Cross-Site Scripting

Getting Developers to Take XSS Seriously

Use Social Engineering to Enhance Your Vulnerability Reporting

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Cross-Site Scripting

Outline

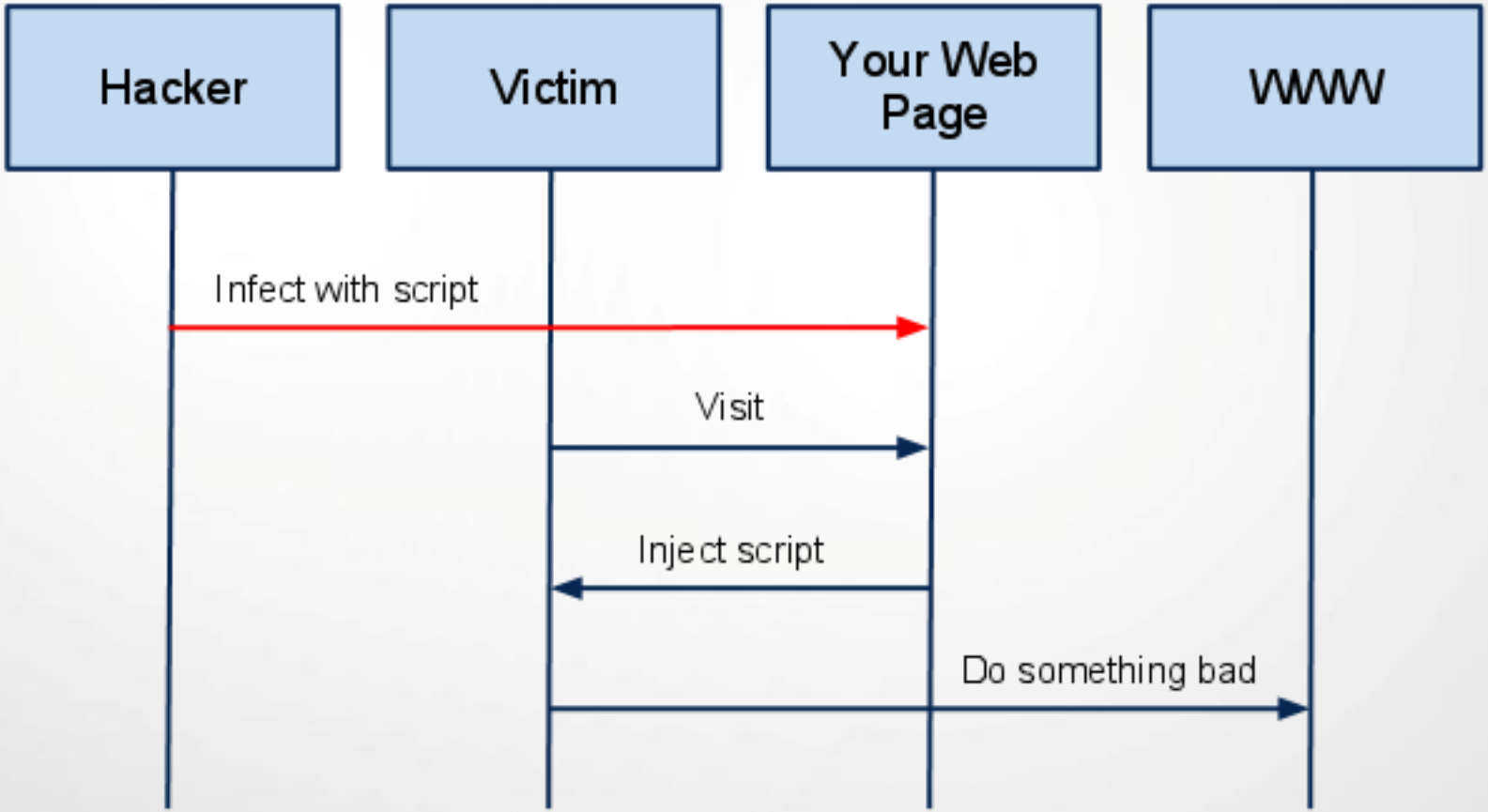
- What is XSS?
- XSS History
- Detecting XSS
- Preventing XSS
- Reporting Tricks

Cross-Site Scripting

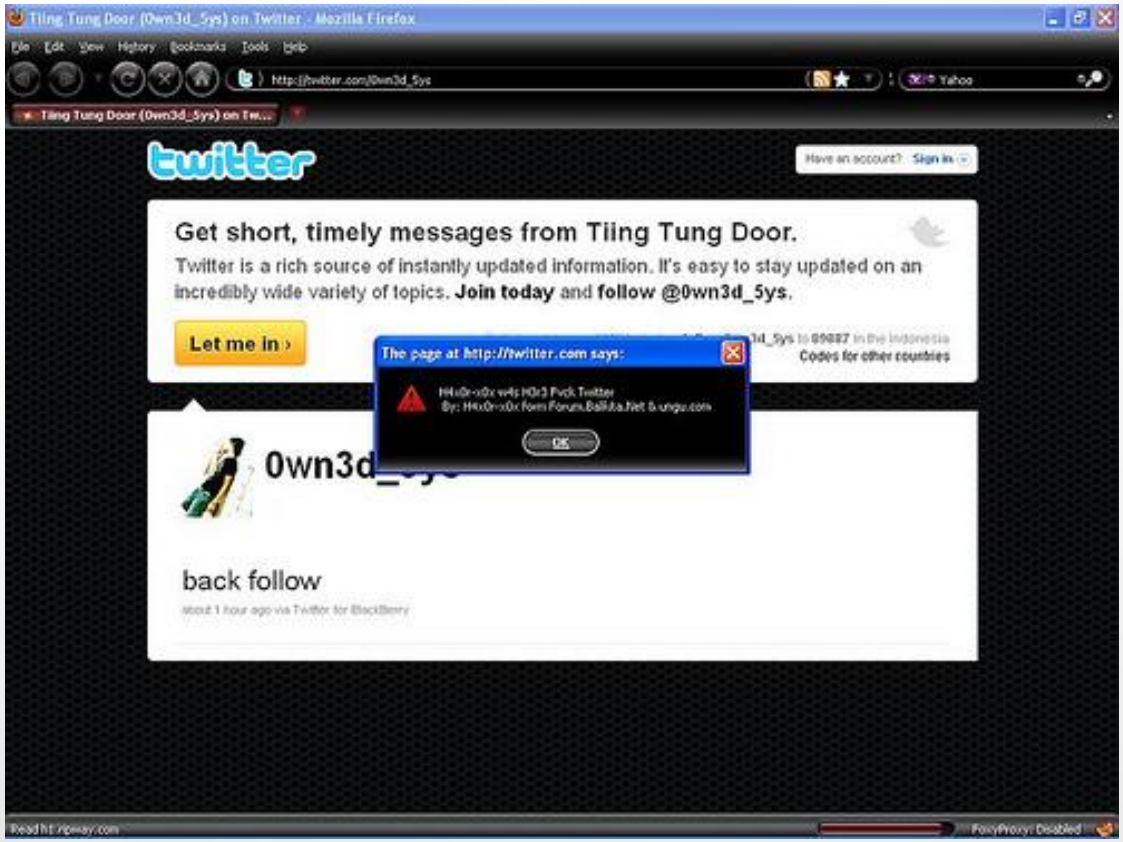
Cross Site Scripting (XSS) is an attack against the user of a website. It is a technique that forces a website to display malicious code, which then executes in the user's web browser. The attacker uses a vulnerable website to send malicious code to another end user of the site. The vulnerability arises when the website takes data in some way from a user and dynamically includes it in a web page without first validating that data.

