7TH ANNUAL ITWEB

SECURITY SUMMIT

REINVENTING INFORMATION SECURITY

WHERE TRUSTED TECHNOLOGIES HAVE FAILED YOU

HTML5 Unbound: A Security & Privacy Drama

Mike Shema

Qualys

iWeb events

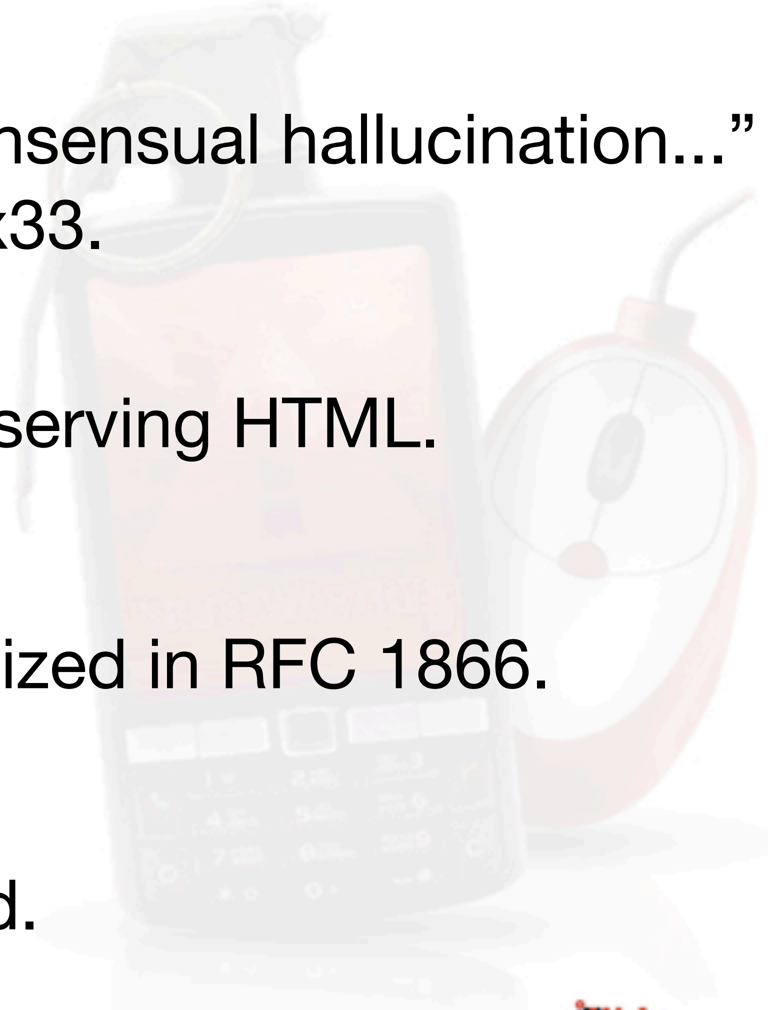
A Drama in Four Parts

- The Meaning & Mythology of HTML5
- Security From Design
- Security (and Privacy) From HTML5
- Design, Doom & Destiny

"This specification defines the 5th major revision of the core language of the World Wide Web: the Hypertext Markup Language (HTML). In this version, new features are introduced ion authors, new elements are ir n into prevailing autho attention has been given to def onformance criteria for user agents in an rove interoperability."

Is my ~~Geocities~~ site secure?

The Path to HTML5



3350 B.C.	Cuneiform enables stone markup languages.
July 1984	“Cyberspace. A consensual hallucination...” *Neuromancer,* p. 0x33.
Dec 1990	CERN httpd starts serving HTML.
Nov 1995	HTML 2.0 standardized in RFC 1866.
Dec 1999	HTML 4.01 finalized.

