CESi alternance

ÉCOLE SUPÉRIEURE DES MÉTIERS

LE CESI :
ENSEIGNEMENT
SUPERIEUR ET
FORMATION
PROFESSIONNELLE

CESi alternance

ÉCOLE SUPÉRIEURE DES MÉTIERS

Web Hacking
I. Intro

LE CESI : ENSEIGNEMENT SUPERIEUR ET FORMATION PROFESSIONNELLE

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ÉCOLE SUPÉRIEURE DES MÉTIERS

The **hacker** culture is a subculture of individuals who enjoy the intellectual challenge of creatively overcoming and circumventing limitations of systems to achieve novel and clever outcomes. The act of engaging in activities in a spirit of playfulness and exploration is termed "**hacking**".

But... for unlighted people,

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Hacking is a chance

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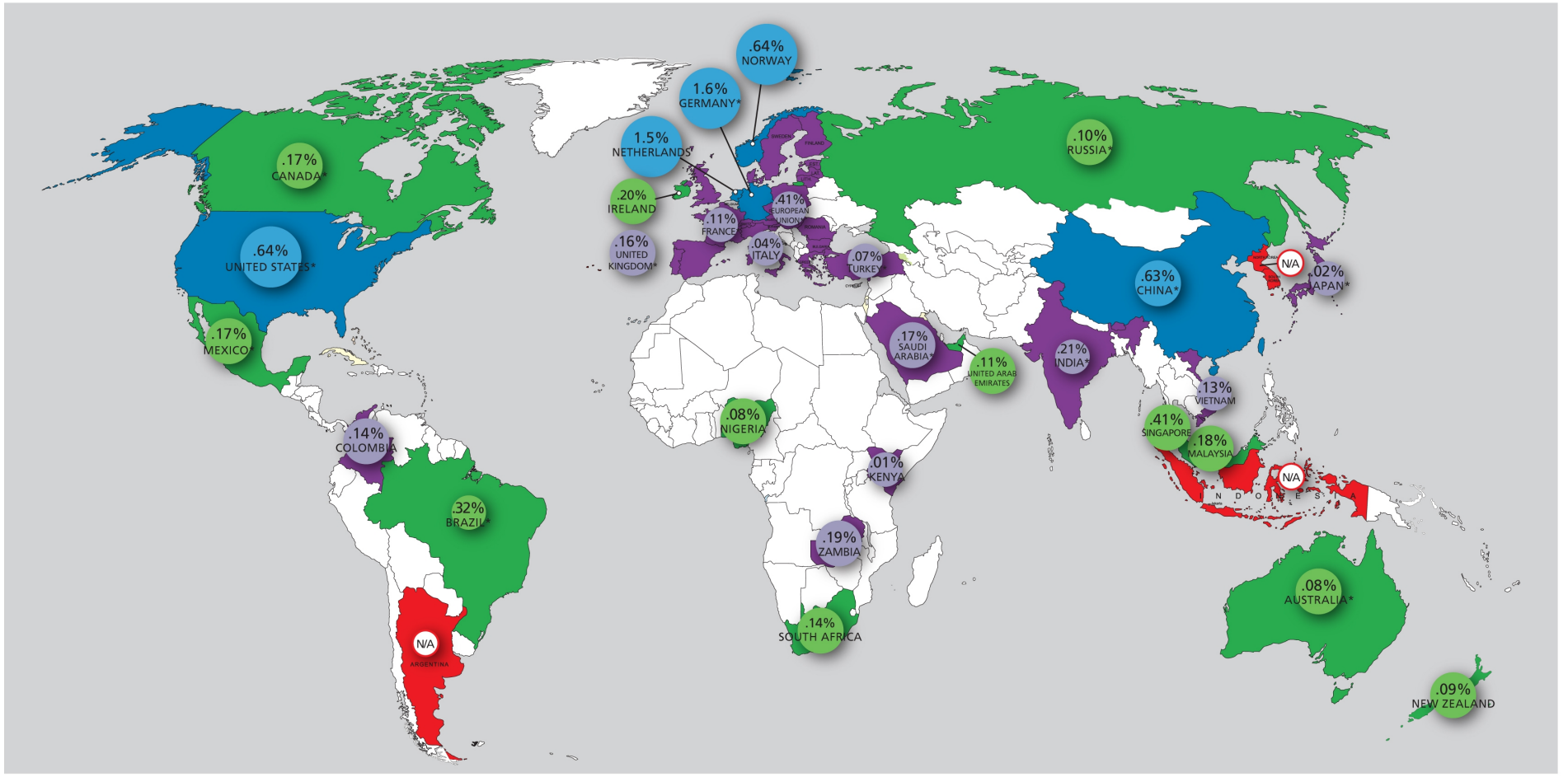
Hacking is a cancer

McAfee
An Intel Company

CYBERCRIME LOSS AS A PERCENT OF GDP (GROSS DOMESTIC PRODUCT)



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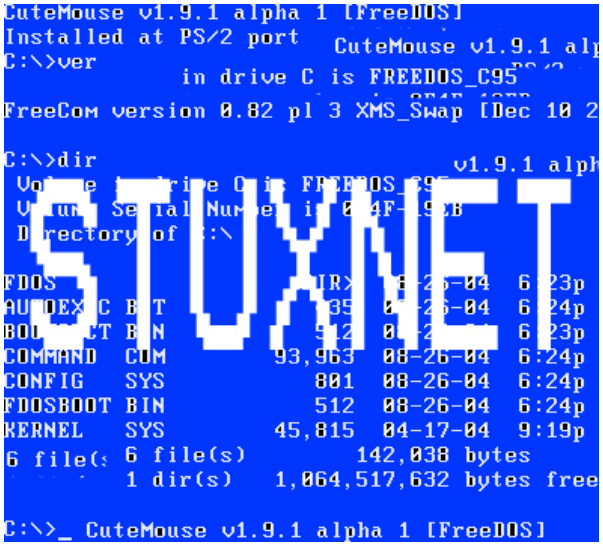
- N/A - Countries currently not measuring cybercrime loss

$445 BILLION
The annual estimated cost to the global economy from cyber crime

200,000+
Jobs lost in the U.S

150,000+
Estimated in Europe

Hacking is used by intelligence



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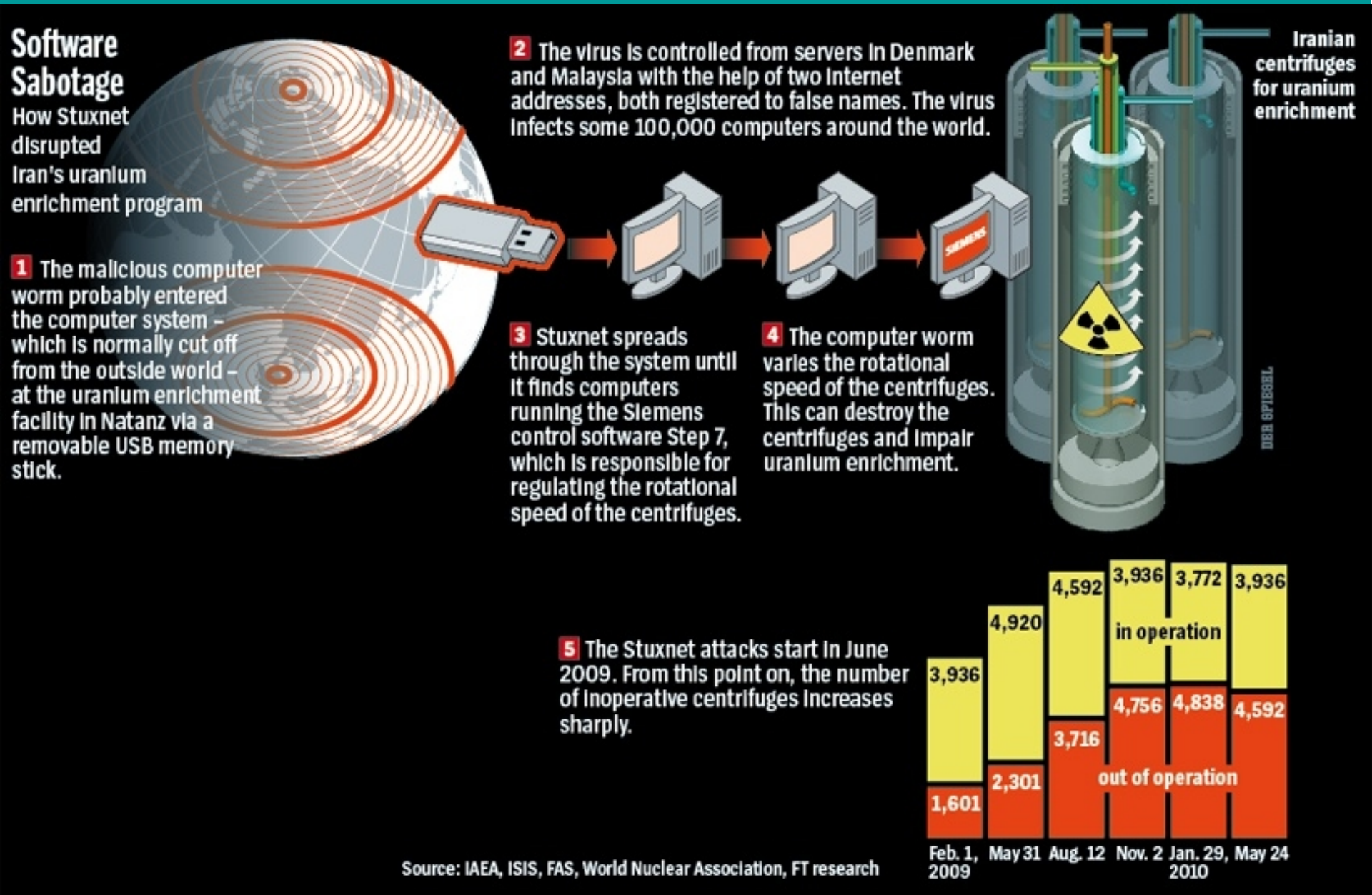

Hacking is used by intelligence

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Web Hacking II. Threats

That may happen?