- account hijacking
- rewrite portions of the page
- log keystrokes
- steal browser information
- Steal client machine data
- attack the user's network

XSS


Hacker
Victim
Your Web Page
WWW
Infect with script
Visit
Inject script
Do something bad

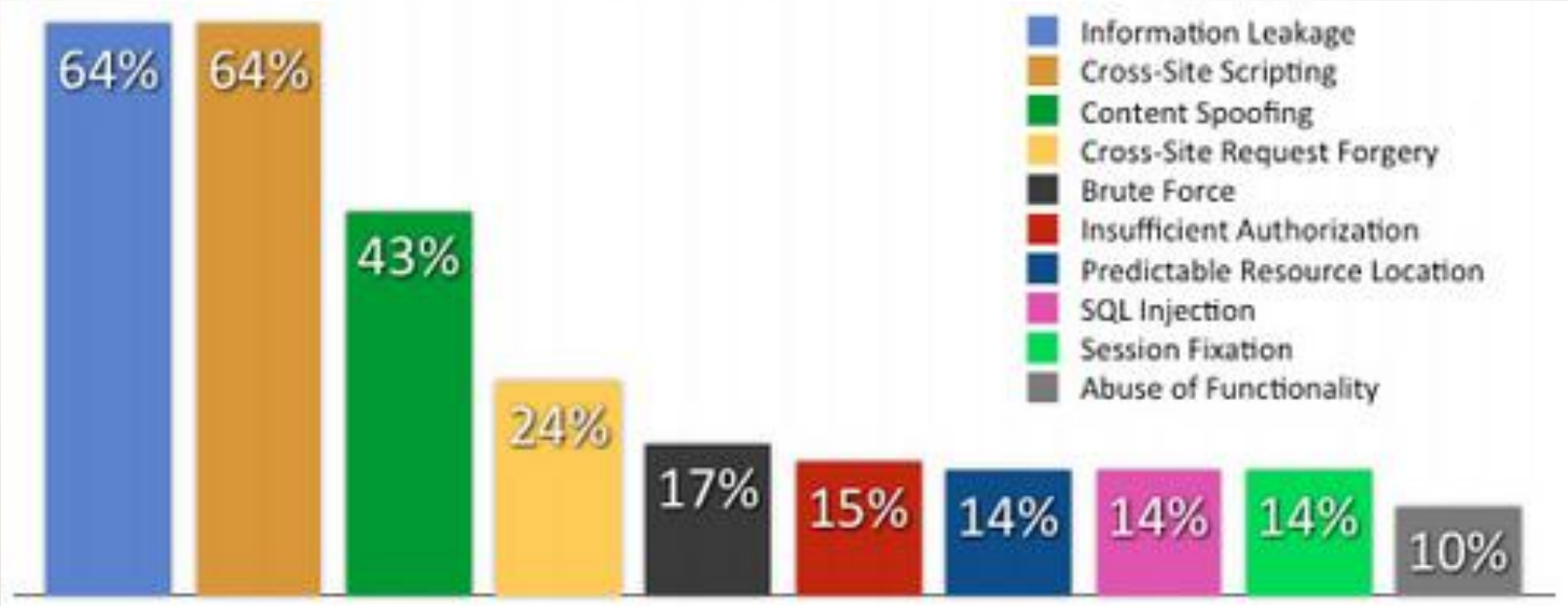
Persistent Cross-Site Scripting



Reflected Cross-Site Scripting

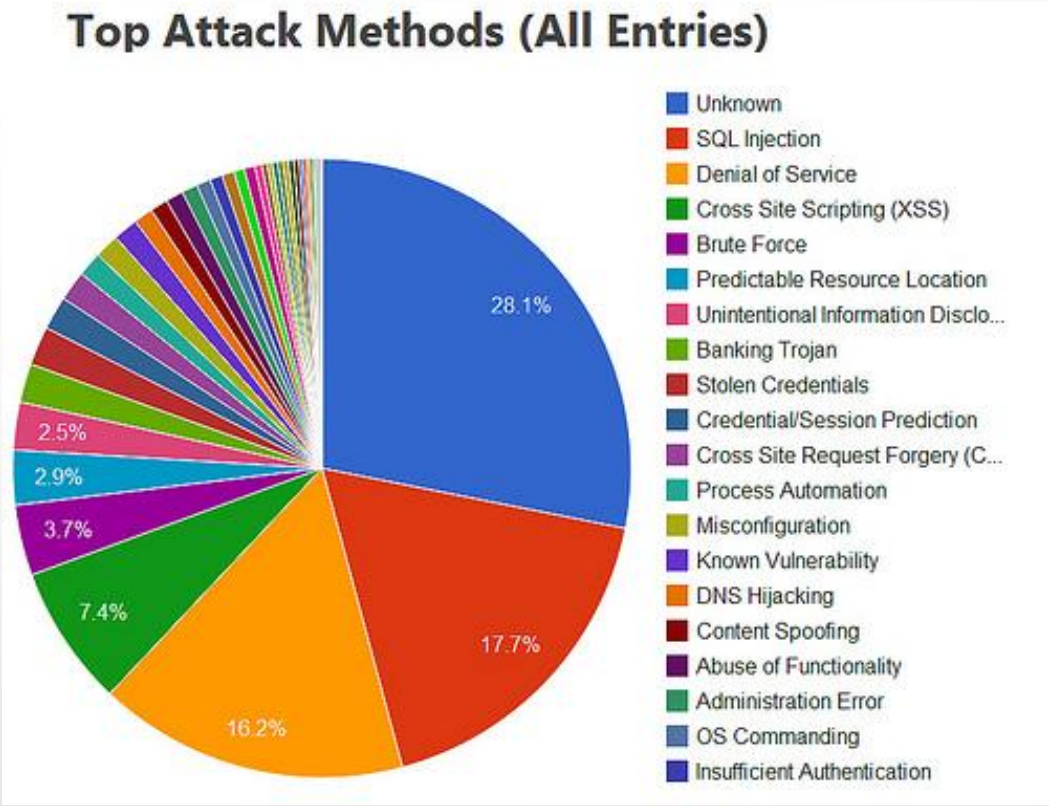
Websites with Cross-Site Scripting

WhiteHat Website Security Statistic Report, Winter 2011



Attacks Using Cross-Site Scripting

Web Hacking Incident Database



Real World Examples

Hacker Redirects Barack Obama's site to hillaryclinton.com