HTML5. Meaning vs. Mythology

<!doctype html>

Cross Origin Resource Sharing

WebSocket API

Web Storage

Web Workers

Social [__________]

[__________] as a Service

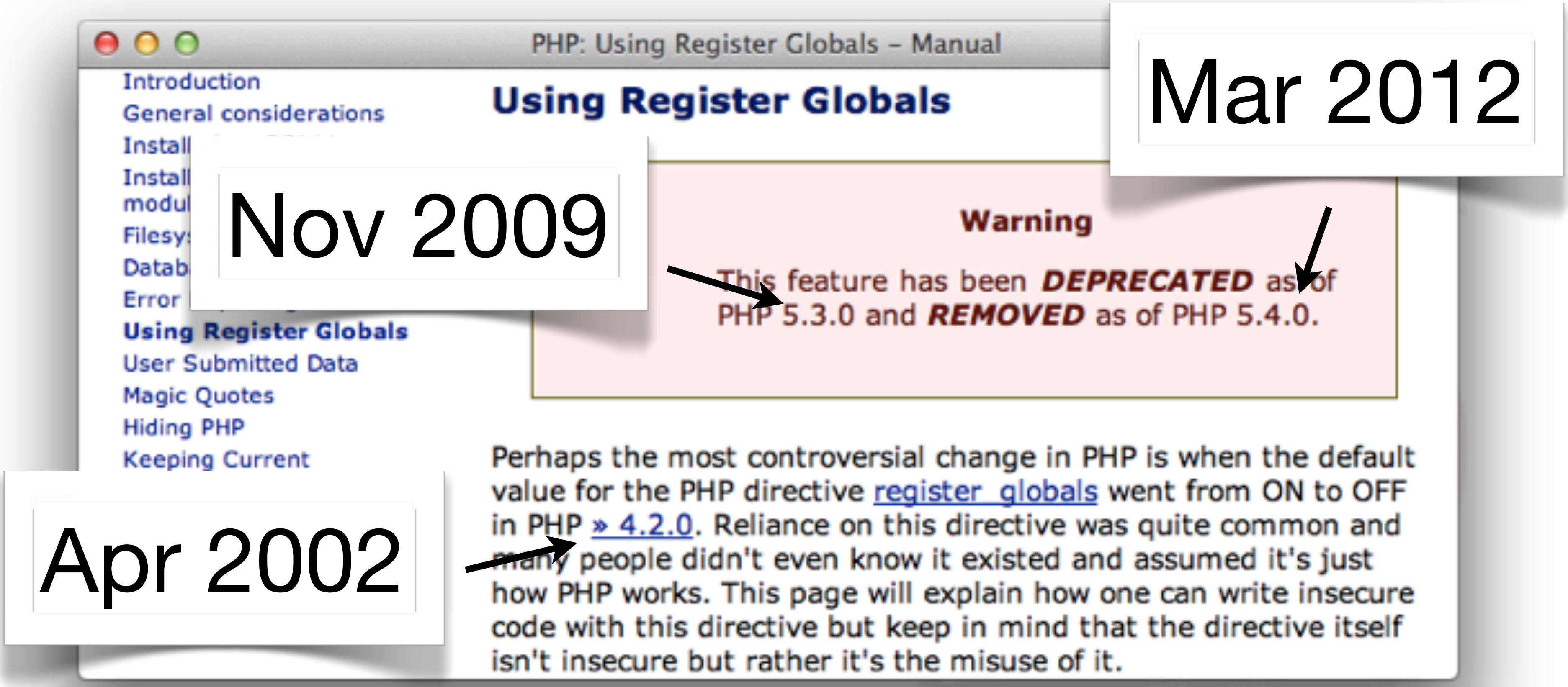
Web 2.0++

Flash, Silverlight

CSRF

Clickjacking

“Default Secure” Takes Time



PHP: Using Register Globals – Manual

Introduction
General considerations
Install
Install
modul
Filesy
Datab
Error
Using Register Globals
User Submitted Data
Magic Quotes
Hiding PHP
Keeping Current

Using Register Globals

Warning

This feature has been ***DEPRECATED*** as of PHP 5.3.0 and ***REMOVED*** as of PHP 5.4.0.