OR

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Business needs Trust!

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ÉCOLE SUPÉRIEURE DES MÉTIERS

Business needs Trust!

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The end of the fortress metaphor

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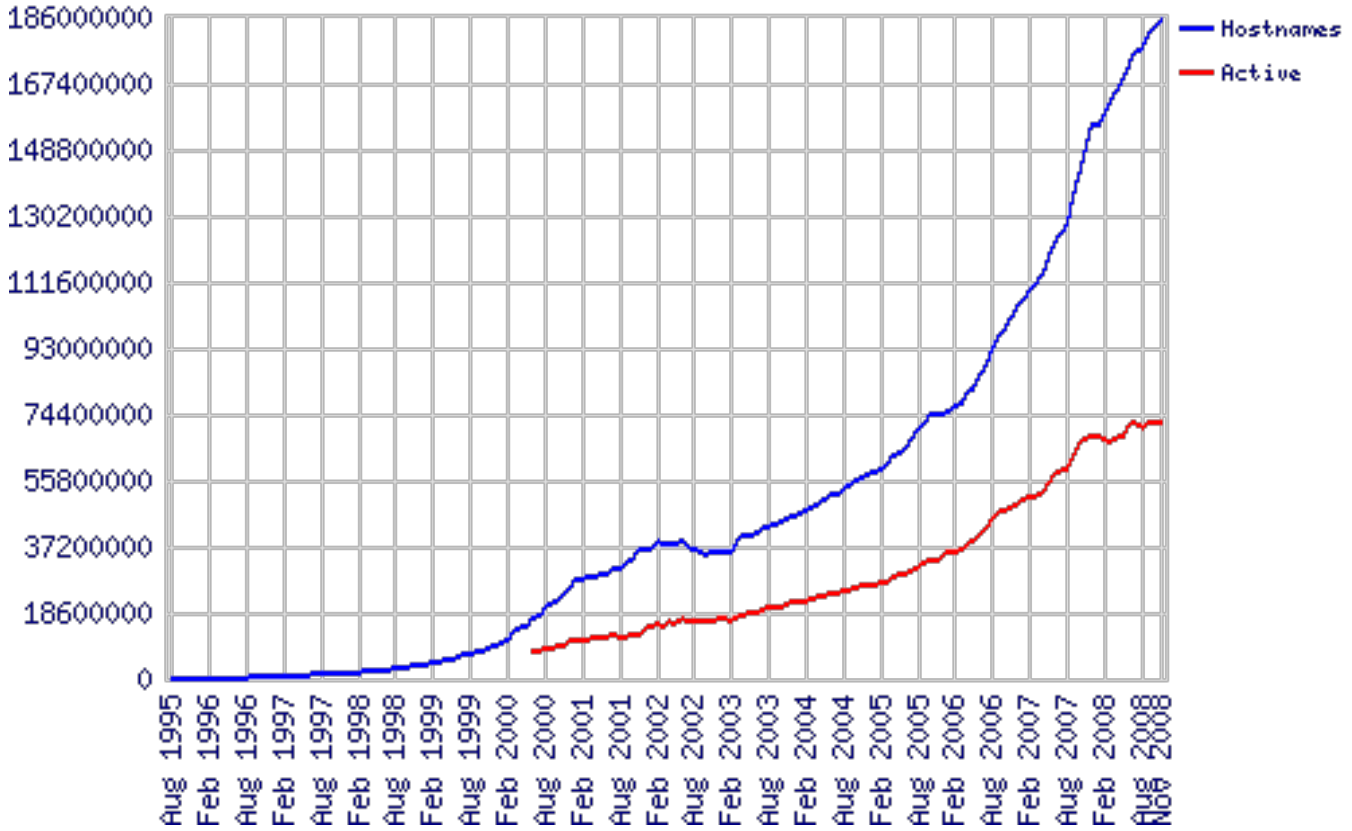
ÉCOLE SUPÉRIEURE DES MÉTIERS

The end of the fortress metaphor

The end of the fortress metaphor



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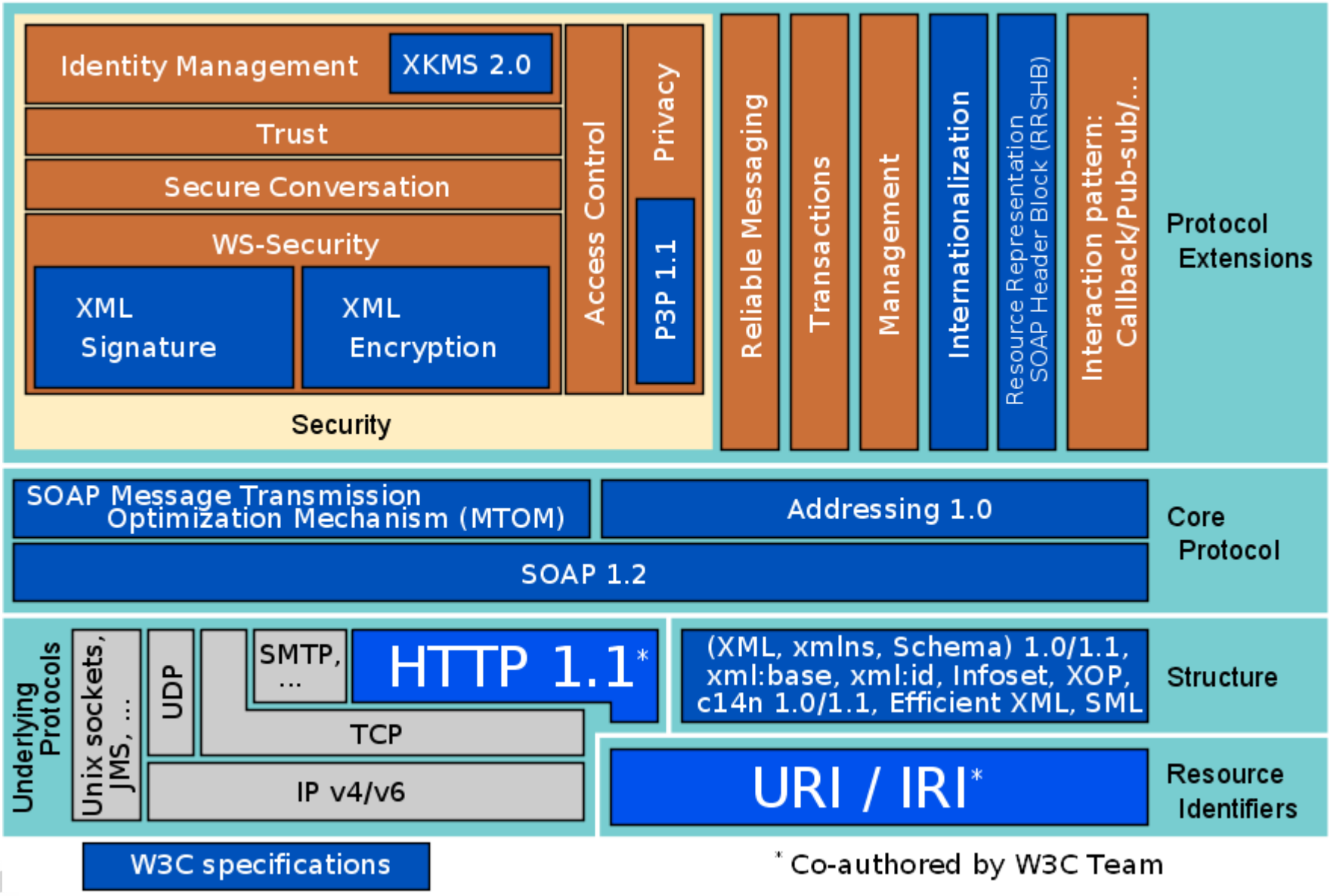
ÉCOLE SUPÉRIEURE DES MÉTIERS

