Potentially Malicious URLs

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First Get Permission If Needed

First Get Permission If Needed

Major issues

- You don't always know if that data you are transmitting is sensitive

- There is no expectation of privacy when utilizing a third party site

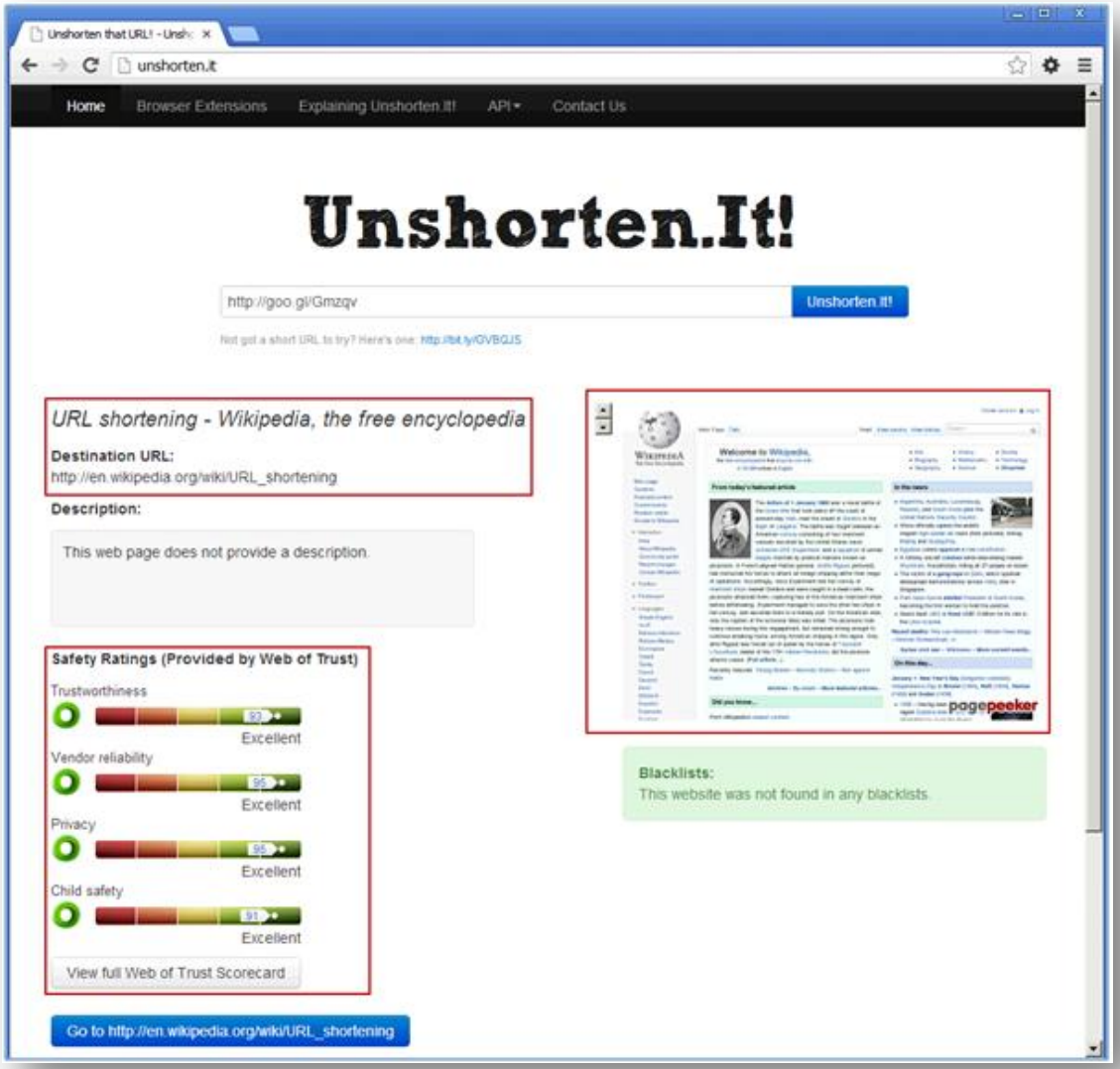
Unshortening

URL shorteners

Name	URL	Ex
TinyURL	http://tinyurl.com/	http://tinyurl.com/bpb94s3
Tiny	http://tiny.cc/	http://tiny.cc/vorjsw
Bitly	https://bitly.com/shorten/	http://bit.ly/WMyu8O
Google Shortener	http://goo.gl/	http://goo.gl/ICq6o
Ow.ly	http://ow.ly/	http://ow.ly/hK9YQ
Twitter Shortener	http://t.co	http://t.co/xxxx
is.gd	http://is.gd/	http://is.gd/PliCom
McAfee Shortener	http://mcaf.ee/	http://mcaf.ee/26tw9

