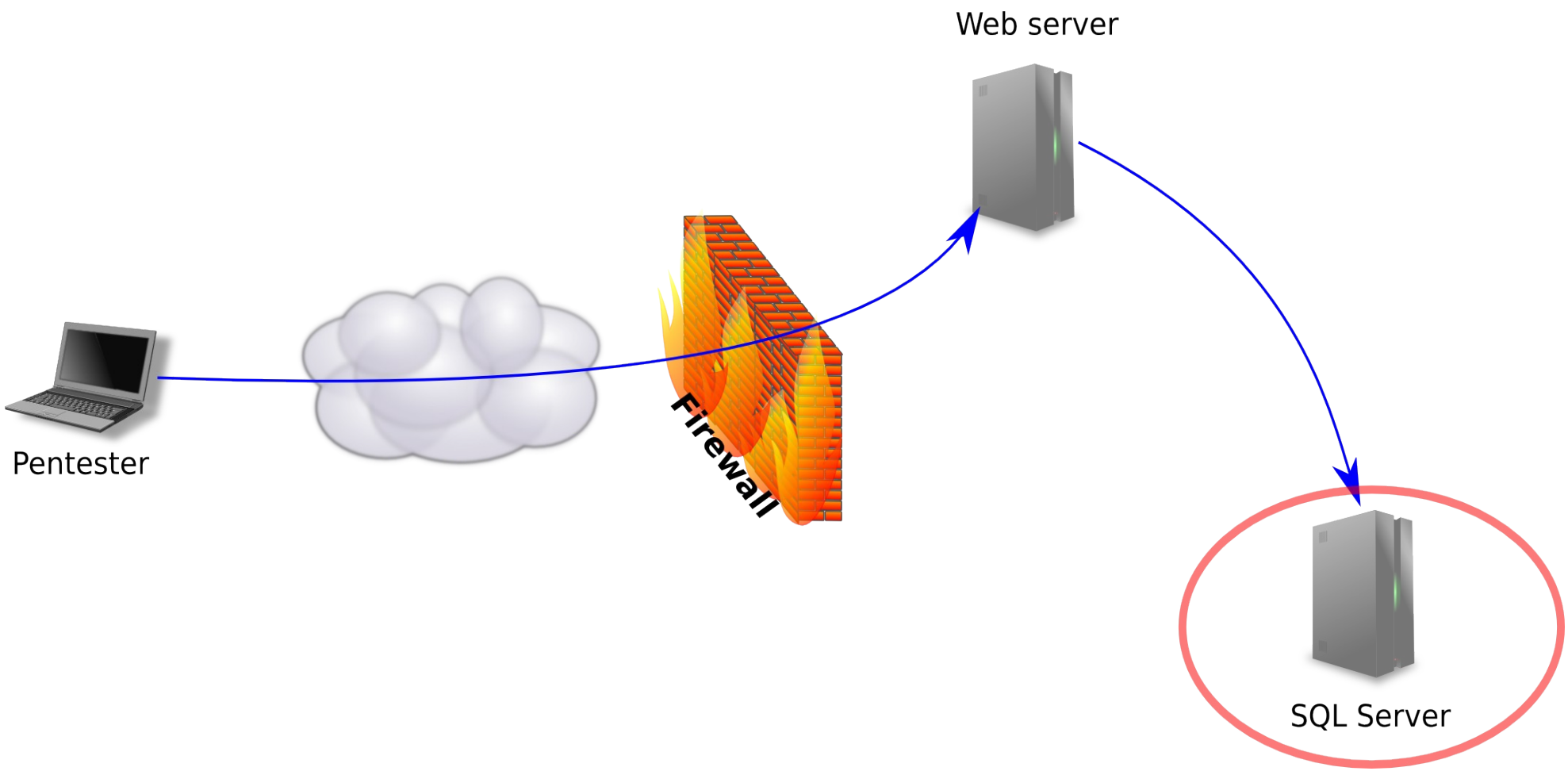

Compromising the Active Directory

- **Domain controllers can be identified by querying a DNS record**

```
$ dig SRV @192.168.111.110 _ldap._tcp.dc._msdcs.hsc.local
[...]
;; ANSWER SECTION:
_ldap._tcp.dc._msdcs.hsc.local.      600 IN  SRV     0 100 389 win2003-ad.hsc.local.

;; ADDITIONAL SECTION:
win2003-ad.hsc.local. 3600    IN      A       192.168.111.110
```

- **If a critical vulnerability hasn't yet been patched:**
  - It can be exploited to take control of the system
  - MS06-040 (netapi), MS08-067 (netapi) , MS10-46 (LNK), ...