The end of the fortress metaphor



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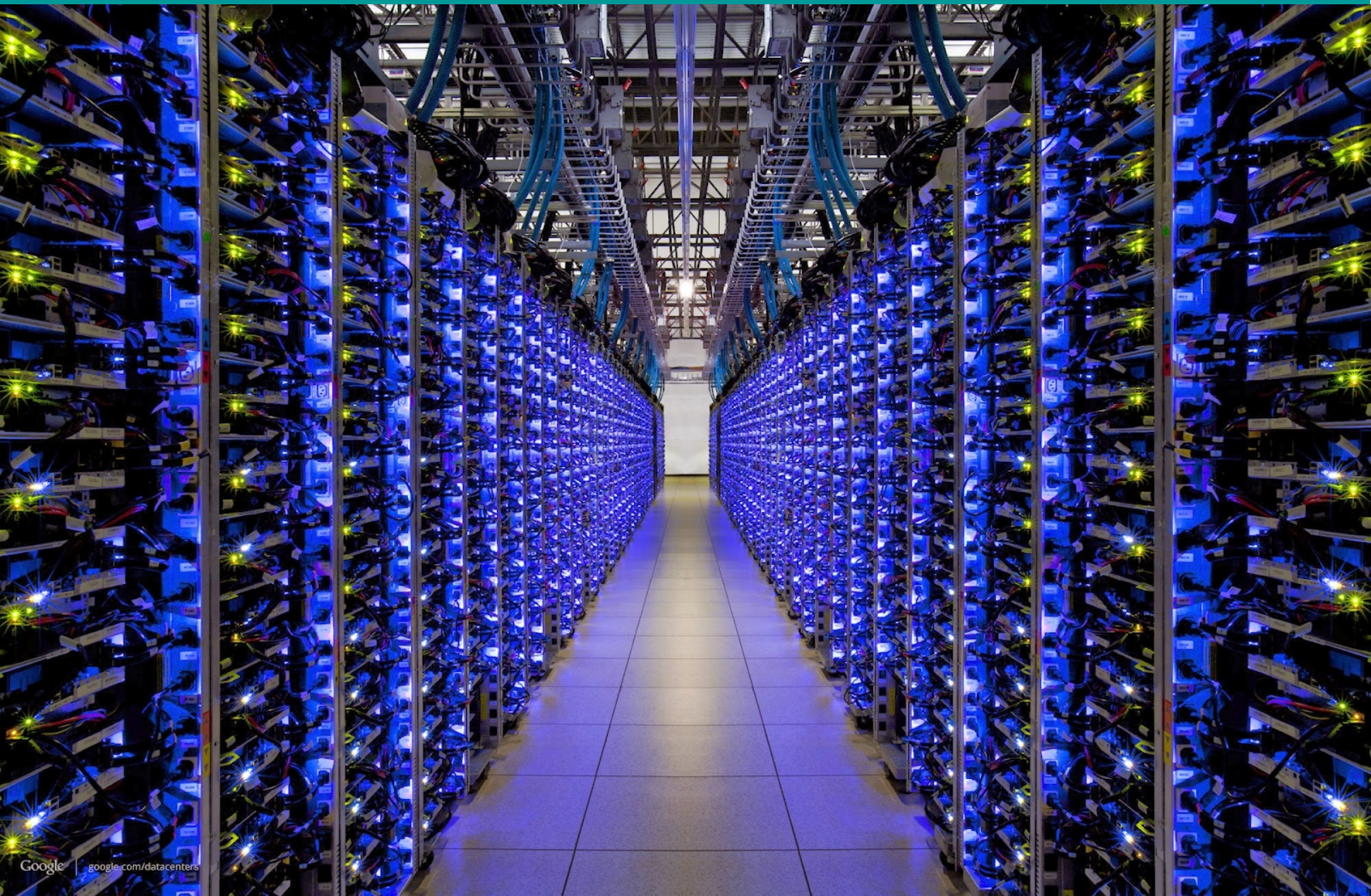

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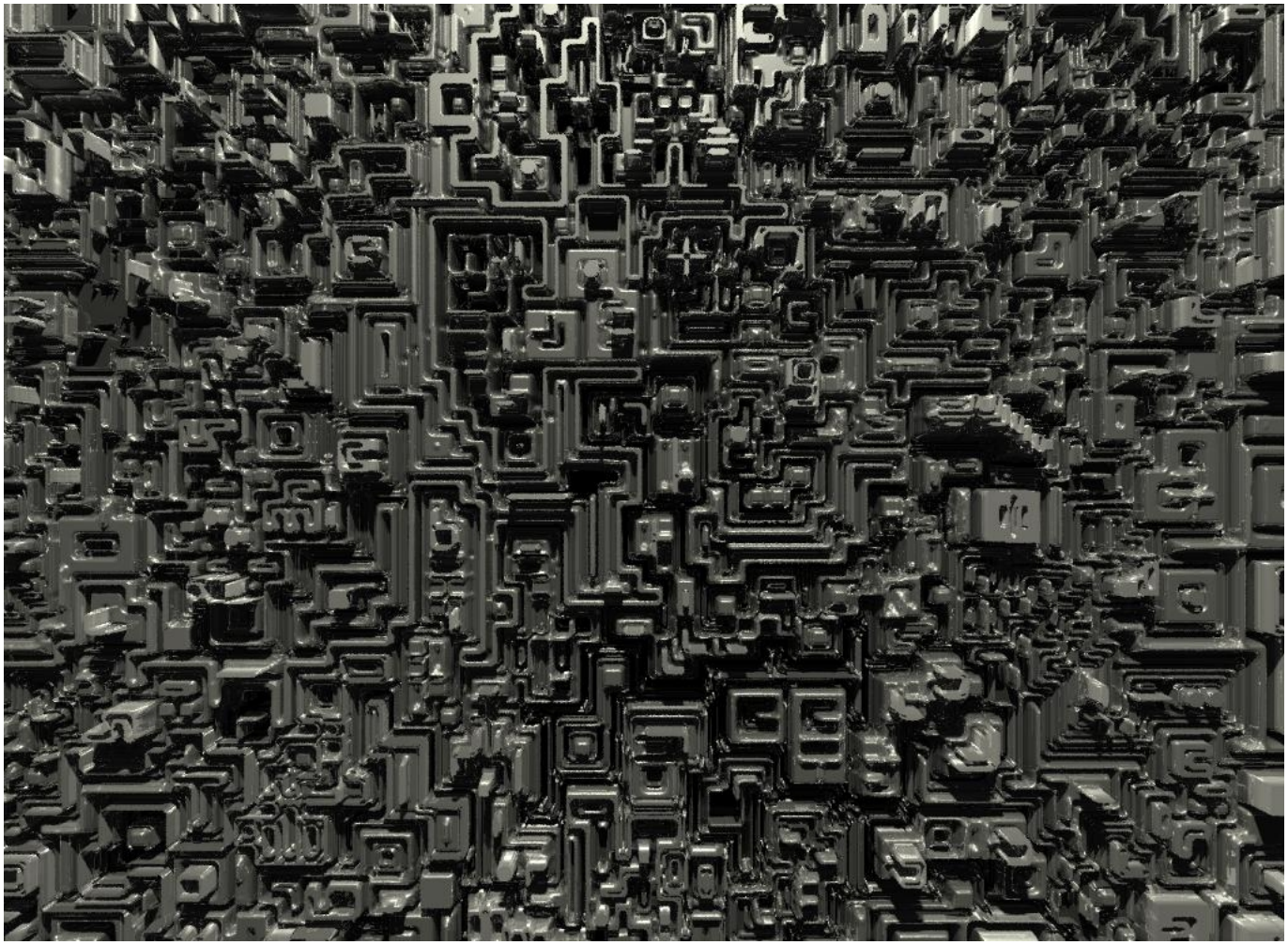

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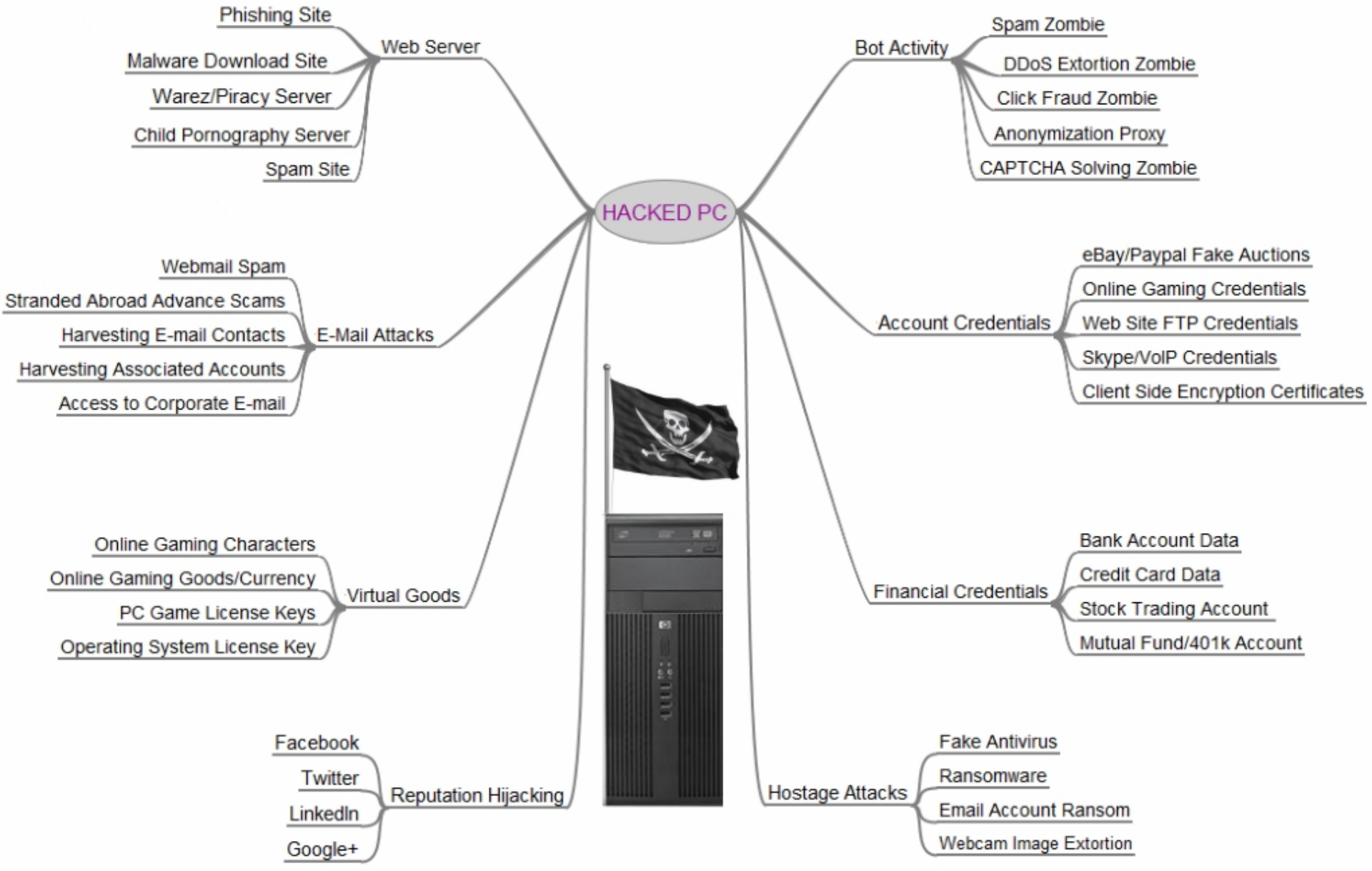
ÉCOLE SUPÉRIEURE DES MÉTIERS