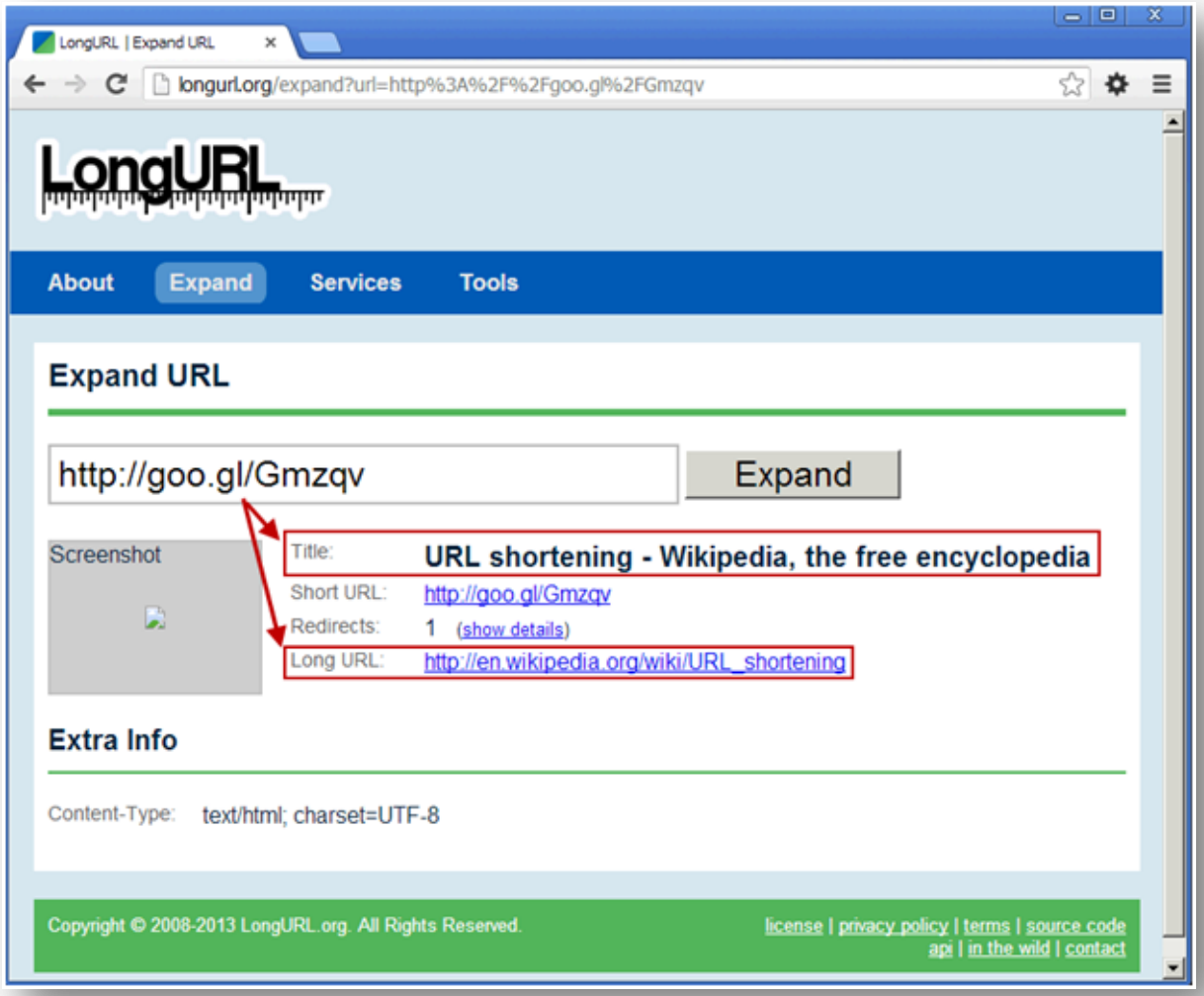
URL unshorteners

- **Unshorten.it**
  - **http://unshorten.it/**



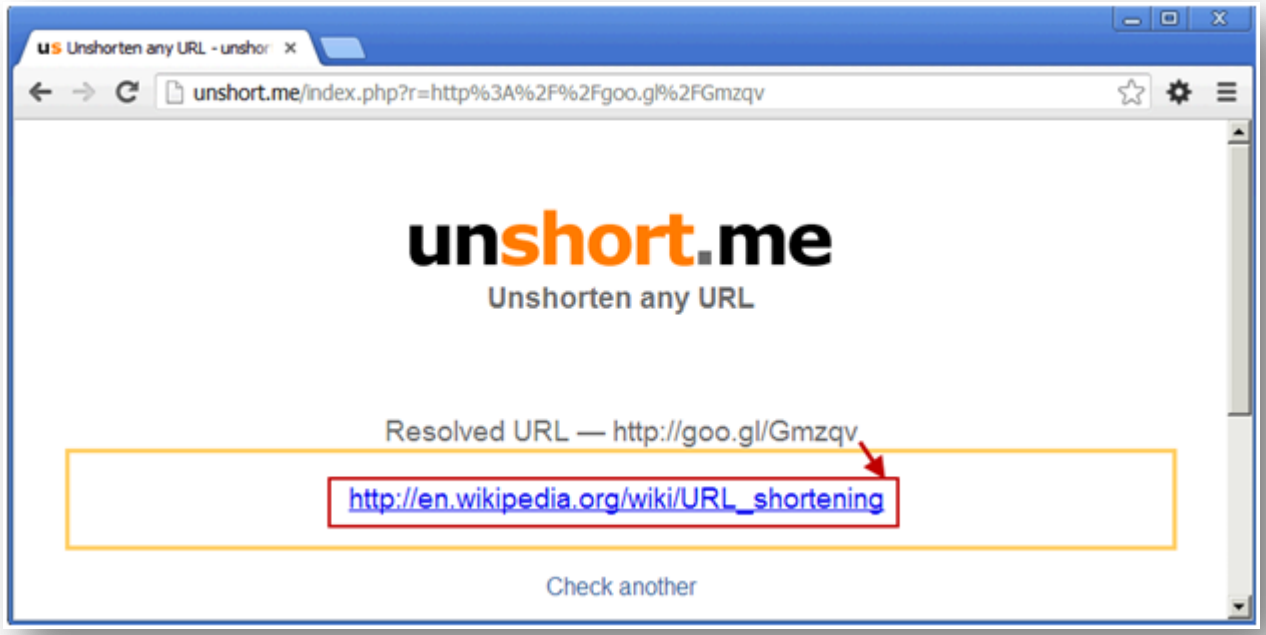
URL unshorteners

- **LongURL**
  - **http://longurl.org/**



URL unshorteners

- **Unshort.me**
  - **http://unshort.me/**



URL unshorteners

- **Unshorten.com**
  - **http://www.unshorten.com/**

Obfuscating

- URI Tricks
- IP Obfuscation
- URL Encoding

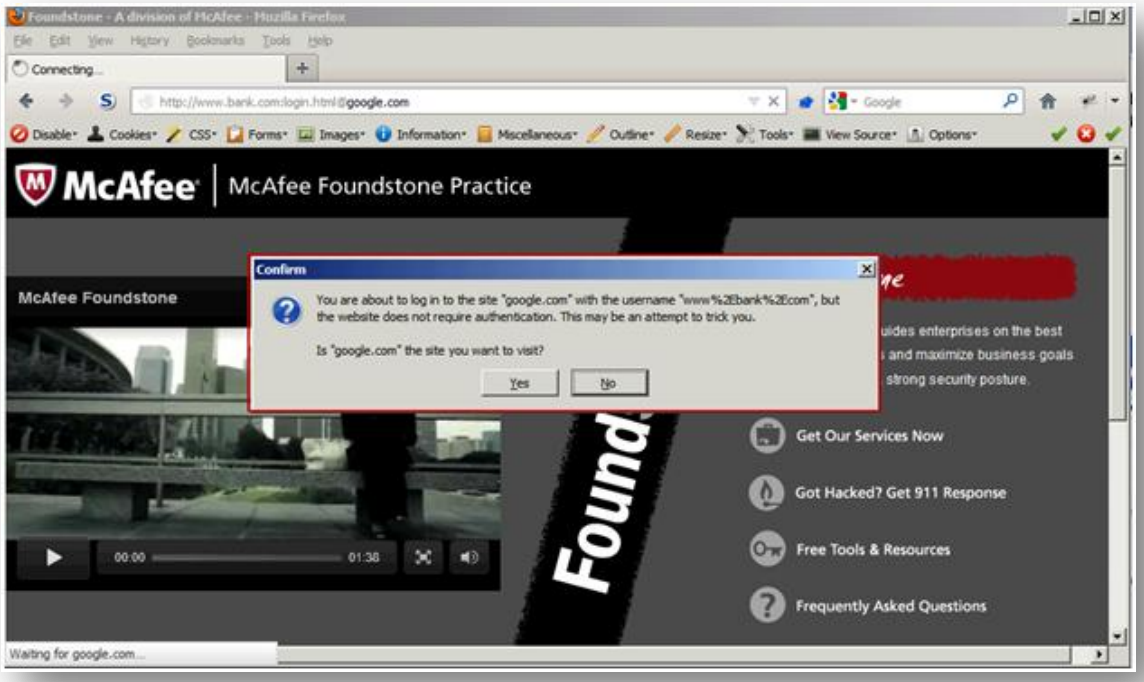
URI Tricks

- **The general URL format**
  - protocol://username:password@host:port/resource

- **Simple examples**
  1) http://www.example.com/a/page.html
  2) https://www.attacker.com:8443/attackscript.js
  3) https://www.bank.com:login.html@phisher.cn/

URI Tricks

- **Chrome v23**
  - Understood the URL and correctly sent us
- **Internet Explorer 8, 9, 10**
  - Not working (only 3.0 – 6.0)
- **Firefox 17.0.1**
  - Warning