Perhaps the most controversial change in PHP is when the default value for the PHP directive register_globals went from ON to OFF in PHP » 4.2.0. Reliance on this directive was quite common and many people didn't even know it existed and assumed it's just how PHP works. This page will explain how one can write insecure code with this directive but keep in mind that the directive itself isn't insecure but rather it's the misuse of it.

Nov 2009

Mar 2012

Apr 2002

“Default Insecure” Is Enduring

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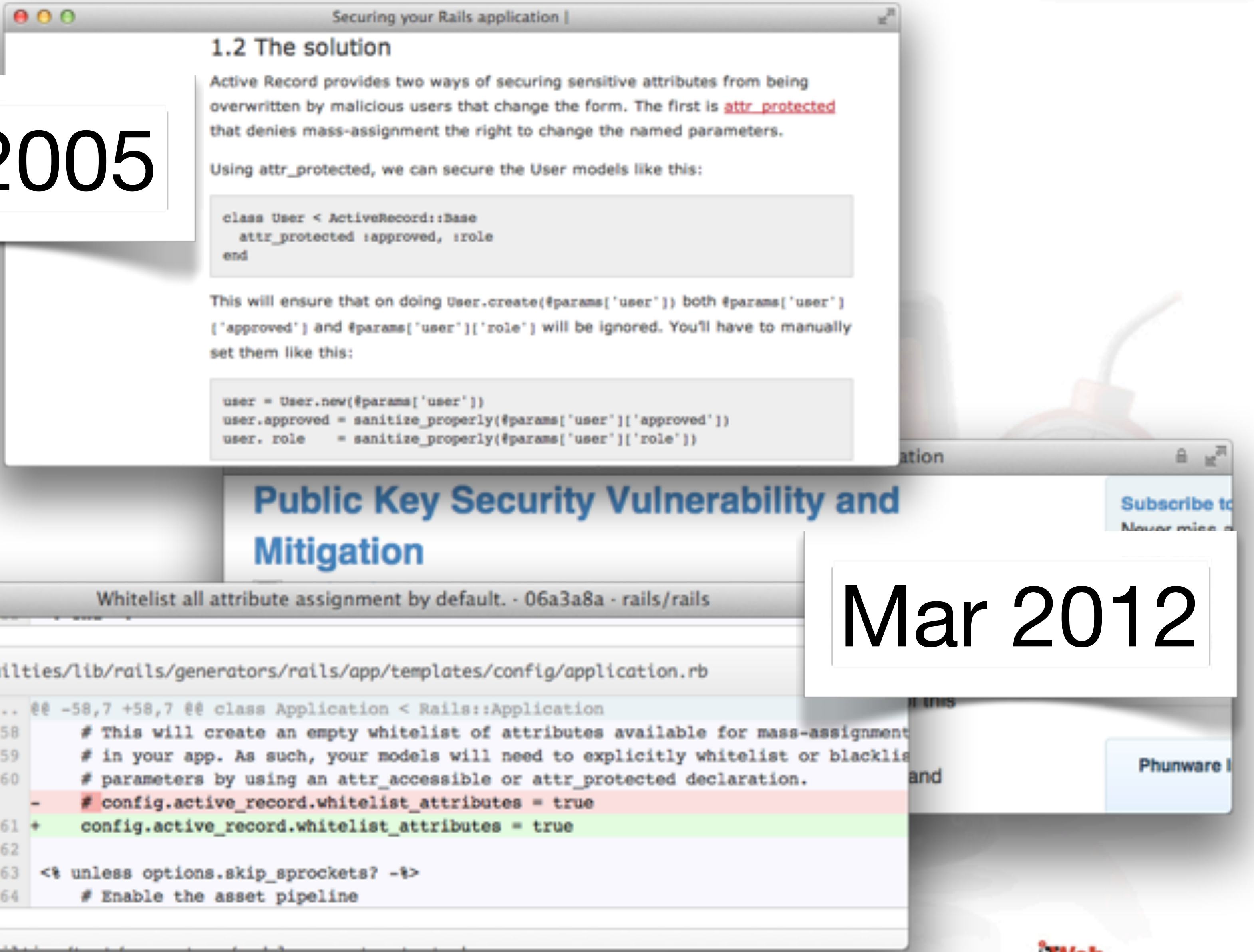