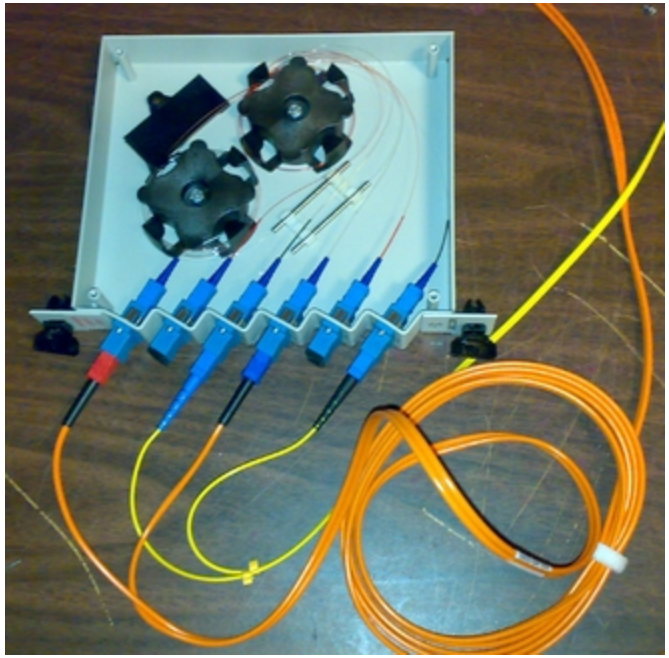
On the client



On the network

Passive attacks: Wireless or Fiber eavesdropper

Active attacks: - evil Wifi router
- DNS poisonning



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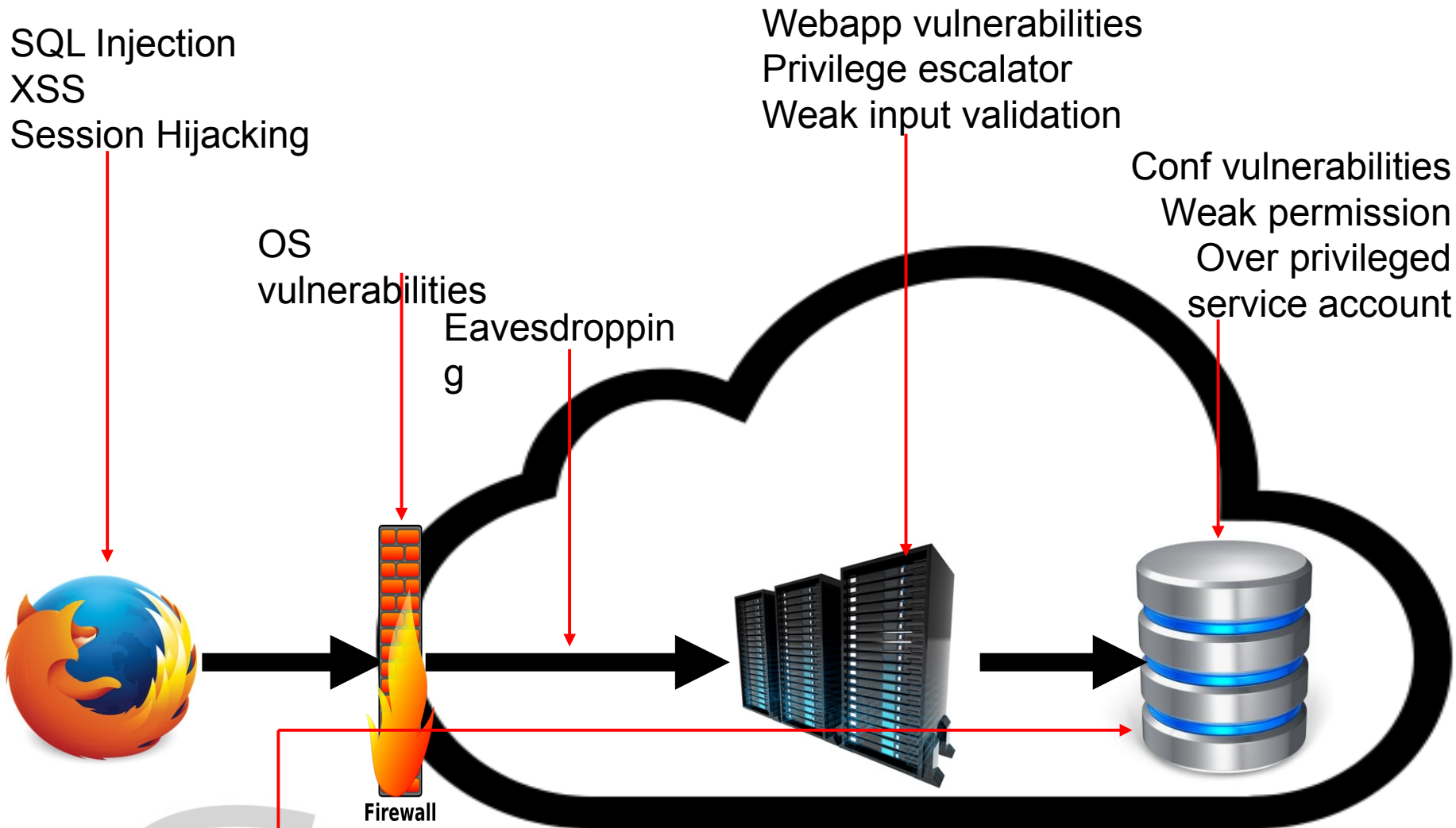
ÉCOLE SUPÉRIEURE DES MÉTIERS

On the server



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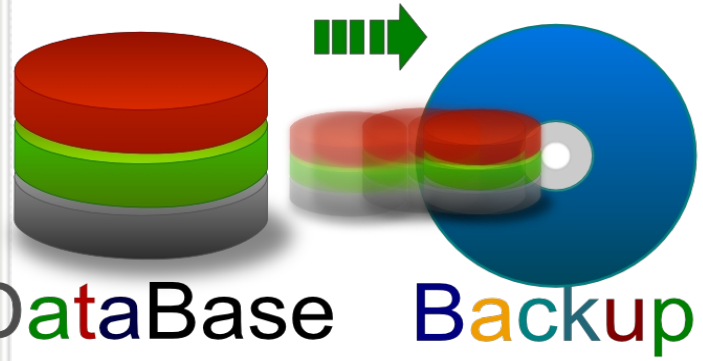
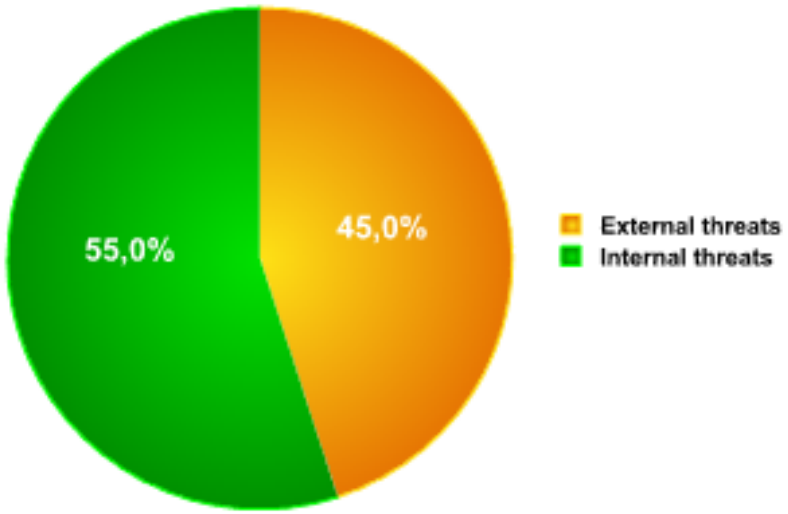
ÉCOLE SUPÉRIEURE DES MÉTIERS

Back Office Threats

View Log File: tot.txt.2008-02-07-16:20:06

```
02-07 16:20:06 +0200 08 tz PROCESSING:00000000: Shepherd thread is started
02-07 16:20:06 +0200 08 tz PROCESSING:00000000: Start scanning queue directory /var
02-07 16:20:07 +0200 08 tz PROCESSING:00000000: Queue directory /var/opt/axigen/que
02-07 16:20:09 +0200 02 tz RPOP:00000001: rpop connection ended, status: 3;Local fo
02-07 16:20:09 +0200 02 tz RPOP:00000002: rpop connection ended, status: 3;Local fo
02-07 16:29:01 +0200 08 tz WEBMAIL:00000003: [192.168.8.179:8000] connection accept
02-07 16:29:01 +0200 08 tz WEBMAIL:00000004: [192.168.8.179:8000] connection accept
02-07 16:29:12 +0200 08 tz WEBMAIL:00000003: Account 'laura.white@mycompany.com' ha
02-07 16:29:16 +0200 08 tz WEBMAIL:00000003: connection closed with [192.168.8.167:
02-07 16:29:16 +0200 08 tz WEBMAIL:00000005: [192.168.8.179:8000] connection accept
02-07 16:29:16 +0200 08 tz WEBMAIL:00000004: connection closed with [192.168.8.167:
02-07 16:29:16 +0200 08 tz WEBMAIL:00000006: [192.168.8.179:8000] connection accept
02-07 16:30:09 +0200 02 tz RPOP:00000007: rpop connection ended, status: 3;Local fo
02-07 16:30:09 +0200 02 tz RPOP:00000008: rpop connection ended, status: 3;Local fo
02-07 16:33:46 +0200 08 tz WEBADMIN:00000009: [192.168.8.179:9000] connection accep
02-07 16:33:51 +0200 08 tz WEBADMIN:00000009: New session 0x2C5EED9B associated wit
```





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Human fails

Technology development

Organization

Psychological weakness

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Business widely impacted

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Web Hacking
III. Countermeasures

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ÉCOLE SUPÉRIEURE DES MÉTIERS

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ÉCOLE SUPÉRIEURE DES MÉTIERS

Security audit

?