During the 2008 democratic primaries, XSS in Obama's website was exploited to redirect visitors to Hillary Clinton's website. Users who went to Obama's community blog were instead taken to www.hillaryclinton.com.

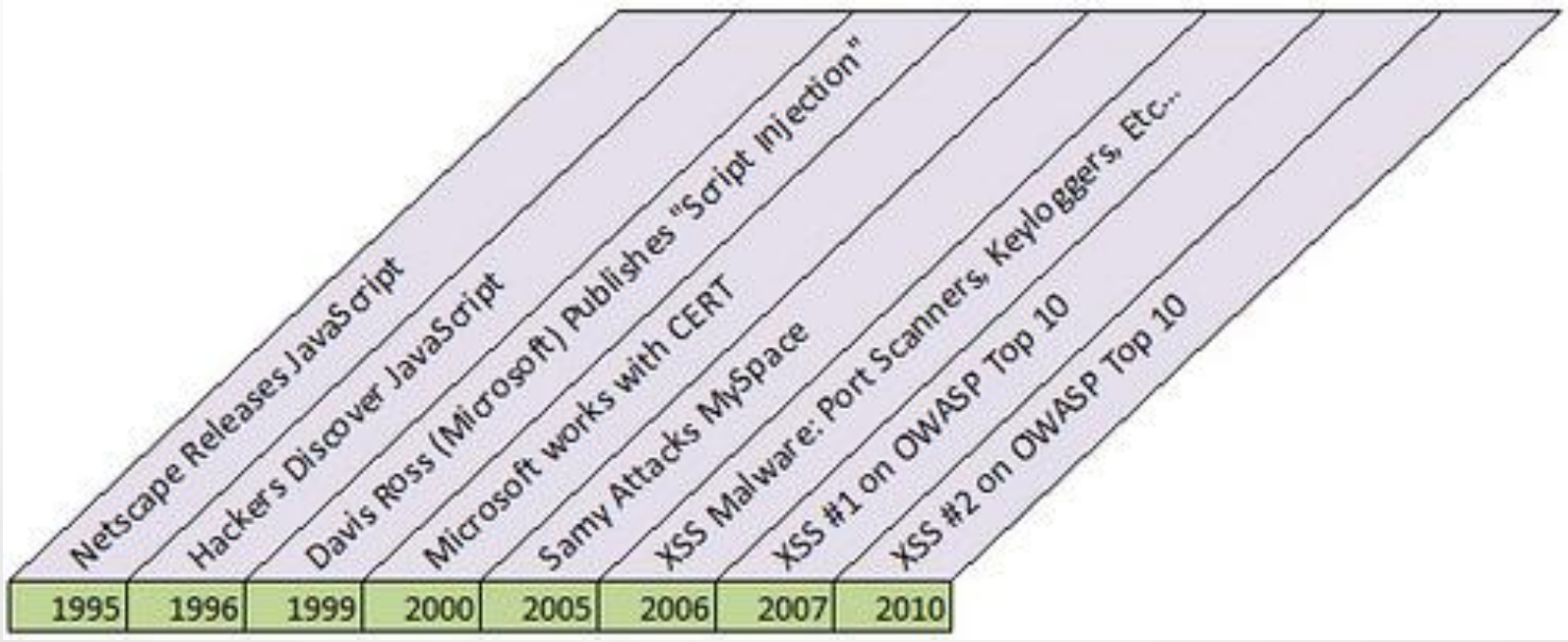
Apache.org hit by targeted XSS attack, passwords compromised

A targeted attack against JIRA admins used XSS to steal administrative cookies. Using those privileges, they installed backdoors and scripts to collect passwords at login. Thanks to people's tendency to use the same password on several websites and applications, the attacker was able to use those credentials get root access to other servers.