Dec 2005

1.2 The solution

Active Record provides two ways of securing sensitive attributes from being overwritten by malicious users that change the form. The first is attr_protected that denies mass-assignment the right to change the named parameters.

Using attr_protected, we can secure the User models like this:

```
class User < ActiveRecord::Base
  attr_protected :approved, :role
end
```

This will ensure that on doing `User.create(@params['user'])` both `@params['user']['approved']` and `@params['user']['role']` will be ignored. You'll have to manually set them like this:

```
user = User.new(@params['user'])
user.approved = sanitize_properly(@params['user']['approved'])
user. role    = sanitize_properly(@params['user']['role'])
```

Public Key Security Vulnerability and Mitigation

Mar 2012

Whitelist all attribute assignment by default. · 06a3a8a · rails/rails

railties/lib/rails/generators/rails/app/templates/config/application.rb

```
... ... @@ -58,7 +58,7 @@ class Application < Rails::Application
        # This will create an empty whitelist of attributes available for mass-assignment
        # in your app. As such, your models will need to explicitly whitelist or blacklis
        # parameters by using an attr_accessible or attr_protected declaration.
-       # config.active_record.whitelist_attributes = true
+       config.active_record.whitelist_attributes = true

      <% unless options.skip_sprockets? -%>
        # Enable the asset pipeline
```

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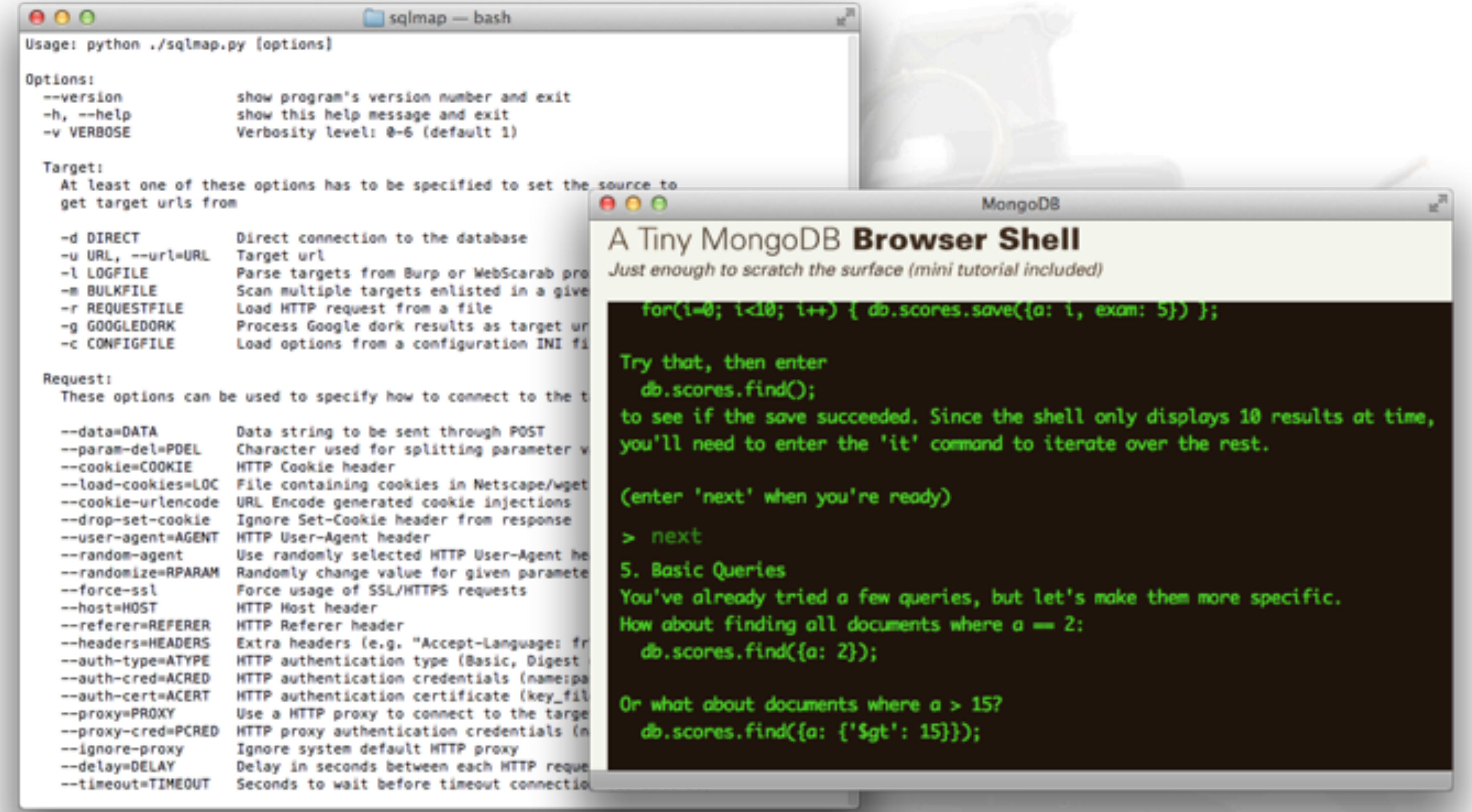
iWeb events