IP obfuscation

- **74.125.131.105 (one of Google's IP addresses)**
  - http://www.bank.com:login.html@74.125.131.105
  - http://www.bank.com:login.html@1249739625/
    - ✓ DWORD conversion
      - (((((74*256) + 125) * 256) + 131) * 256) + 105 = 1249739625
  - http://www.bank.com:login.html@0x4a.0x7d.0x83.0x69/
    - ✓ Hex conversion
      - 74 = 0x4a 125 = 0x7d 131=0x83 105=0x69
  - http://www.bank.com:login.html@0112.0175.0203.0151/
    - ✓ Octal conversion
      - 74 = 0112 125 = 0175 131 = 0203 105 = 0151

URL Encoding

- converts characters into a format that can be transmitted over the Internet
- Be used in URLs to confuse the user and hide intention
  - ftp://foo:foo%40example.com@ftp.example.com/pub/a.txt
    - ✓ %40 -> '@'

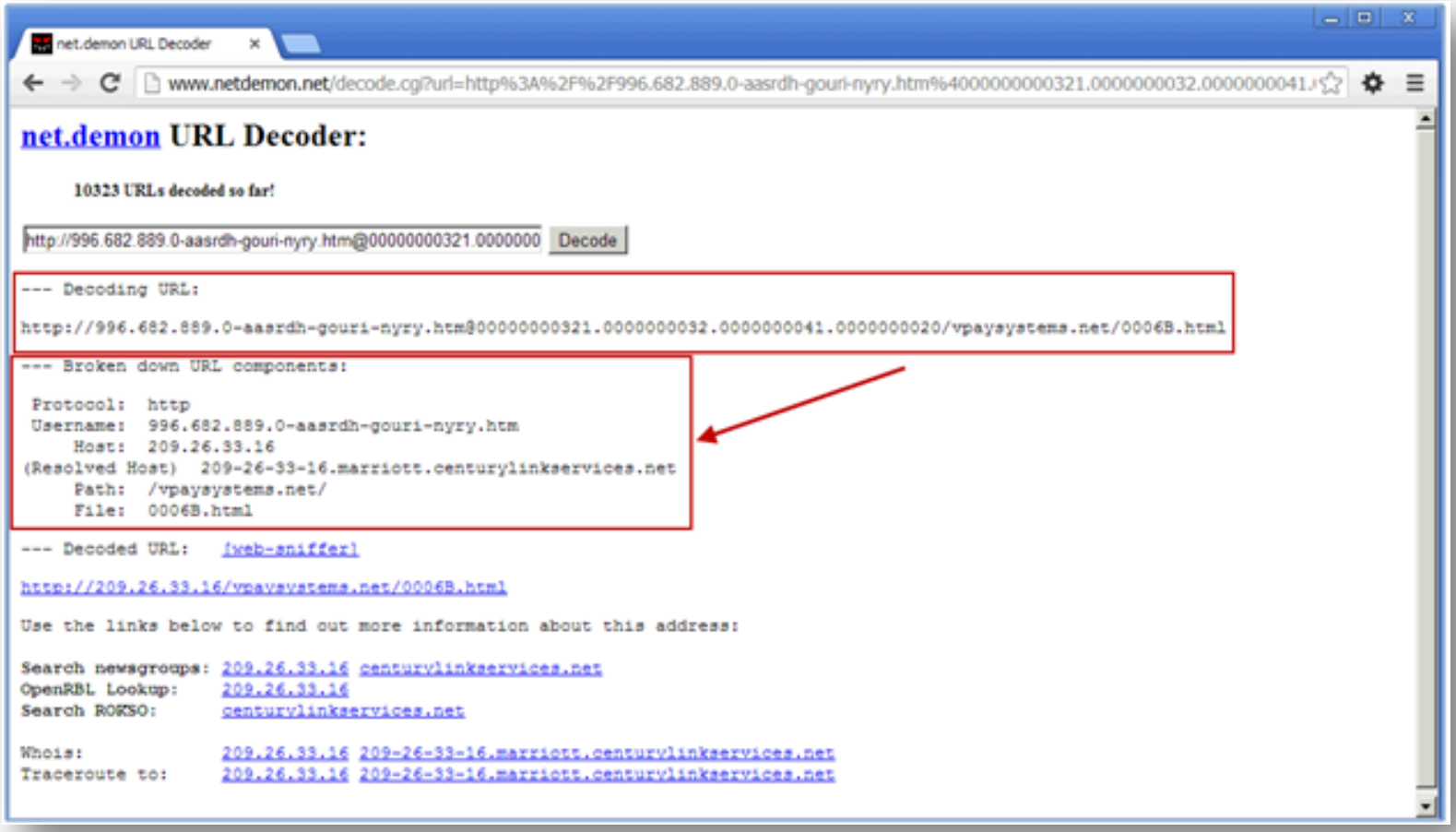
Deobfuscating

Deobfuscating

- **http://225.116.453.0-bank-login.htm@00000112.00000175.00000203.00000151**
  - These can still be done by hand, but can be time consuming
  - There are some third-party sites that will help you figure out what the URL is doing