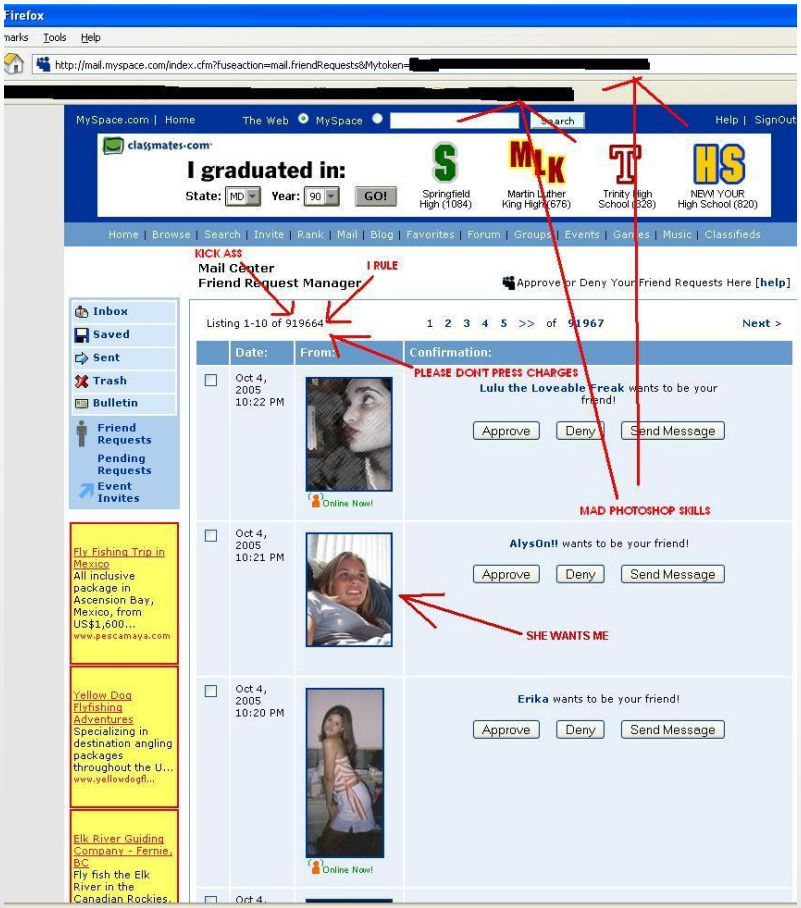
New XSS Facebook Worm Allows Automatic Wall Posts

An XSS in the Facebook's mobile API allowed a maliciously prepared iframe element containing JavaScript to post to user's walls.

History of Cross-Site Scripting



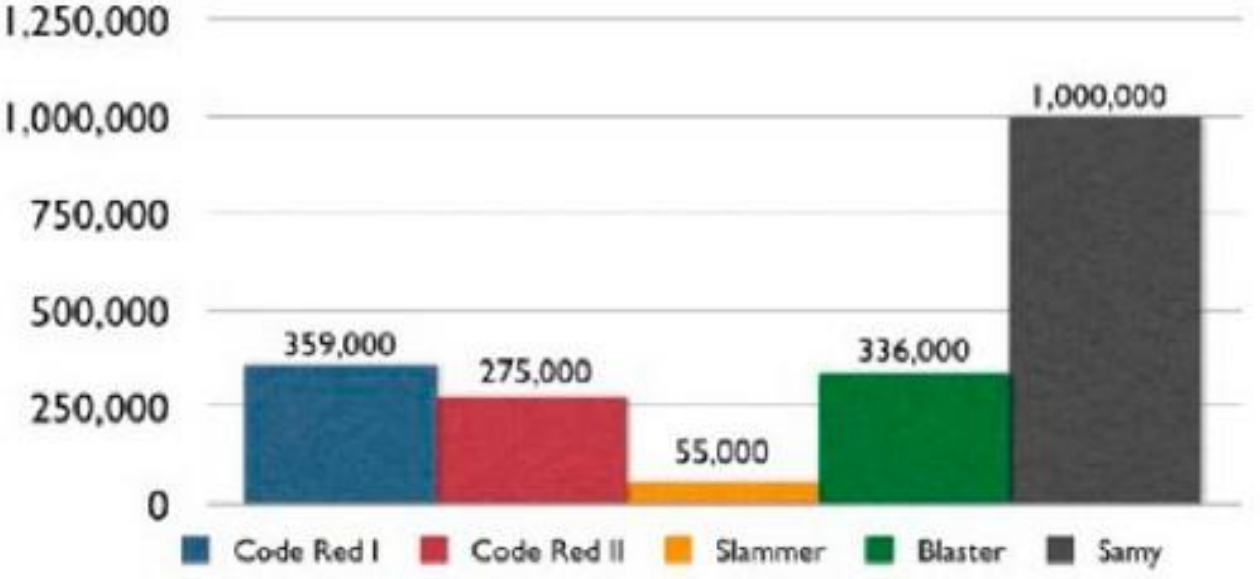
Samy



"I'm sorry MySpace and FOX. I love you guys, all the great things MySpace provides, and all the great shows FOX has, my favorite being Nip/Tuck. Oh wait, Nip/Tuck is FX? My bad, but FOX, I'm sure you still have some good stuff. But maybe you should start picking up Nip/Tuck reruns? Just a thought. I'm kidding! Please don't sue me."

Samy

Fastest Spreading Worm in History



JavaScript Malware

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- account hijacking
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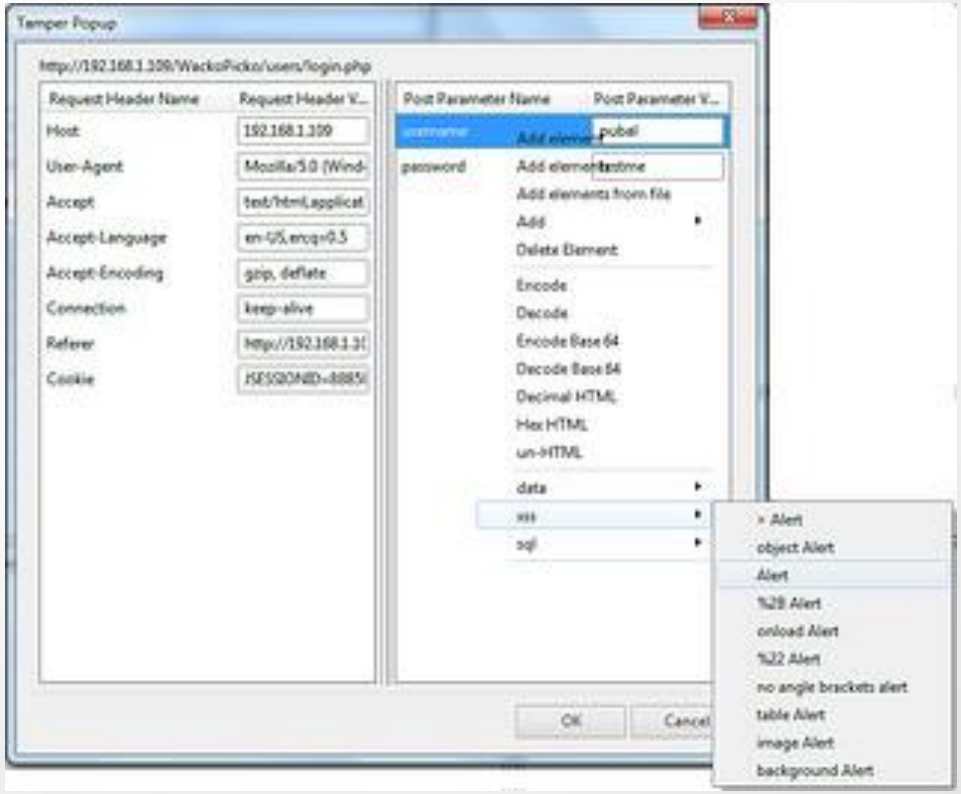
- ANYTHING A USER CAN DO OR ACCESS FROM THE BROWSER!