PENETRATION TESTING

OLD SCHOOL

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Security audit

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ÉCOLE SUPÉRIEURE DES MÉTIERS

DON'T DELEGATE IT

Security by design

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ÉCOLE SUPÉRIEURE DES MÉTIERS

Security by design

COVERAGE ALL...

Product design and development

Hardware programming

Application & hardware testing

Review code for vulnerabilities

Fix vulnerabilities ASAP

Always aware

Malware analysis, Reverse engineering

Application security review

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ÉCOLE SUPÉRIEURE DES MÉTIERS

Security by design

COVERAGE ALL...
with :

- **developers**
- **admin sys**
- **threats sentinels**

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ÉCOLE SUPÉRIEURE DES MÉTIERS

Security by design

Review code for vulnerabilities:

- pair review off all entry points
- integrate frameworks security fixes
- white box pen tests

Penetration testing:

- with trained team (mandatory)
- blackbox preferred
- apply OWASP guides

Fix vulnerabilities ASAP:

- deliver small changes continuously
- mastering release management
- integrate & deploy framework fixes
- automated smoke test strategy

Security by design

Always aware:

- follow OSS release managers
- inspect OSS discussion groups
- look at CVE
- read OWASP references & newsletter

What is a CVE ?

- **Common Vulnerabilities & Exposures**
- **standardized format**

https://cve.mitre.org/
https://www.owasp.org

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ÉCOLE SUPÉRIEURE DES MÉTIERS

Malware analysis :

- for all untrusted environments

- know your adversary

- don't be weak with known malwares

Security by design

Application security review:

- filter vulnerabilities related to your technical stack
- review by vulnerability
- maintain compliance matrix
- do it deeply for all major release

Security by design

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ÉCOLE SUPÉRIEURE DES MÉTIERS

Test developer threats knowledge:

- fix vulnerabilities with untrained developer

- under trained developer supervision

- share the knowledge
  (how to Xploit / fix a given vulnerability)

- communicate ONCE the patch in production

Even best developers fails...

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You have been hacked

#1 NO LIES #1

#2 OPEN or CLOSE ?

#3 EVALUATE IMPACTS

→ operational

→ reputability

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React after hacks

#1 lock exploit EVEN with business impact

#2 Communicate clearly

#3 Legal – save hack proofs

But major diseases can occurs

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ÉCOLE SUPÉRIEURE DES MÉTIERS

Initial situation

#1 Main Data Center OOO
(Out Of Order)

#2 Related to a hack

#3 Only aim: destroy you

Expendables

#1 Detect vulnerability vector

#2 Patch emergency site

#3 Don't inject new vulnerabilities

#4 Switch to emergency

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Prepared situation

#1 Scenario written in a DRP

(Disaster Recovery Plan)

#2 Tested in operational conditions

#3 Rebuild it periodically

#4 <u>Often theoretical</u>

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Prepared situation

...May works for institutions

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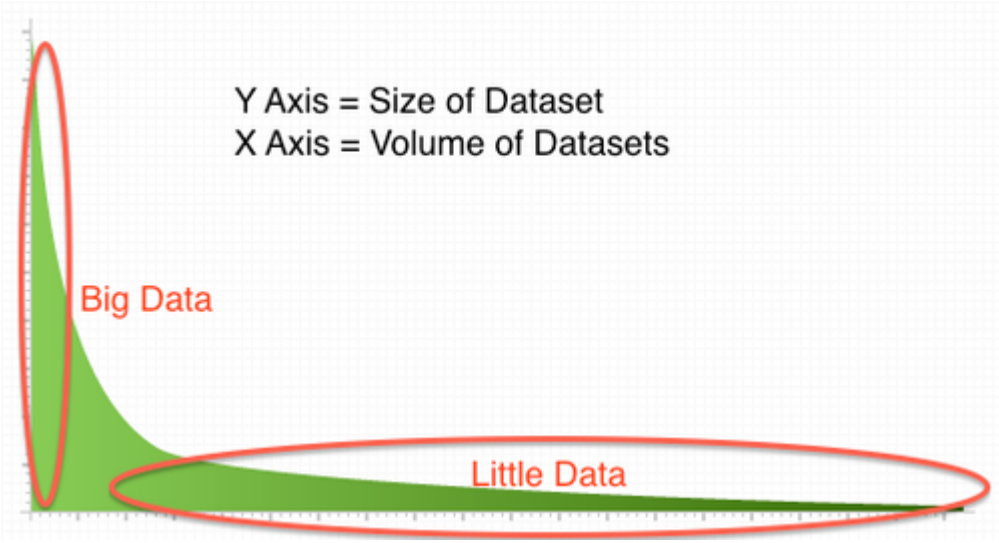
ÉCOLE SUPÉRIEURE DES MÉTIERS

Prepared situation

They have few data



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Prepared situation

They have few data

2x 750m2

Scale → Petaoctet

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ÉCOLE SUPÉRIEURE DES MÉTIERS

Prepared situation

LIMITS?

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Prepared situation

14 DC x 9000m2
900.000 server... in 2011

Scale → unknown

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ÉCOLE SUPÉRIEURE DES MÉTIERS

Prepared situation

→ Replication
→ Multi DC
→ Multi continents

Is NATIVE

Prepared situation

Other exists

15 DC

7 DC

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ÉCOLE SUPÉRIEURE DES MÉTIERS

Prepared situation

Global Capacity is huge but limited

4 TB/S

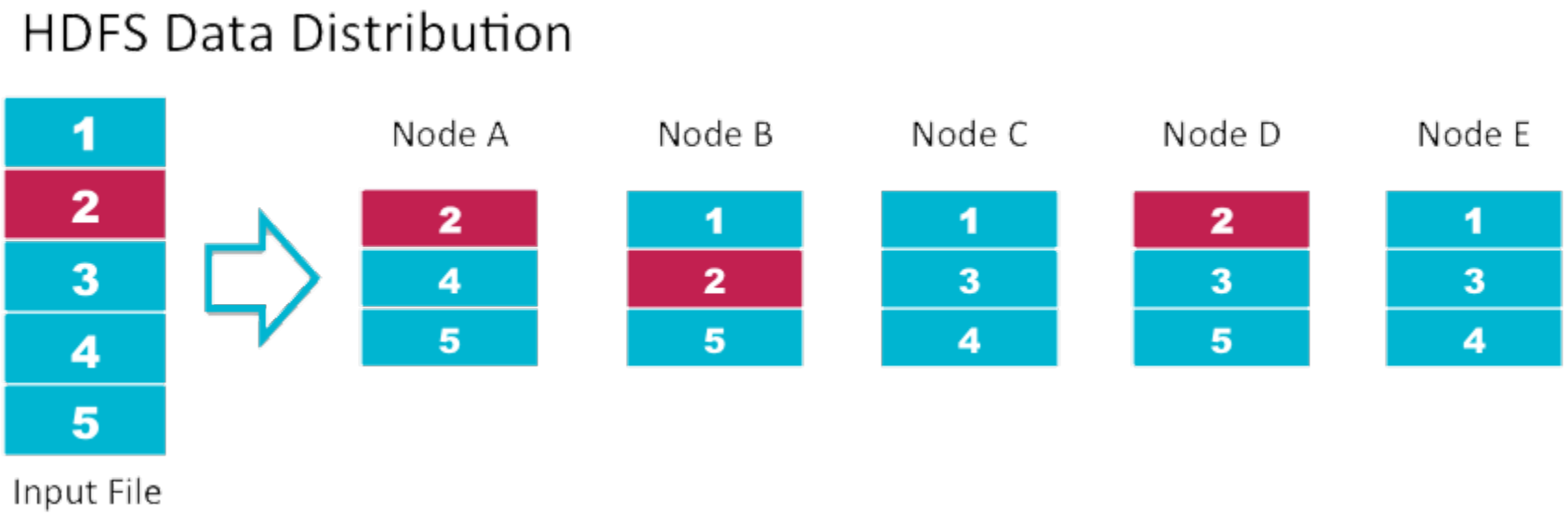
Prepared situation

Move 9 PB daily
takes time...

3 hours with the FULL bandwidth of the 3rd worldwide IPS

Prepared situation

Replication



Other multiple DC

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ÉCOLE SUPÉRIEURE DES MÉTIERS

Prepared situation

Be robust even if

→ **you loose one server**

→ **you loose one rack**

or in extreme cases

→ **one DC**

Prepared situation

Don't be prepared to the Evil...