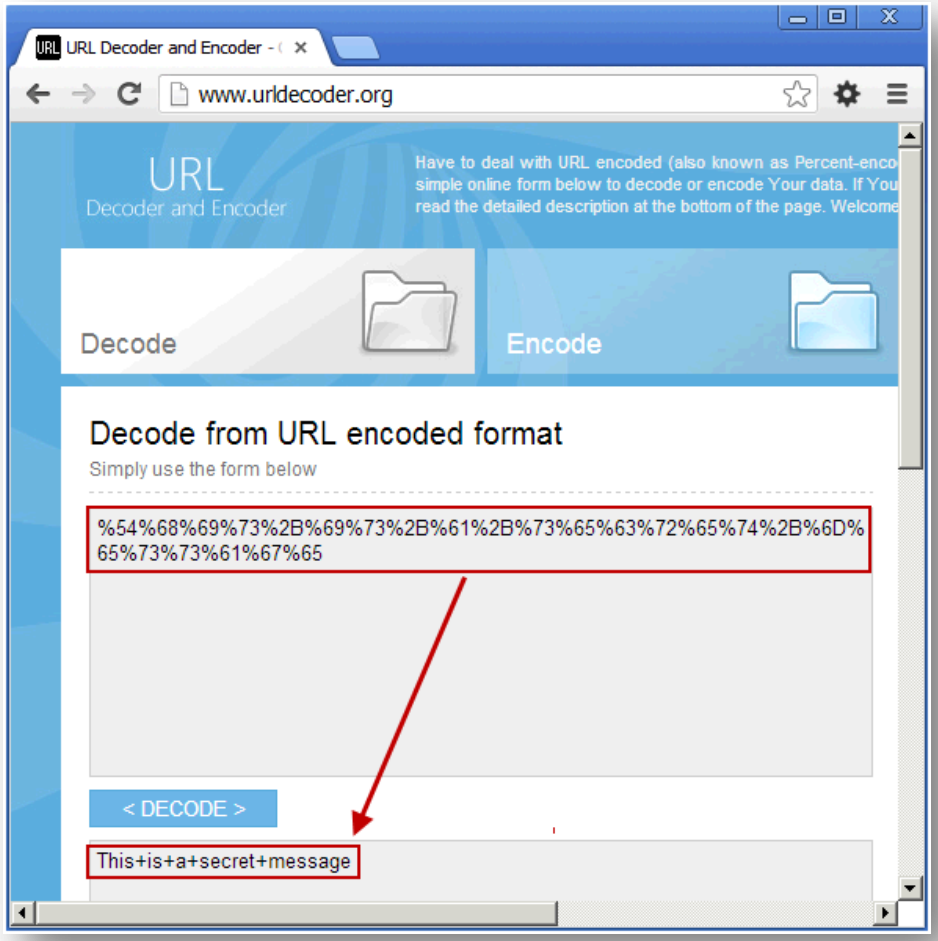
Deobfuscating

- **Netdemon**
  - http://www.netdemon.net/decode.cgi



Deobfuscating

- **URL decoder**
  - http://www.urldecoder.org/

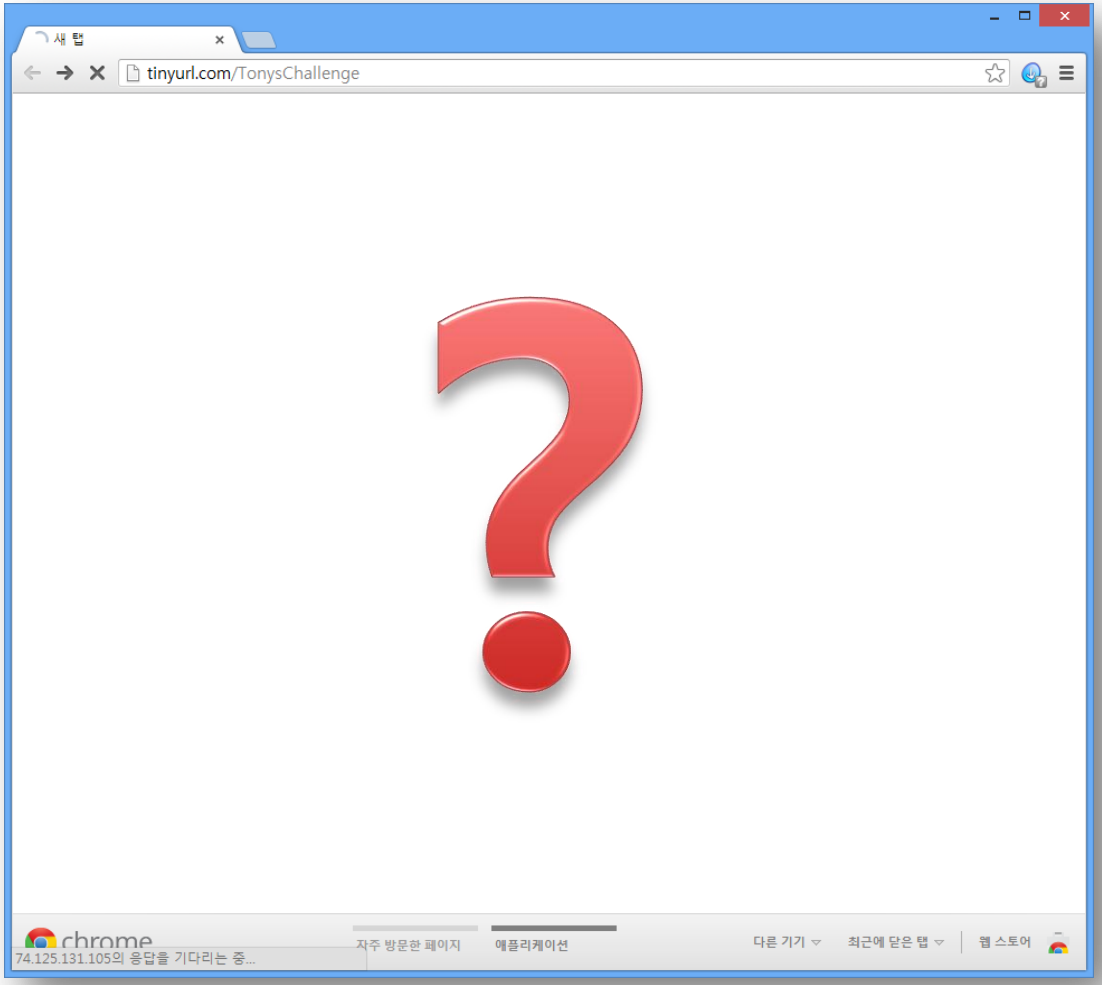


Challenge!

- Manual Safe Deconstruction
- Automatic Safe Deconstruction
- Obfuscation Process
- Tracing the Click
- Browser Compatibility
- Conclusion

Challenge!

- **http://tinyurl.com/TonysChallenge**



Manual Safe Deconstruction

1. Unshorten the URL
2. Discard URL trickery
3. Convert Octal to Decimal
4. URL decode
5. WHOIS attribution

Manual Safe Deconstruction

- **Unshorten the URL**
  - Use one of the URL shorteners called tinyurlchecker

Manual Safe Deconstruction

- **Unshorten the URL**
  - Result
    - ✓ http://225.116.453.0-bank-login.htm@00000112.00000175.00000203.00000151/%75%72%6C?%73%61=%74&%75%72%6C=%68%74%74%70%3A%2F%2F%77%77%77%2E%79%6F%75%74%75%62%65%2E%63%6F%6D%2F%77%61%74%63%68%3Fv%3%44%6F%48%67%35%53%4A%59%52%48%41%30

Manual Safe Deconstruction

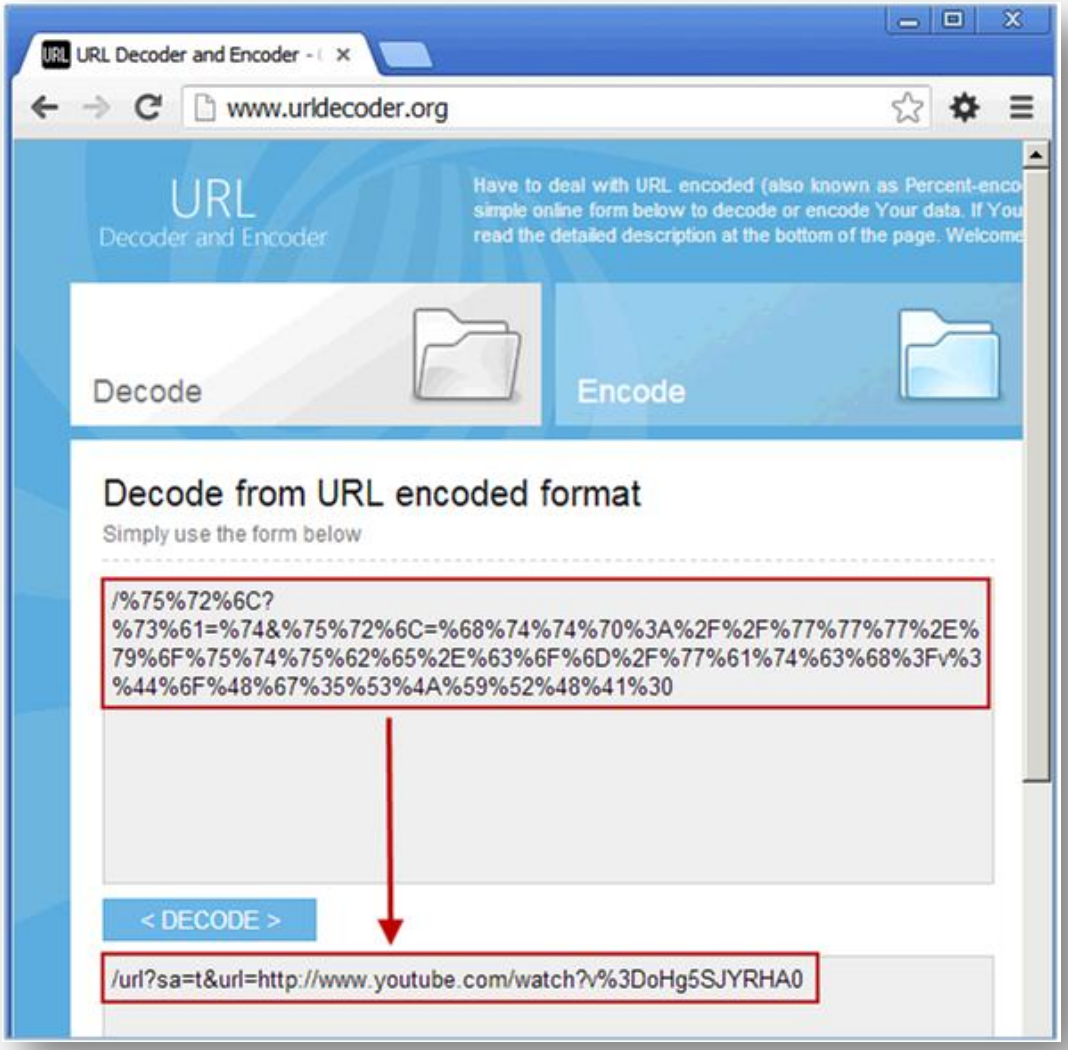
- **Discard URL trickery**
  - Remove anything from the http:// up to and including the '@'.
  - Result
    - ✓ http://00000112.00000175.00000203.00000151/%75%72%6C?%73%61=%74&%75%72%6C=%68%74%74%70%3A%2F%2F%77%77%77%2E%79%6F%75%74%75%62%65%2E%63%6F%6D%2F%77%61%74%63%68%3Fv%3%44%6F%48%67%35%53%4A%59%52%48%41%30