Manual Testing

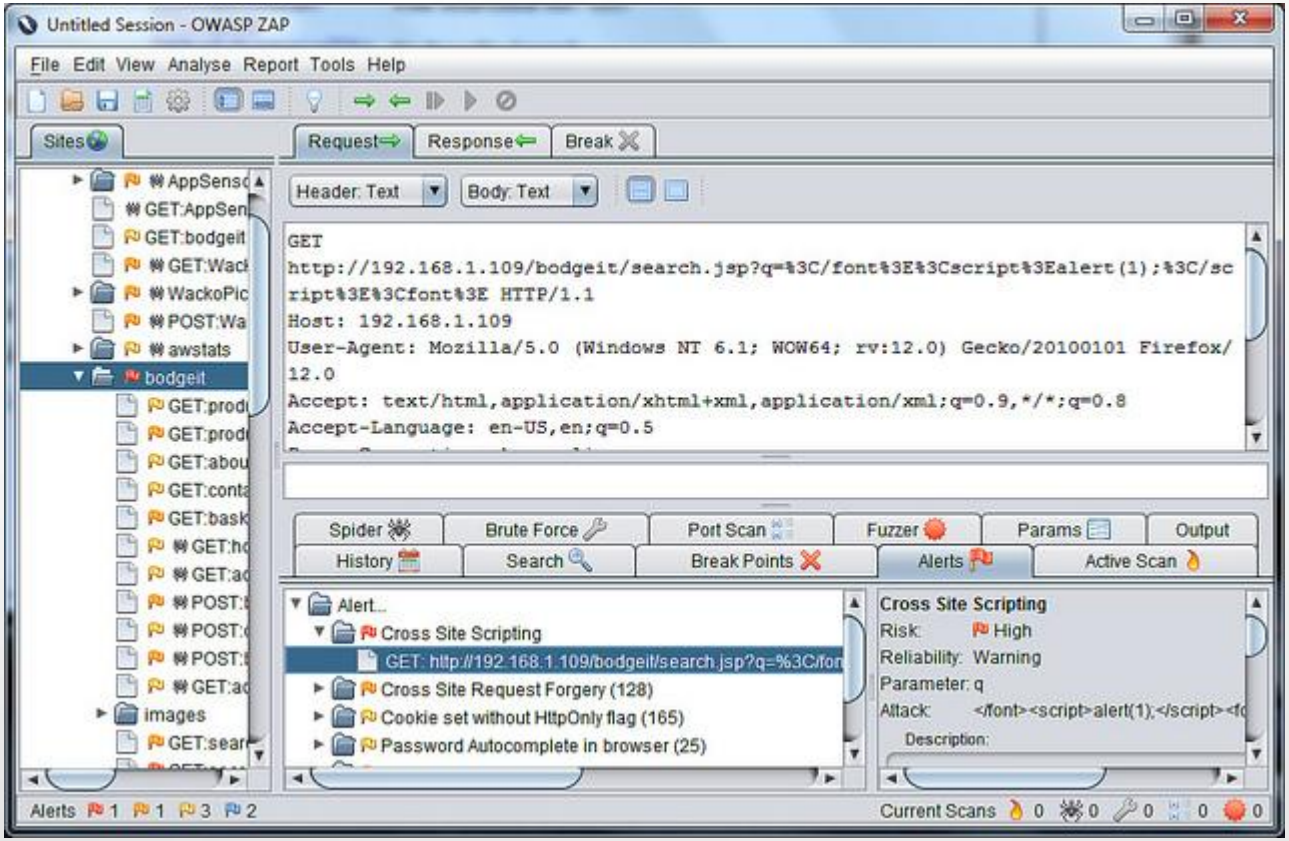
<SCRIPT>alert('XSS')</SCRIPT>

XSS Cheat-Sheet: http://ha.ckers.org/xss.html
OWASP Broken Web Applications (Vulnerable Applications to Hack): https://www.owasp.org/index.php/OWASP_Broken_Web_Applications_Project