Invite him at your table

NETFLIX

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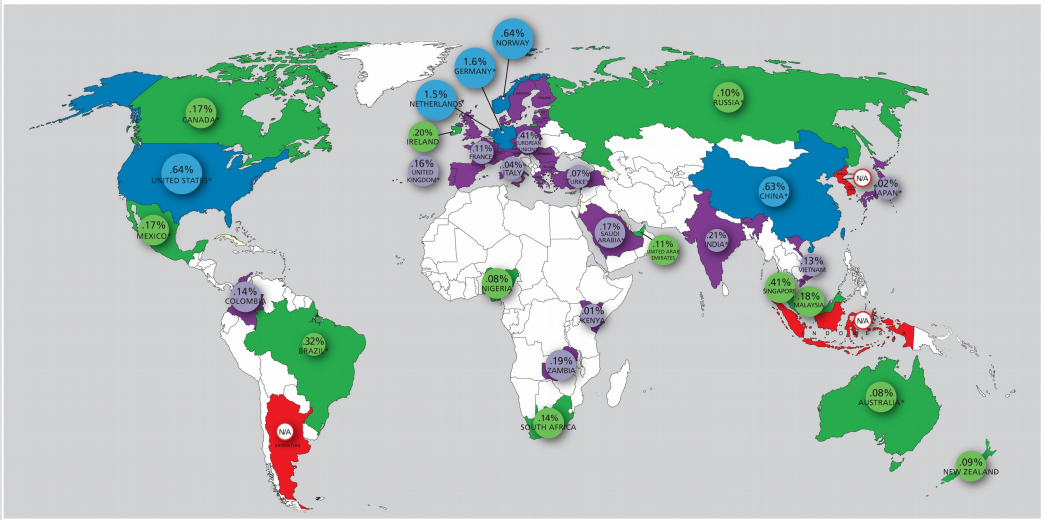

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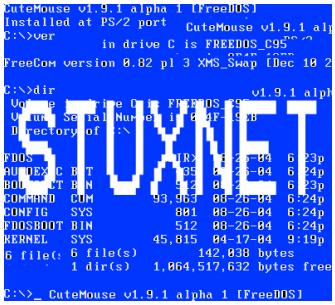

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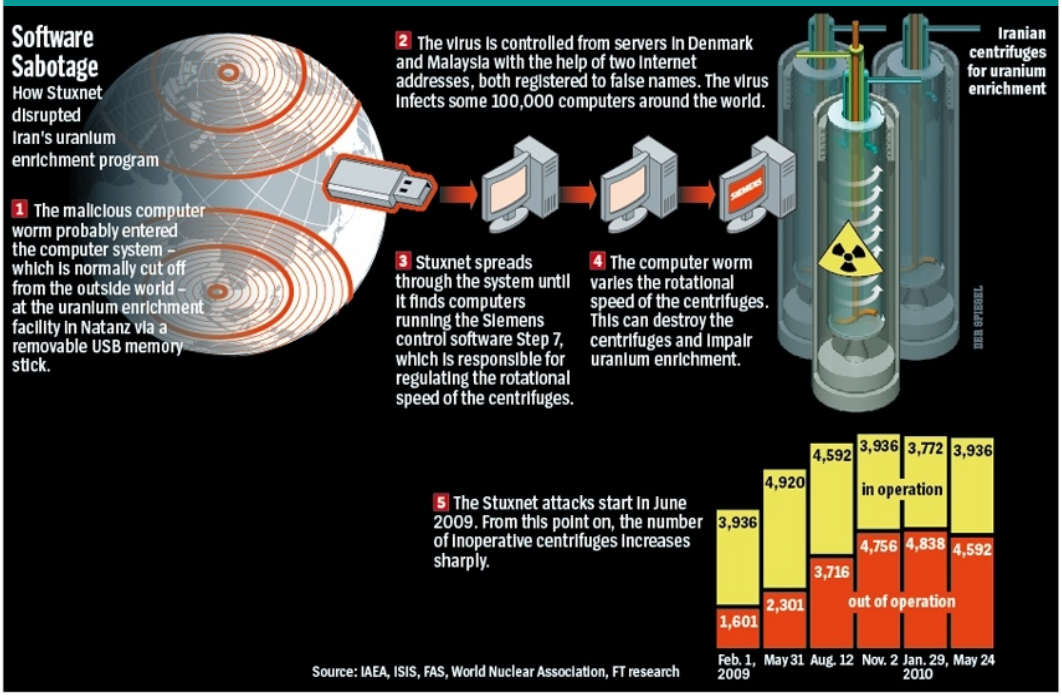

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II. Threats

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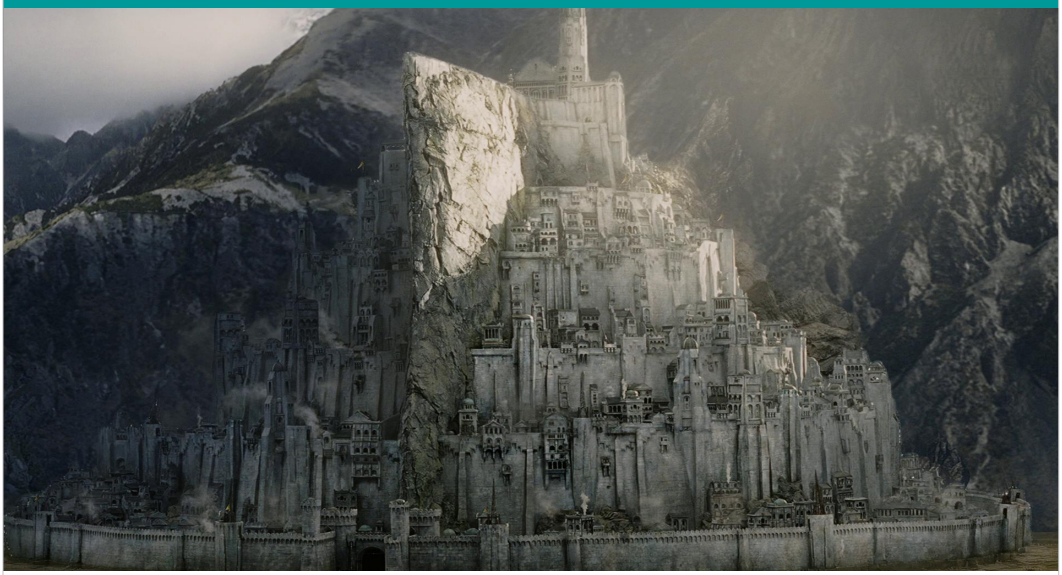
The end of the fortress metaphor



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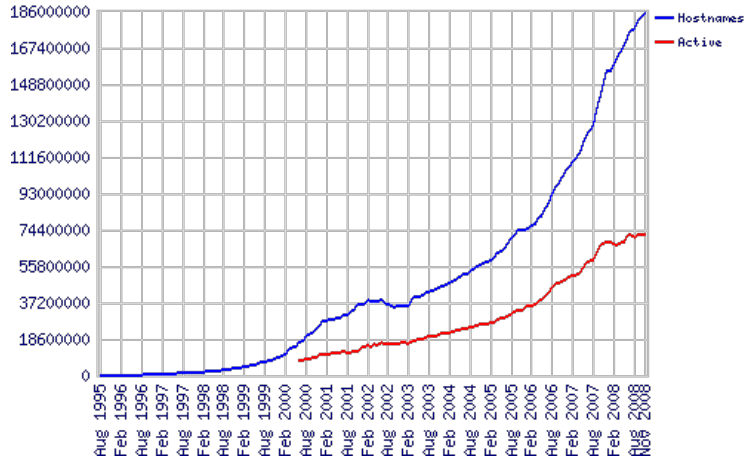

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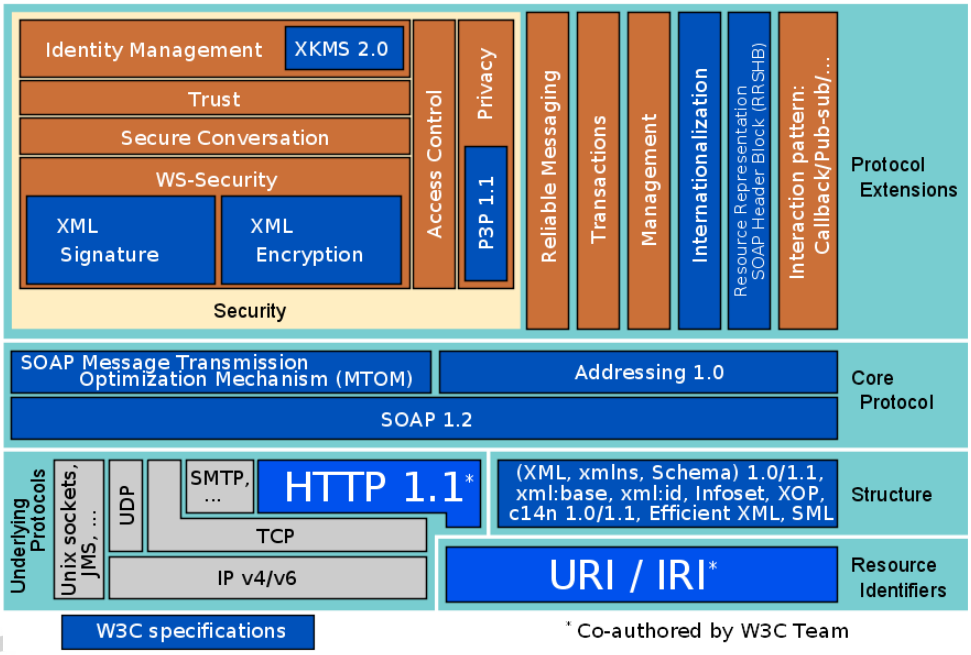