Manual Safe Deconstruction

- **Convert Octal to Decimal**
  - Address: http://00000112.00000175.00000203.00000151
  - Convert: 00000112 = 74 00000175 = 125 00000203 = 131 00000151 = 105
  - Becomes: http://74.125.131.105
  - Result
    - ✓ http://74.125.131.105/%75%72%6C?%73%61=%74&%75%72%6C=%68%74%74%70%3A%2F%2F%77%77%77%2E%79%6F%75%74%75%62%65%2E%63%6F%6D%2F%77%61%74%63%68%3Fv%3%44%6F%48%67%35%53%4A%59%52%48%41%30

Manual Safe Deconstruction

- **URL decode**

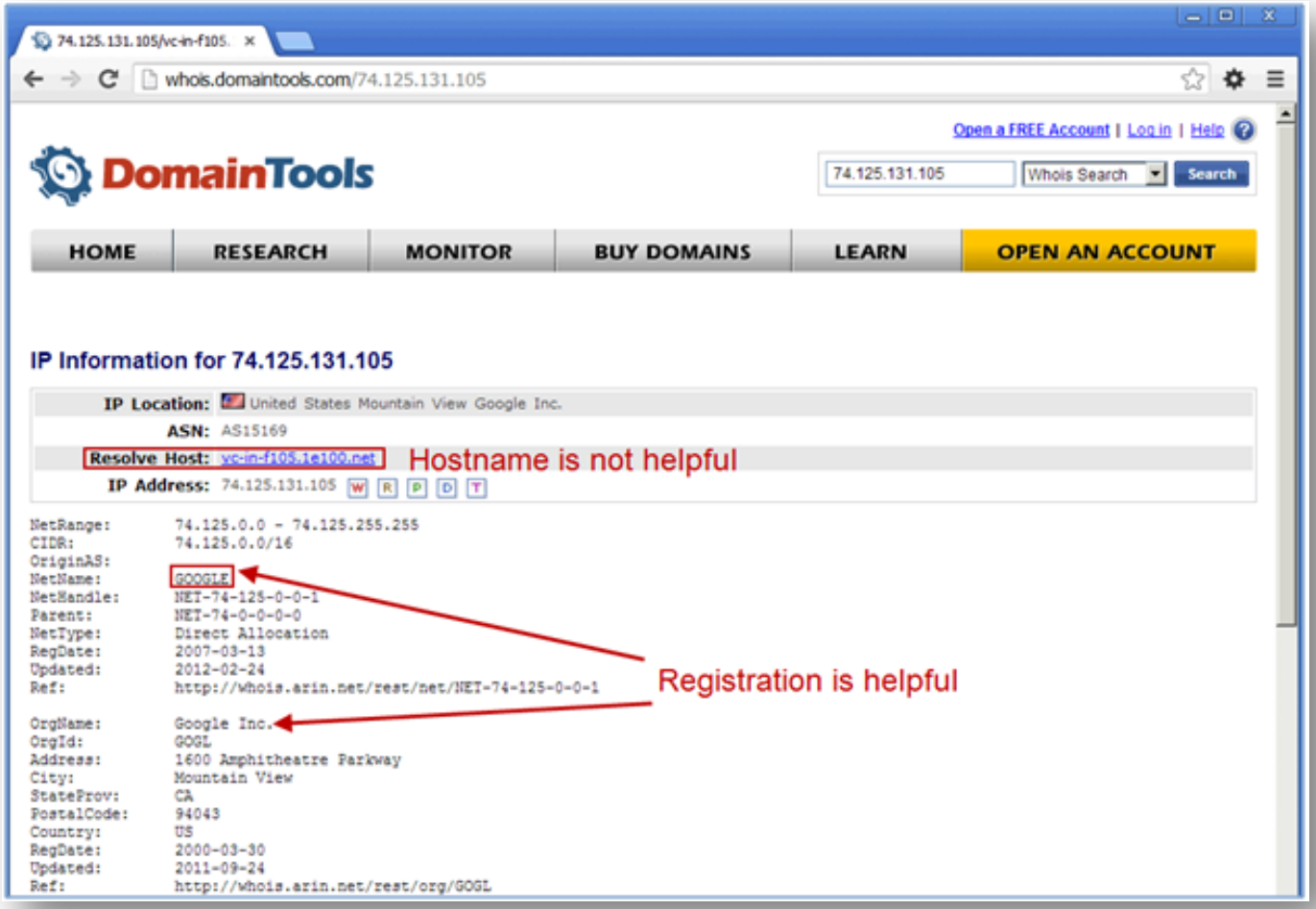


Manual Safe Deconstruction

- **URL decode**
  - Result
    - ✓ http://74.125.131.105/url?sa=t&url=http://www.youtube.com/watch?v%3DoHg5SJYRHA0