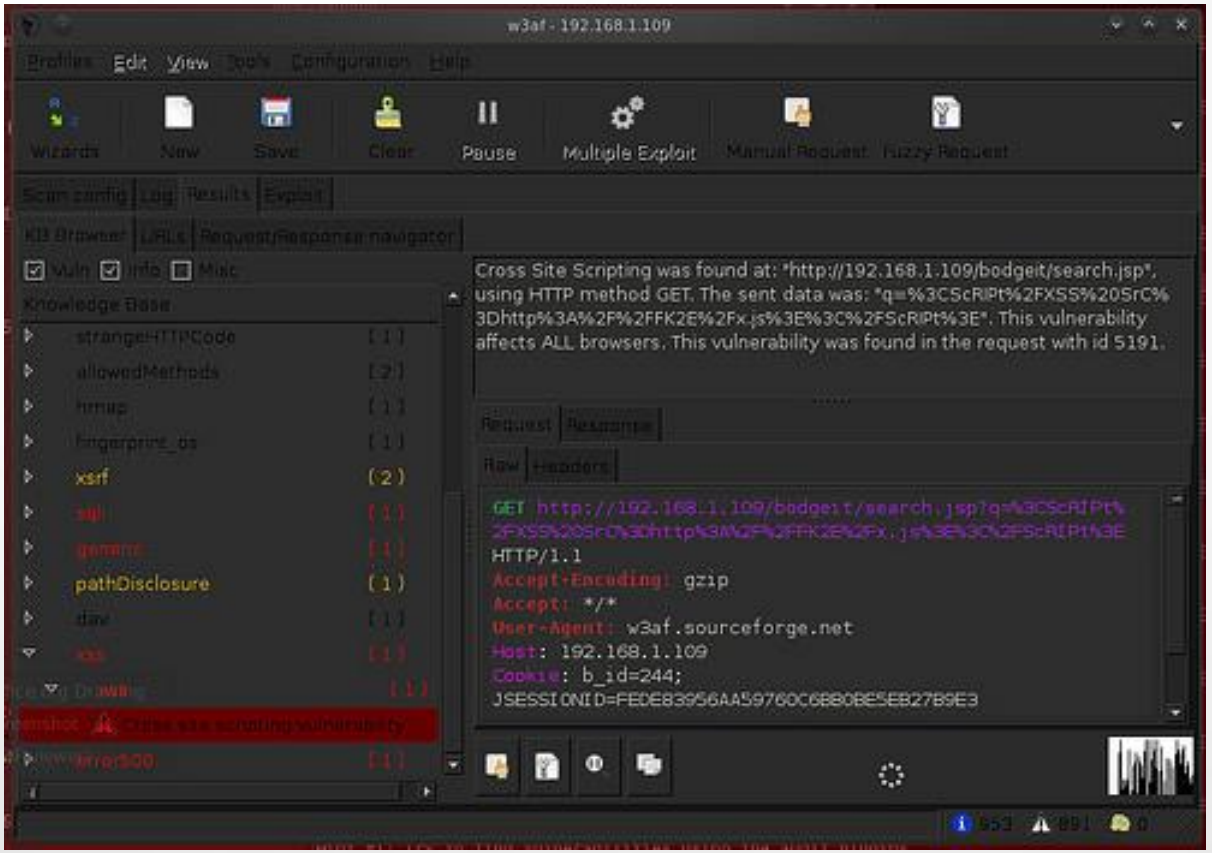
Browser Plugins



Web Application Vulnerability Scanners



Web Application Vulnerability Scanners



Preventing Cross-Site Scripting

https://www.owasp.org/index.php/XSS_(Cross_Site_Scripting)_Prevention_Cheat_Sheet

Input Validation

Accept known good (whitelist)
Reject known bad (blacklist)
Sanitize (change input to acceptable format)

Output Encoding / Escaping

Characters will still render in a browser correctly; escaping simply lets the interpreter know the data is not meant to be executed.

& → &
< → <
> → >
" → "
' → '
/ → /

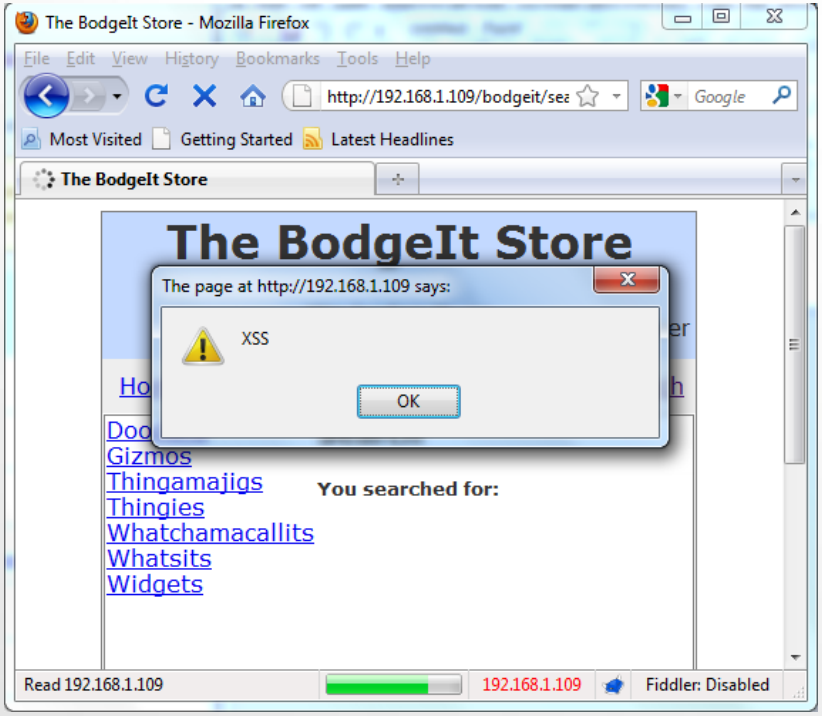
Preventing Cross-Site Scripting

Use Libraries

ESAPI – https://www.owasp.org/index.php/ESAPI
MS Anti-XSS Library - http://wpl.codeplex.com

Cross-Site Scripting Reporting

Seriously?