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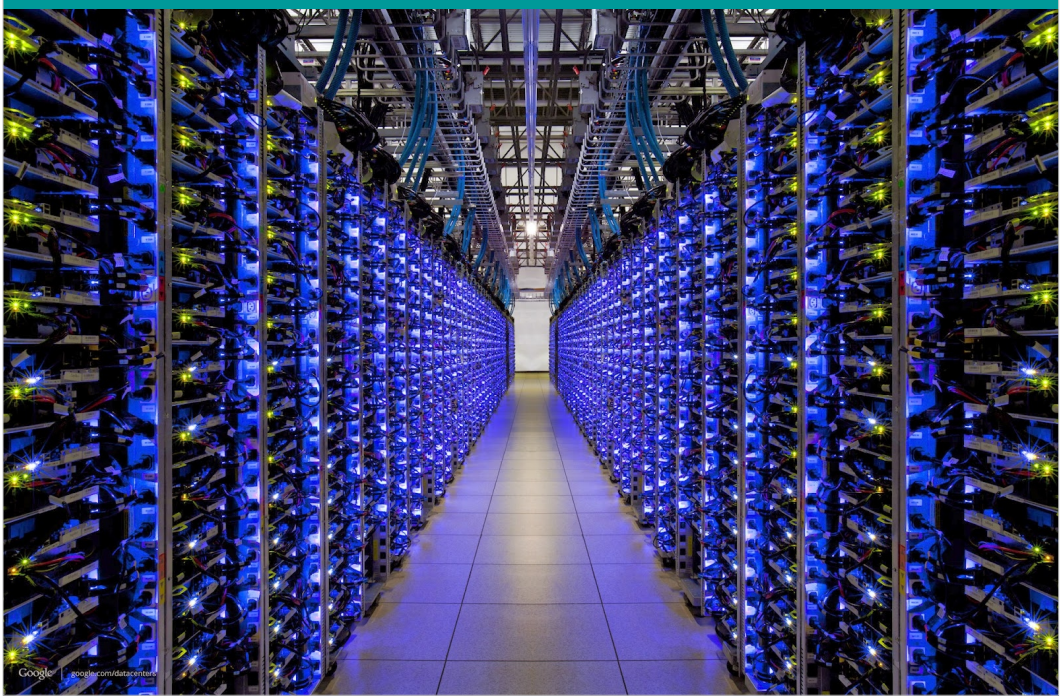

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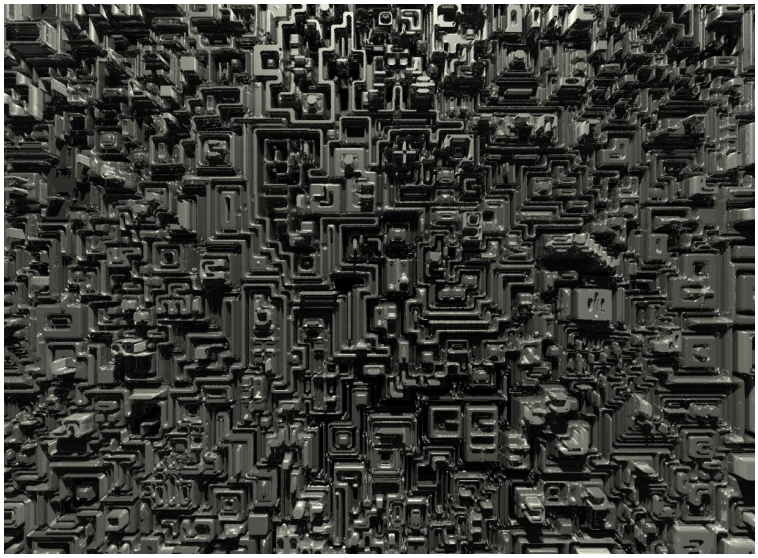

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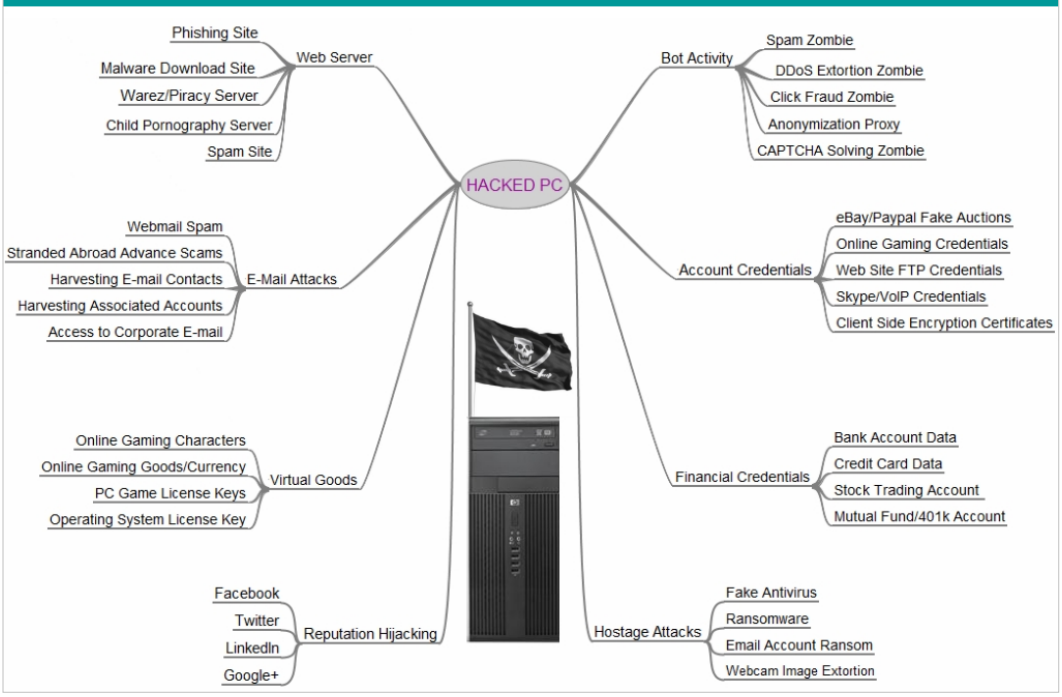

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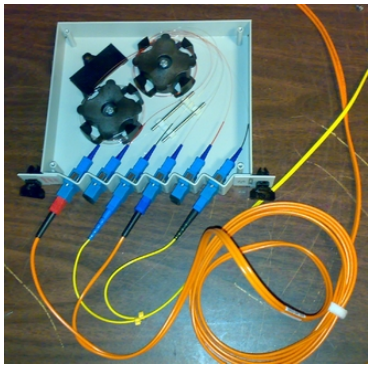

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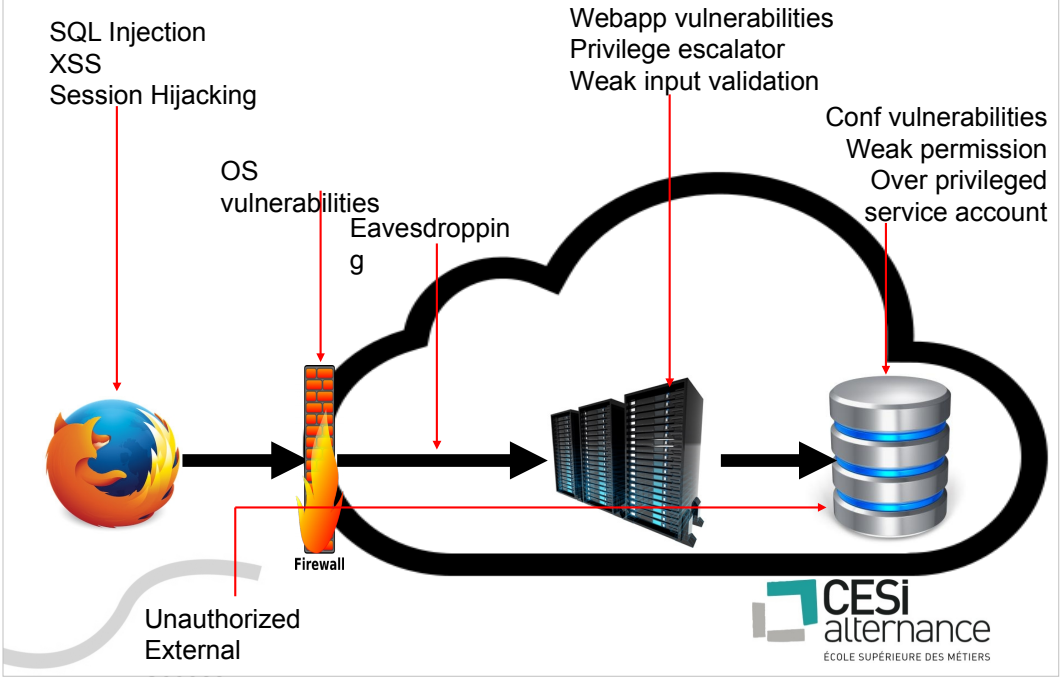
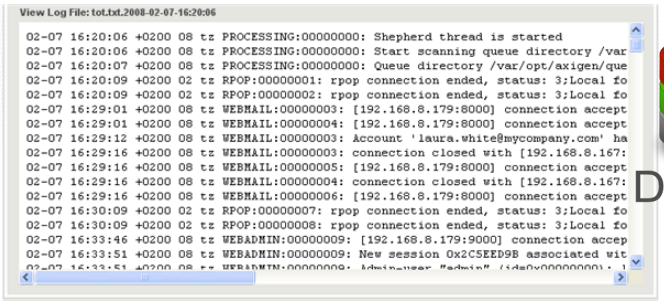
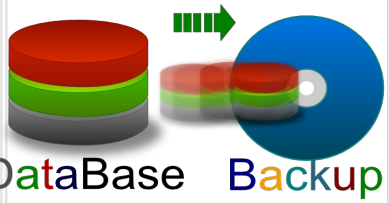
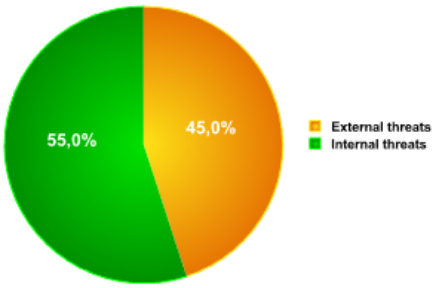
On the server