Demonstration

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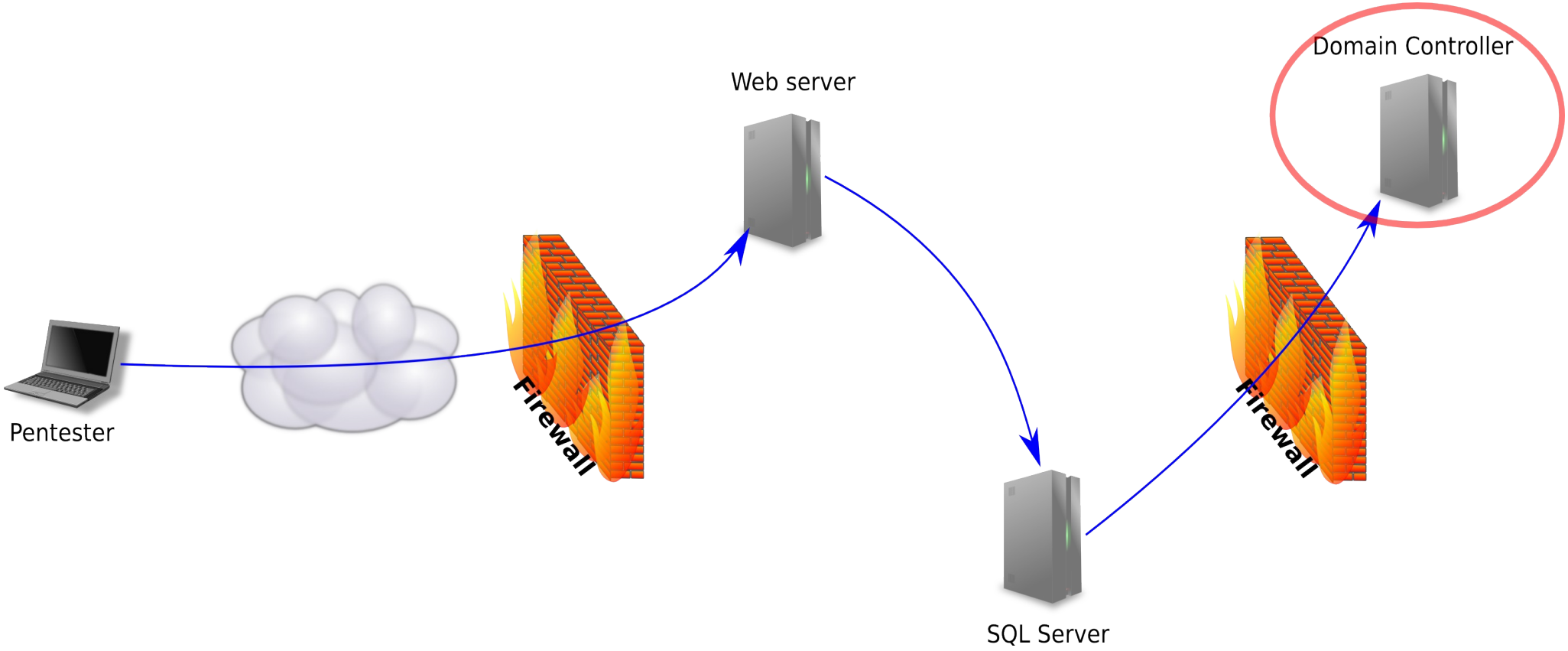

Conclusion

- **Increasing number of attacks against web applications**
  - A vulnerability can be created by mistake very quickly :
    - Unfiltered user inputs, weak passwords, unpatched software…
  - Exploitation techniques are now mature
  - Impact can be disastrous :
    - Leak of confidential data
    - Servers and applications compromised or vandalized
    - …
- **Pentests make you aware of the issues before the real hackers...**