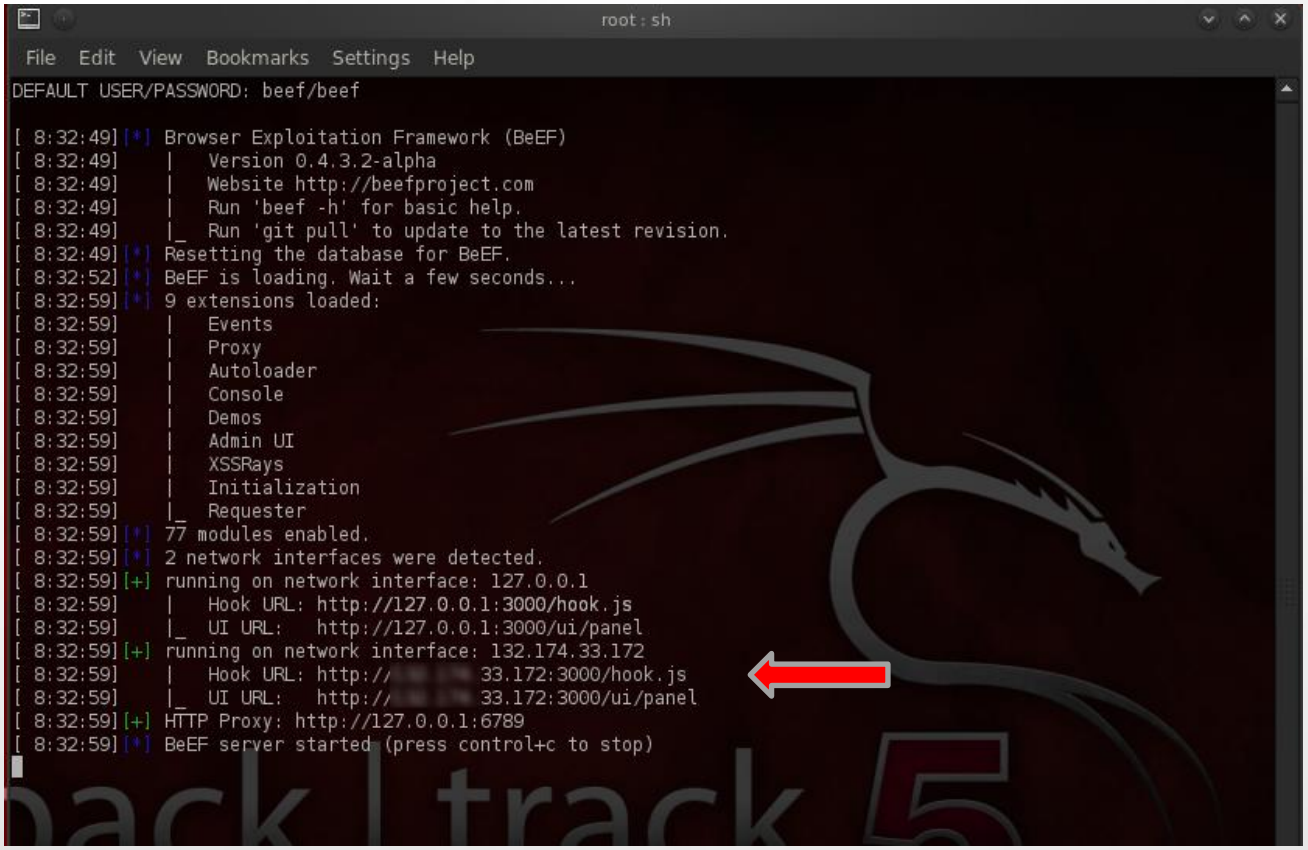


The value of the search_txt request parameter is copied into the value of an HTML tag attribute which is not encapsulated in any quotation marks. The payload <script>alert(XSS)</script> was submitted in the search_txt parameter. This input was echoed unmodified in the application's response.

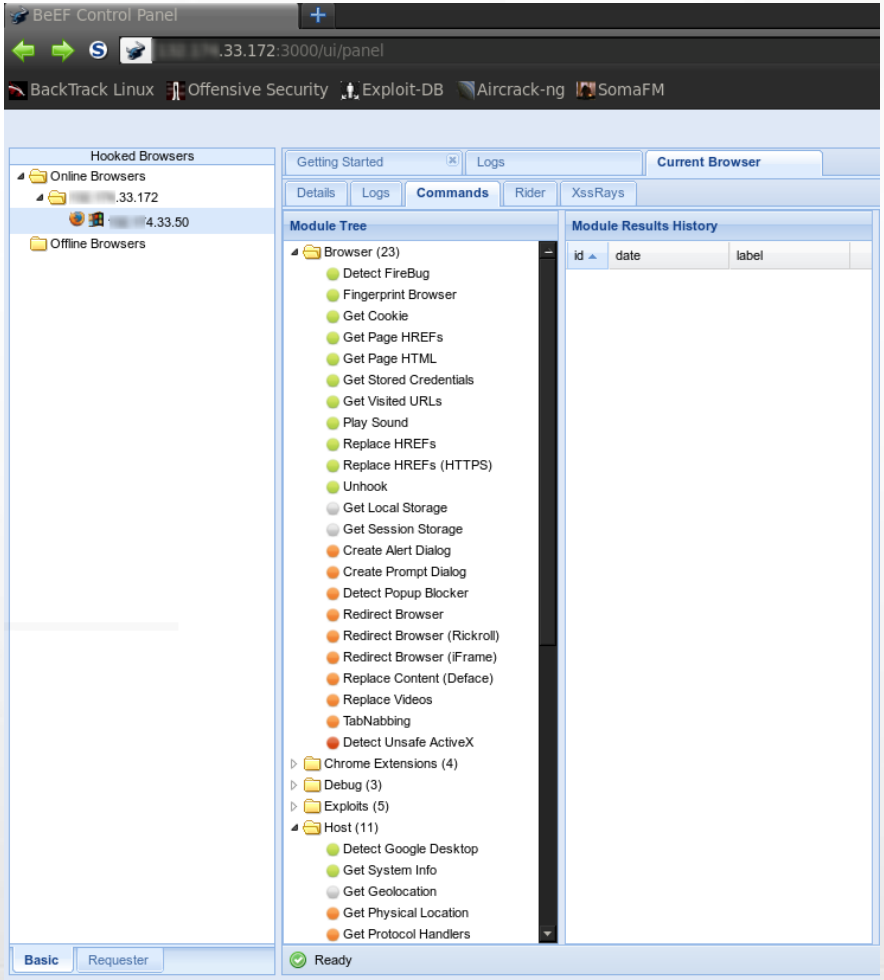
This proof-of-concept attack demonstrates that it is possible to inject arbitrary JavaScript into the application's response.

Browser Exploitation Framework (BeEF)

http://beefproject.com/



Cross-Site Scripting Exploitation



Socially Engineering your Report

Exploit the Vulnerability! Report the Impact!