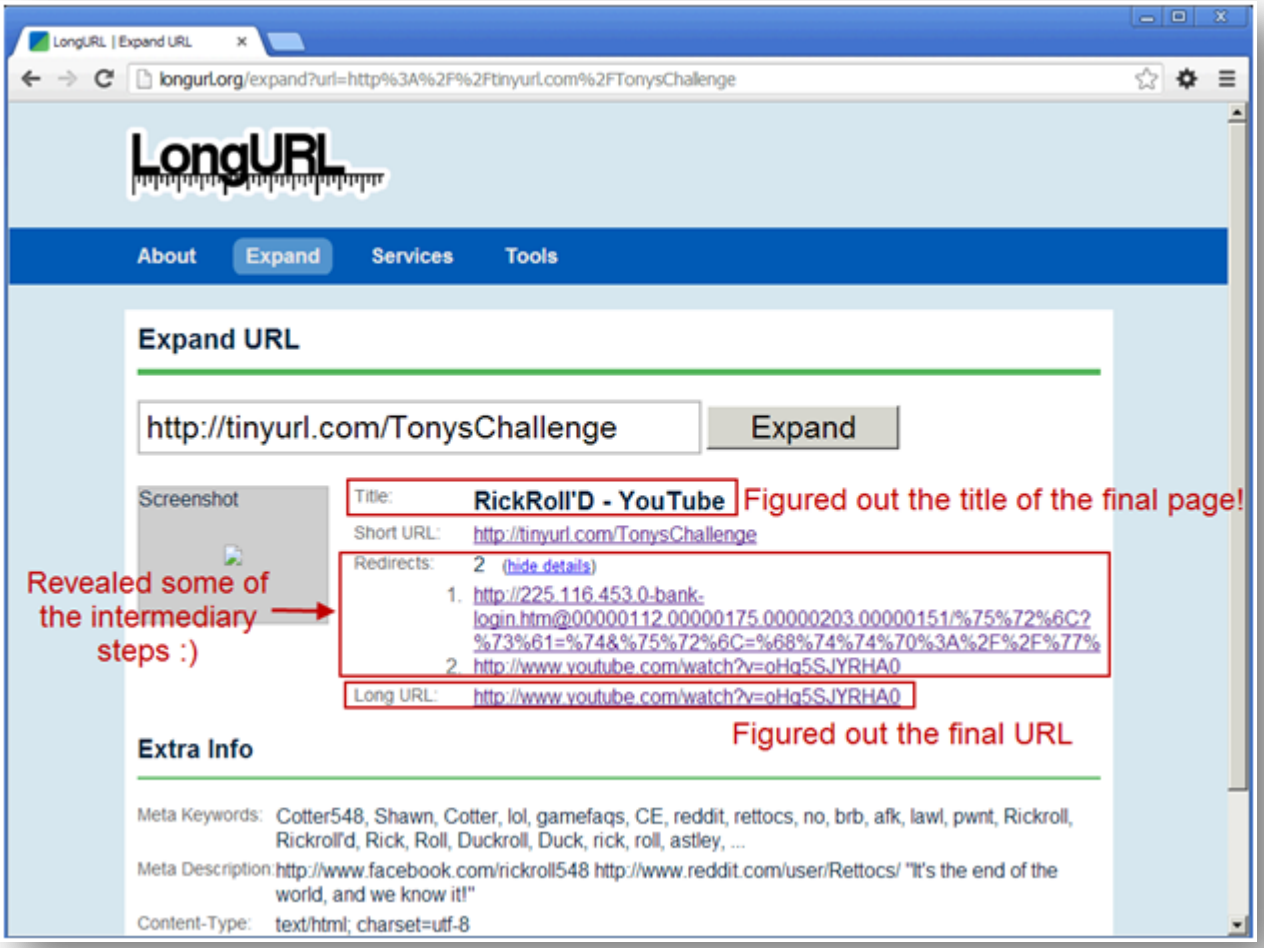
Manual Safe Deconstruction

- **WHOIS attribution**



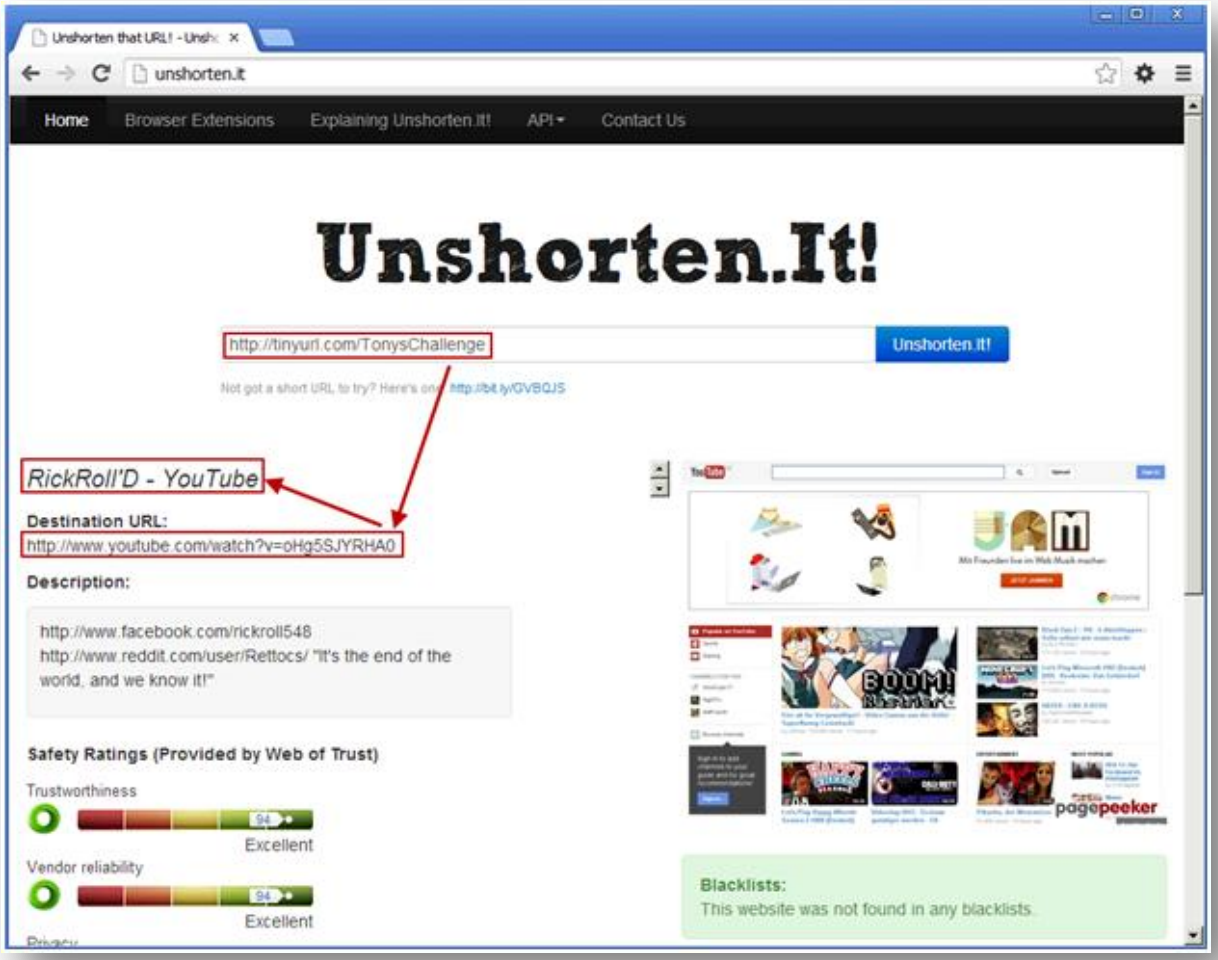
Automatic Safe Deconstruction

- **LongURL**



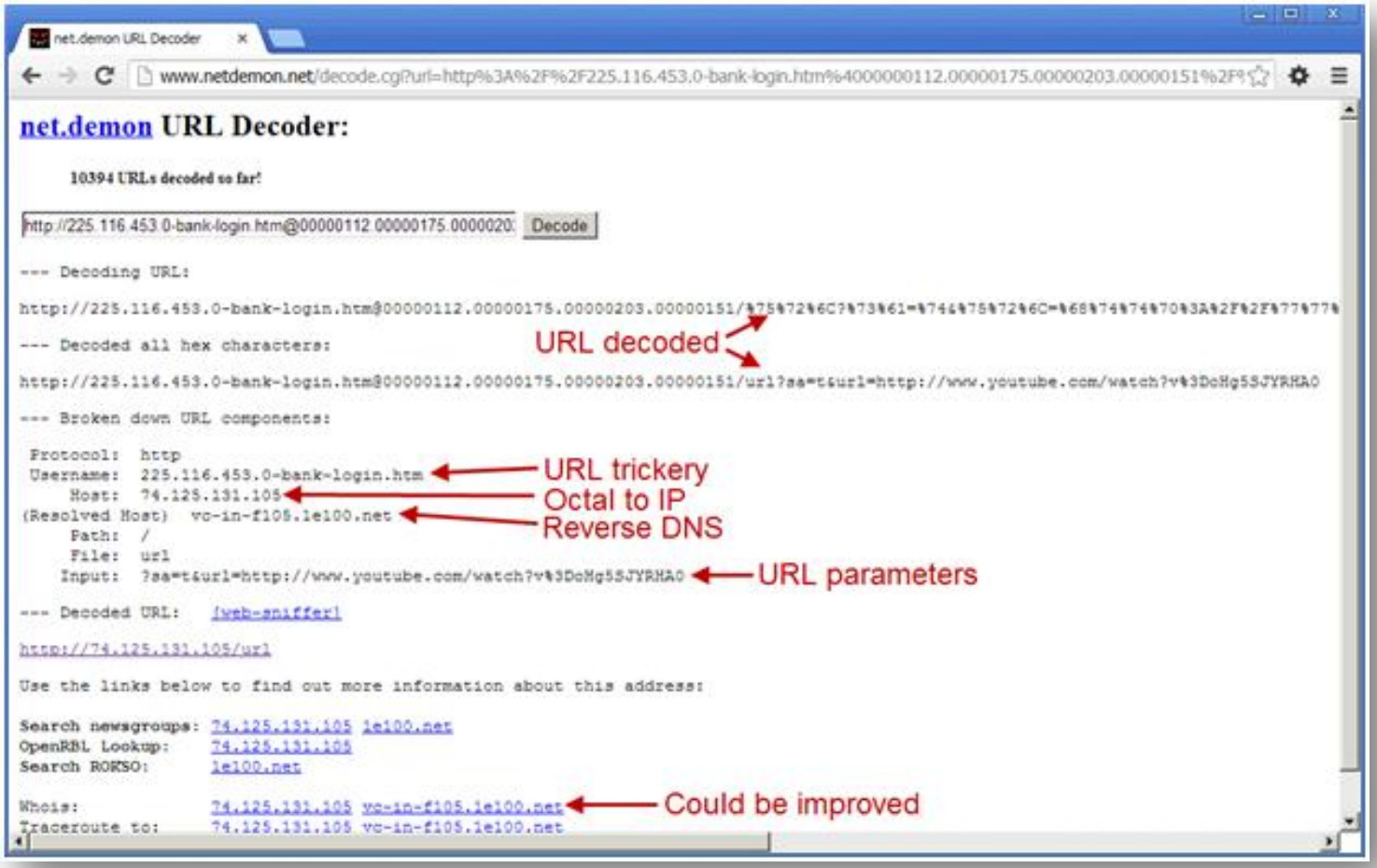
Automatic Safe Deconstruction

- **Unshorten.it**



Automatic Safe Deconstruction

- **Netdemon**



Obfuscation Process

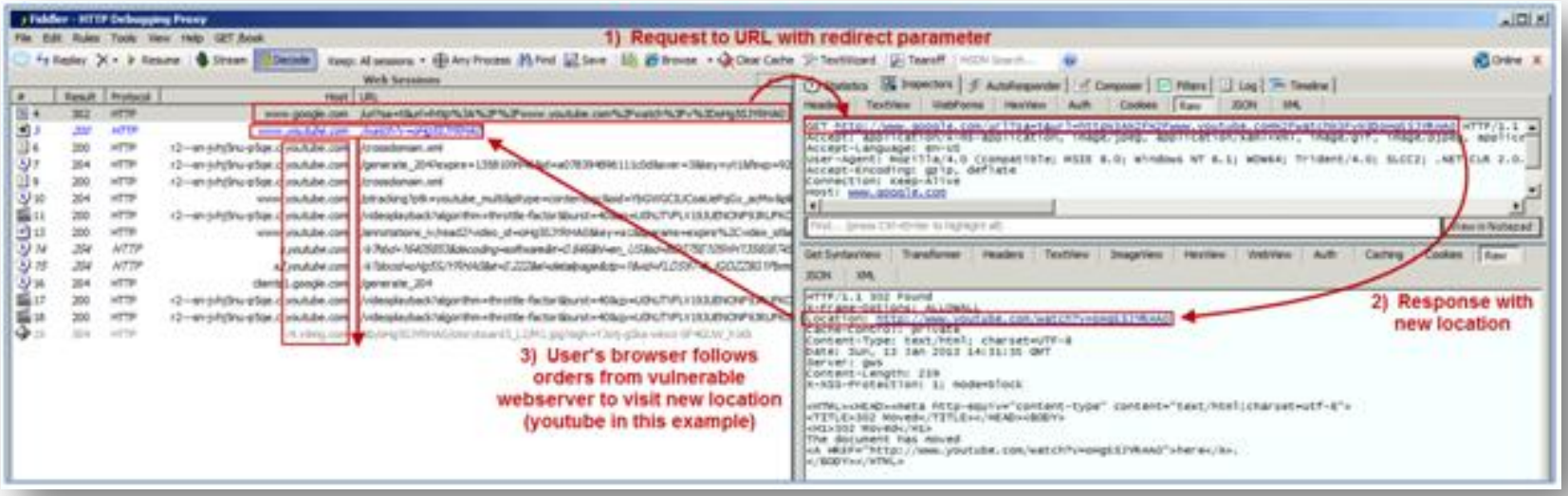
- URL Redirection
- Octal IP Representation
- URL Encoding
- URL Trickery
- URL Shortening

Obfuscation Process

- **URL Redirection**
  - An application that accepts a parameter that allows the end user to be redirected to another page
  - It happens so quickly that the user does not have time to react and stop the next page from loading
  - A simple example of a URL redirect:
    - ✓ http://www.vulnerablesite.com?URL=http://www.attacker.com

Obfuscation Process

- **URL Redirection**
  - The URL redirect we used in our special link is against Google (with their gracious permission for educational purposes):
    - ✓ http://www.google.com/url?sa=t&url=http%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DoHg5SJYRHA0



Obfuscation Process

- **Octal IP Representation**

1. nslookup www.google.com resolved one of Google's web servers to 74.125.131.105.
2. Using Microsoft's Calculator, we converted the IP address - 74 = 0112 125 = 0175 131 = 0203 105 = 0151.
3. After adding some zero padding (any number of zeros can be used), we come up with http://00000112.00000175.00000203.00000151
4. Replace "www.google.com" in our redirect URL

- Result :
  - ✓ http://00000112.00000175.00000203.00000151/url?sa=t&url=http%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DoHg5SJYRHA0