Back Office Threats







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Human fails

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Web Hacking
III. Countermeasures

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Security audit

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DON'T DELEGATE IT

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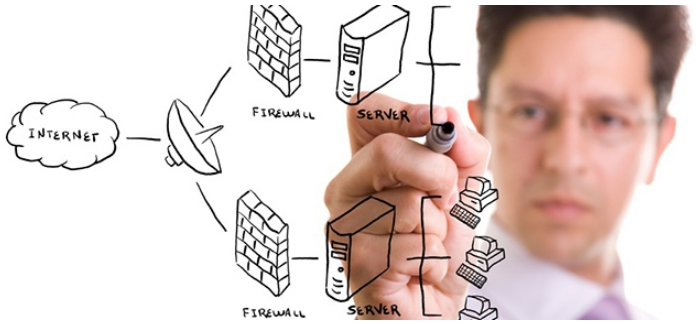
ÉCOLE SUPÉRIEURE DES MÉTIERS

Security by design



CESi alternance
ÉCOLE SUPÉRIEURE DES MÉTIERS

Security by design

COVERAGE ALL...

Product design and development

Hardware programming

Application & hardware testing

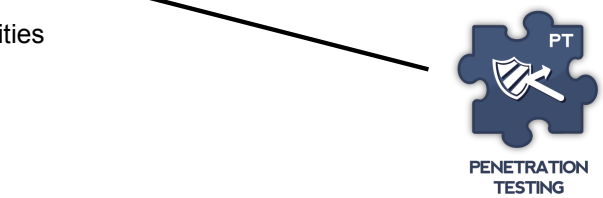
Review code for vulnerabilities

Fix vulnerabilities ASAP

Always aware

Malware analysis, Reverse engineering

Application security review



CESI alternance
ÉCOLE SUPÉRIEURE DES MÉTIERS

Security by design

COVERAGE ALL...
with :

- **developers**
- **admin sys**
- **threats sentinels**

CESi alternance
ÉCOLE SUPÉRIEURE DES MÉTIERS

Review code for vulnerabilities:

- pair review off all entry points
- integrate frameworks security fixes
- white box pen tests

Penetration testing:

- **with trained team (mandatory)**
- **blackbox preferred**
- **apply OWASP guides**

Security by design

Fix vulnerabilities ASAP:

- **deliver small changes continuously**
- **mastering release management**
- **integrate & deploy framework fixes**
- **automated smoke test strategy**

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Security by design

Always aware:

- **follow OSS release managers**
- **inspect OSS discussion groups**
- **look at CVE**
- **read OWASP references & newsletter**

What is a CVE ?

- **Common Vulnerabilities & Exposures**
- **standardized format**

https://cve.mitre.org/
https://www.owasp.org

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Malware analysis :

- **for all untrusted environments**
- **know your adversary**
- **don't be weak with known malwares**

Application security review:

- filter vulnerabilities related to your technical stack
- review by vulnerability
- maintain compliance matrix
- do it deeply for all major release

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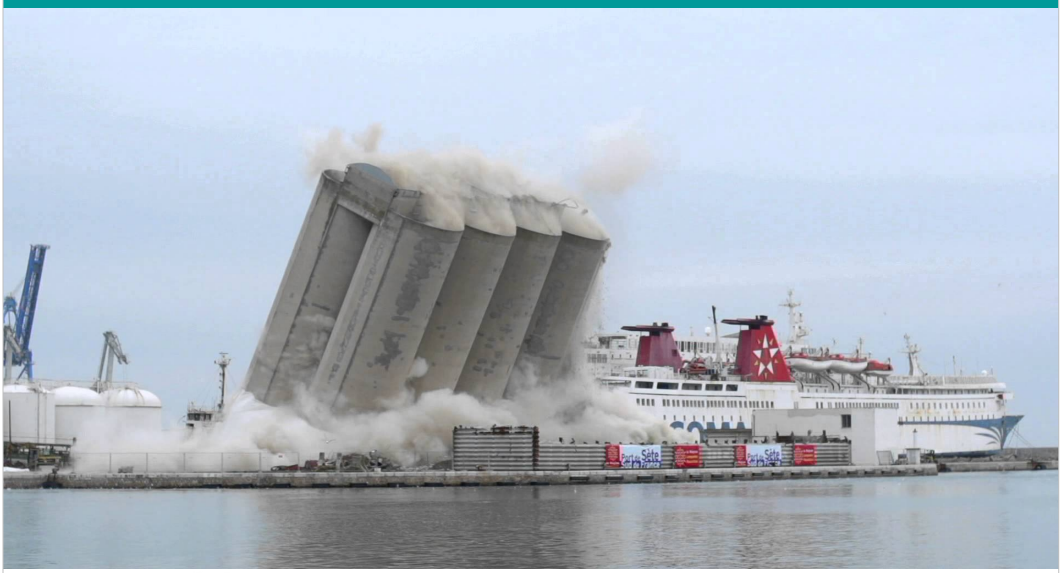
Security by design



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Test developer threats knowledge:

- **fix vulnerabilities with untrained developer**
- **under trained developer supervision**
- **share the knowledge**
  (how to Xploit / fix a given vulnerability)
- **communicate ONCE the patch in production**

Even best developers fails...

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You have been hacked

#1 NO LIES #1

#2 OPEN or CLOSE ?

#3 EVALUATE IMPACTS

→ operational

→ reputability

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React after hacks

#1 lock exploit EVEN with business impact

#2 Communicate clearly

#3 Legal – save hack proofs

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But major diseases can occurs

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Initial situation

#1 Main Data Center OOO

(Out Of Order)

#2 Related to a hack

#3 Only aim: destroy you

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Expendables

#1 Detect vulnerability vector

#2 Patch emergency site

#3 Don't inject new vulnerabilities

#4 Switch to emergency

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Prepared situation

#1 Scenario written in a DRP

(Disaster Recovery Plan)

#2 Tested in operational conditions

#3 Rebuild it periodically

#4 Often theoretical

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Prepared situation

...May works for institutions

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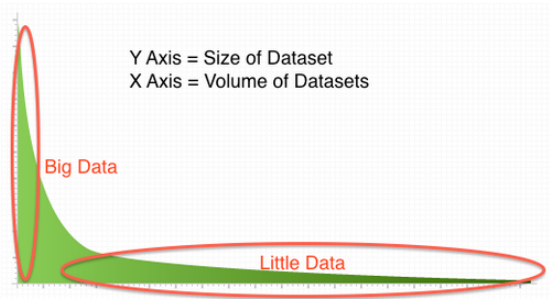
ÉCOLE SUPÉRIEURE DES MÉTIERS

Prepared situation

They have few data



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Prepared situation

They have few data

2x 750m2

Scale → Petaoctet

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Prepared situation

LIMITS?

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Prepared situation

14 DC x 9000m2
900.000 server... in 2011

Scale → unknown

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Prepared situation

→ Replication
→ Multi DC
→ Multi continents

Is NATIVE

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Prepared situation

Other exists

15 DC

7 DC

Prepared situation

Global Capacity is huge but limited

4 TB/S

Prepared situation

Move 9 PB daily
takes time...

3 hours with the FULL bandwidth
of the 3rd worldwide IPS

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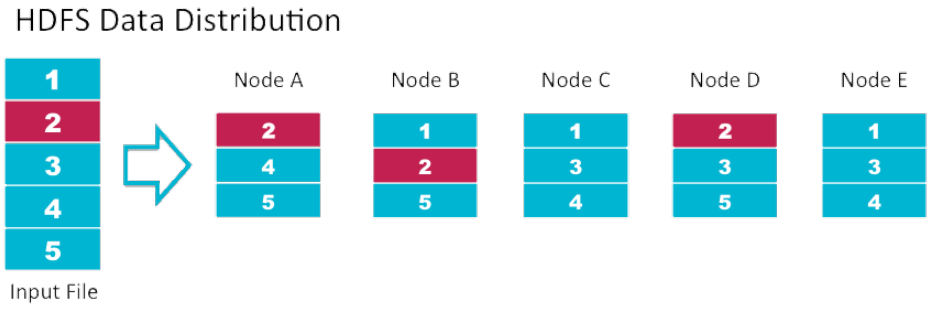
ÉCOLE SUPÉRIEURE DES MÉTIERS

Prepared situation

Replication



Other multiple DC

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Prepared situation

Be robust even if

→ **you loose one server**

→ **you loose one rack**
or in extreme cases
→ **one DC**

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Prepared situation

Don't be prepared to the Evil...

Invite him at your table

NETFLIX

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