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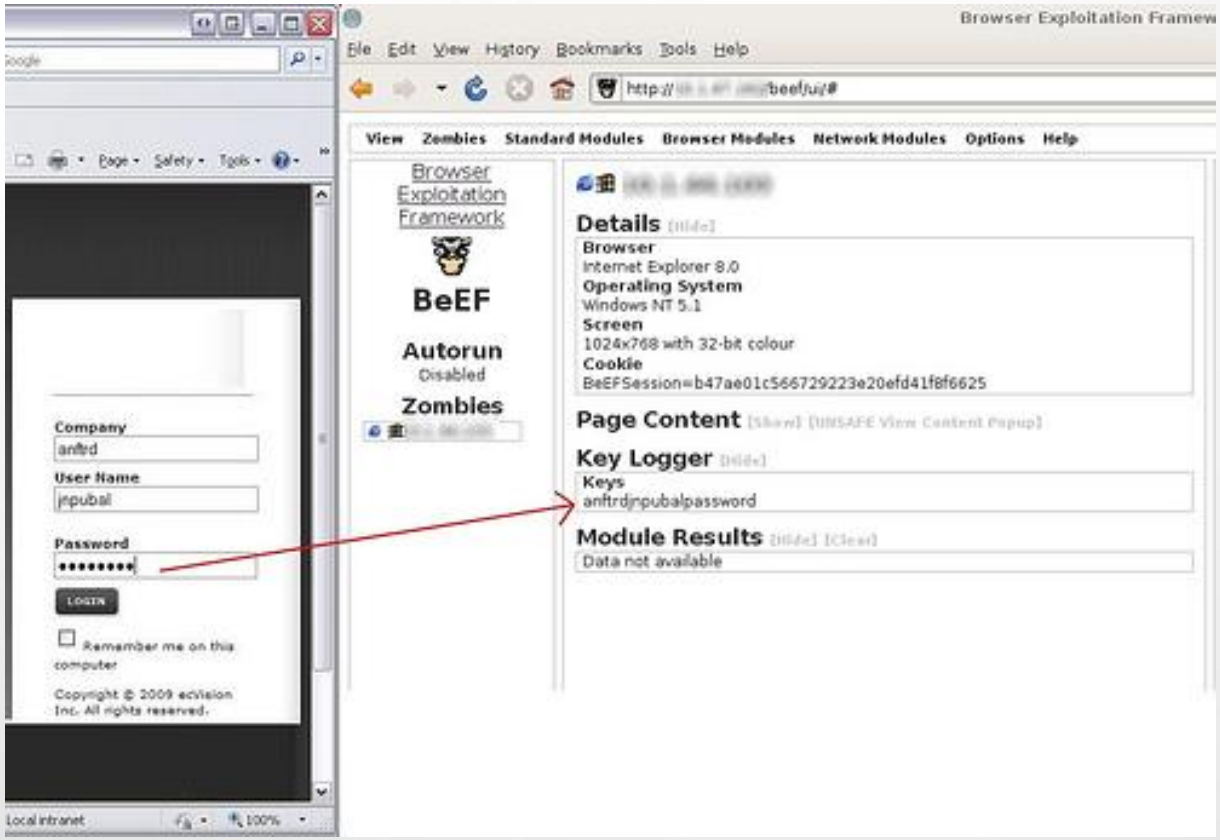


Copy Machine Experiment

The Power of "Because"

"May I use the Xerox machine?"
Giving no reason - 60%

"May I use the Xerox machine, because I have to make copies?"
Giving no real reason - 93%

"May I use the Xerox machine, because I'm in a rush?"
Giving a reason - 94%

Commander's Intent

Give Them a Reason!

Bystander Apathy

Assign a JIRA Ticket!

Contrast Frame

NLP

The Ponemon Institute puts the cost per record of a breach at $214, with an average cost of 7.2 million dollars. By contrast, a week of development time seems cheap.

Options

1 - $5,000	95% Effective
2 - $500	80% Effective

Herd Effect

You're all sheep.

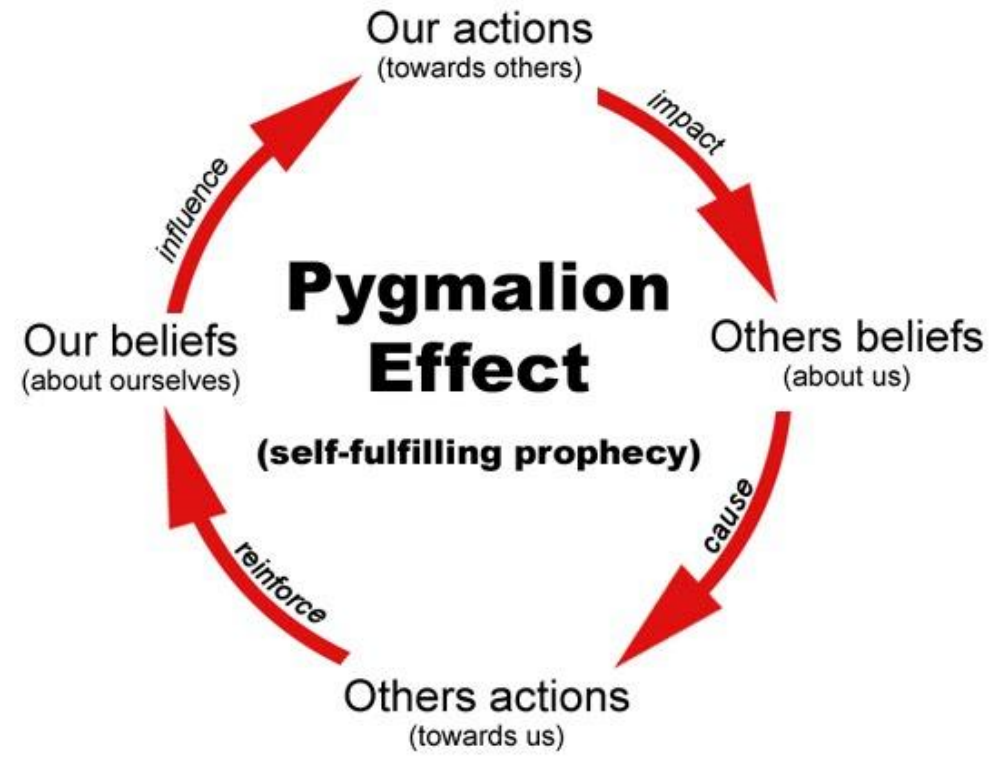
Best Practices

Amazon and Facebook employ CAPTCHA

93% of Websites in our Industry use Input Validation

Pygmalion Effect

Clearly Communicate Expectations



Metrics

If you want to improve something, measure it.

Measure to see if what you're doing is working. If not, try something else.

THANK YOU

Questions?!