Obfuscation Process

- **URL Encoding**

ASCII	URL Encoded
url	%75%72%6C
sa	%73%61
t	%74
http	%68%74%74%70
www.youtube.com	%77%77%77%2E%79%6F%75%74%75%62%65%2E%63%6F%6D
watch	%77%61%74%63%68
DoHg5SJYRHA0	%44%6F%48%67%35%53%4A%59%52%48%41%30

Obfuscation Process

- **URL Encoding**
  - http://00000112.00000175.00000203.00000151/url?sa=t&url=http%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DoHg5SJYRHA0

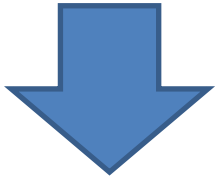
  - http://00000112.00000175.00000203.00000151/%75%72%6C?%73%61=%74&%75%72%6C=%68%74%74%70%3A%2F%2F%77%77%77%2E%79%6F%75%74%75%62%65%2E%63%6F%6D%2F%77%61%74%63%68%3Fv%3%44%6F%48%67%35%53%4A%59%52%48%41%30

Obfuscation Process

- **URL trickery**
  - Chrome is the only browser that will send the user to the destination page without a warning when the URL is formatted as follows:
    - ✓ http://www.bank.com:login.html@google.com/

Obfuscation Process

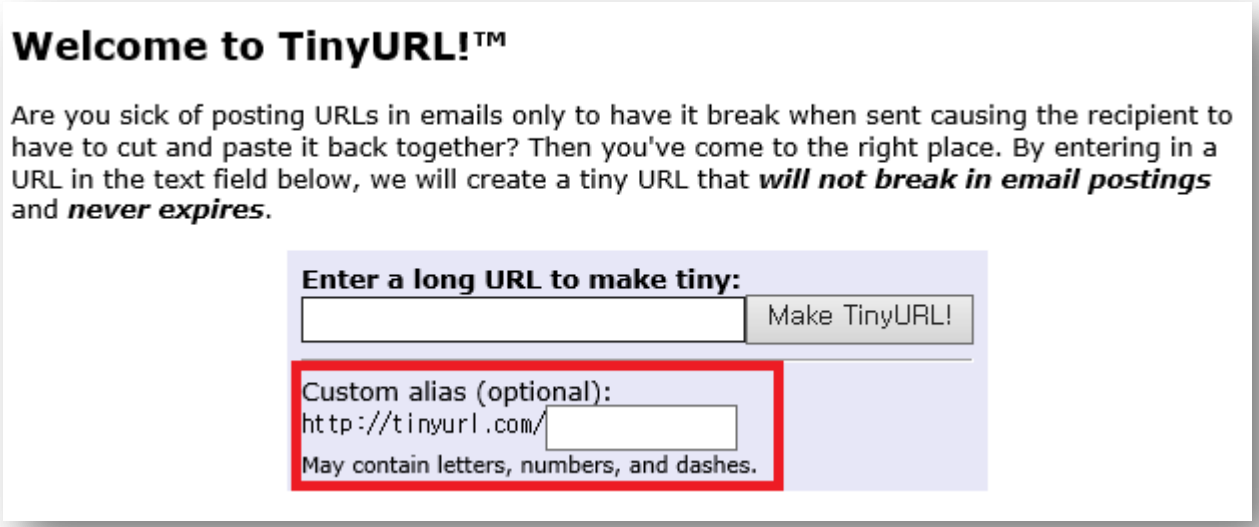
- **URL trickery**
  - http://00000112.00000175.00000203.00000151/%75%72%6C?%73%61=%74&%75%72%6C=%68%74%74%70%3A%2F%2F%77%77%77%2E%79%6F%75%74%75%62%65%2E%63%6F%6D%2F%77%61%74%63%68%3Fv%3%44%6F%48%67%35%53%4A%59%52%48%41%30



  - http://225.116.453.0-bank-login.htm@00000112.00000175.00000203.00000151/%75%72%6C?%73%61=%74&%75%72%6C=%68%74%74%70%3A%2F%2F%77%77%77%2E%79%6F%75%74%75%62%65%2E%63%6F%6D%2F%77%61%74%63%68%3Fv%3%44%6F%48%67%35%53%4A%59%52%48%41%30

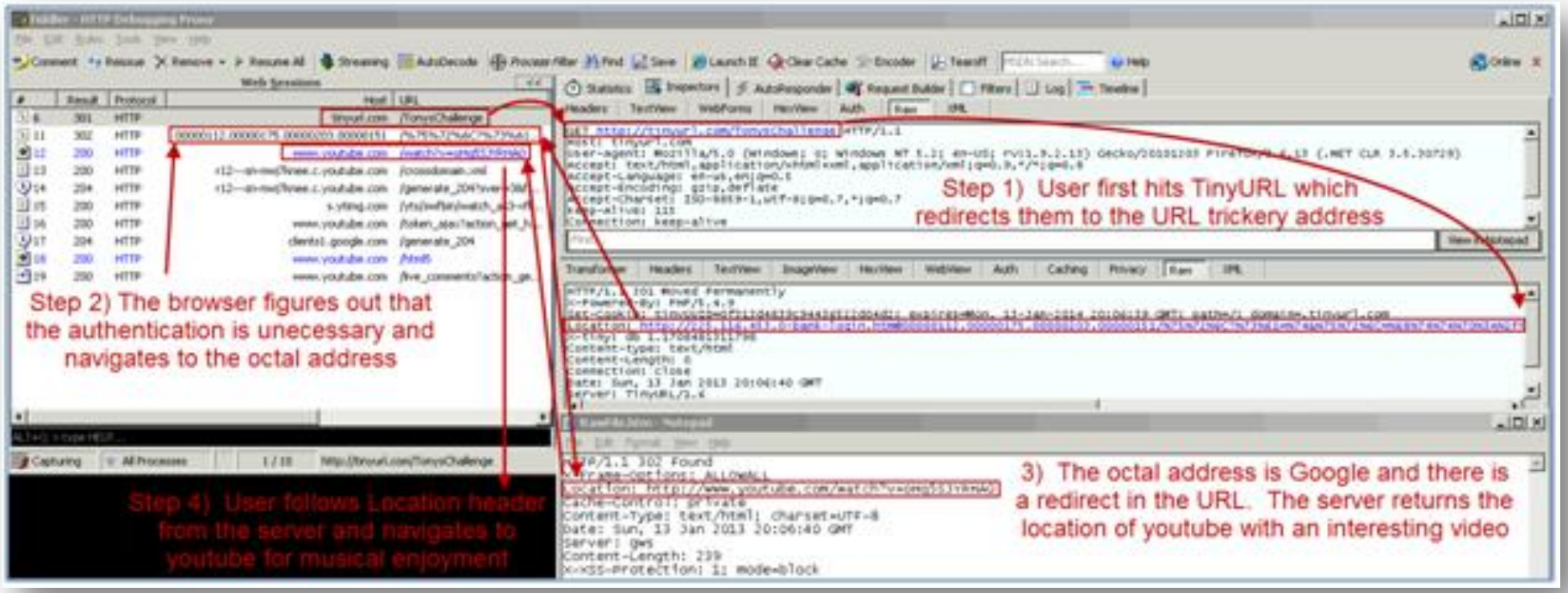
Obfuscation Process

- **URL Shortening**
  - Used TinyUrl because it allows us to specify a memorable link such as TonysChallenge



  - Result :
    - ✓ http://tinyurl.com/TonysChallenge

Tracing the Click



Browser Compatibility

- Only Chrome!

Question and Answer