“Developer Insecure” Is Eternal

- Advanced Persistent Ignorance



```
Usage: python ./sqlmap.py [options]

Options:
  --version             show program's version number and exit
  -h, --help            show this help message and exit
  -v VERBOSE            Verbosity level: 0-6 (default 1)

  Target:
    At least one of these options has to be specified to set the source to
    get target urls from

    -d DIRECT           Direct connection to the database
    -u URL, --url=URL   Target url
    -l LOGFILE          Parse targets from Burp or WebScarab pro
    -m BULKFILE         Scan multiple targets enlisted in a give
    -r REQUESTFILE      Load HTTP request from a file
    -g GOOGLEDORK       Process Google dork results as target ur
    -c CONFIGFILE       Load options from a configuration INI fi

  Request:
    These options can be used to specify how to connect to the t

    --data=DATA         Data string to be sent through POST
    --param-del=PDEL    Character used for splitting parameter v
    --cookie=COOKIE     HTTP Cookie header
    --load-cookies=LOC  File containing cookies in Netscape/wget
    --cookie-urlencode  URL Encode generated cookie injections
    --drop-set-cookie   Ignore Set-Cookie header from response
    --user-agent=AGENT  HTTP User-Agent header
    --random-agent      Use randomly selected HTTP User-Agent he
    --randomize=RPARAM  Randomly change value for given paramete
    --force-ssl         Force usage of SSL/HTTPS requests
    --host=HOST         HTTP Host header
    --referer=REFERER   HTTP Referer header
    --headers=HEADERS   Extra headers (e.g. "Accept-Language: fr
    --auth-type=ATYPE   HTTP authentication type (Basic, Digest
    --auth-cred=ACRED   HTTP authentication credentials (name:pa
    --auth-cert=ACERT   HTTP authentication certificate (key_fil
    --proxy=PROXY       Use a HTTP proxy to connect to the targe
    --proxy-cred=PCRED  HTTP proxy authentication credentials (n
    --ignore-proxy      Ignore system default HTTP proxy
    --delay=DELAY       Delay in seconds between each HTTP reque
    --timeout=TIMEOUT   Seconds to wait before timeout connectio
```

A Tiny MongoDB **Browser Shell**

Just enough to scratch the surface (mini tutorial included)

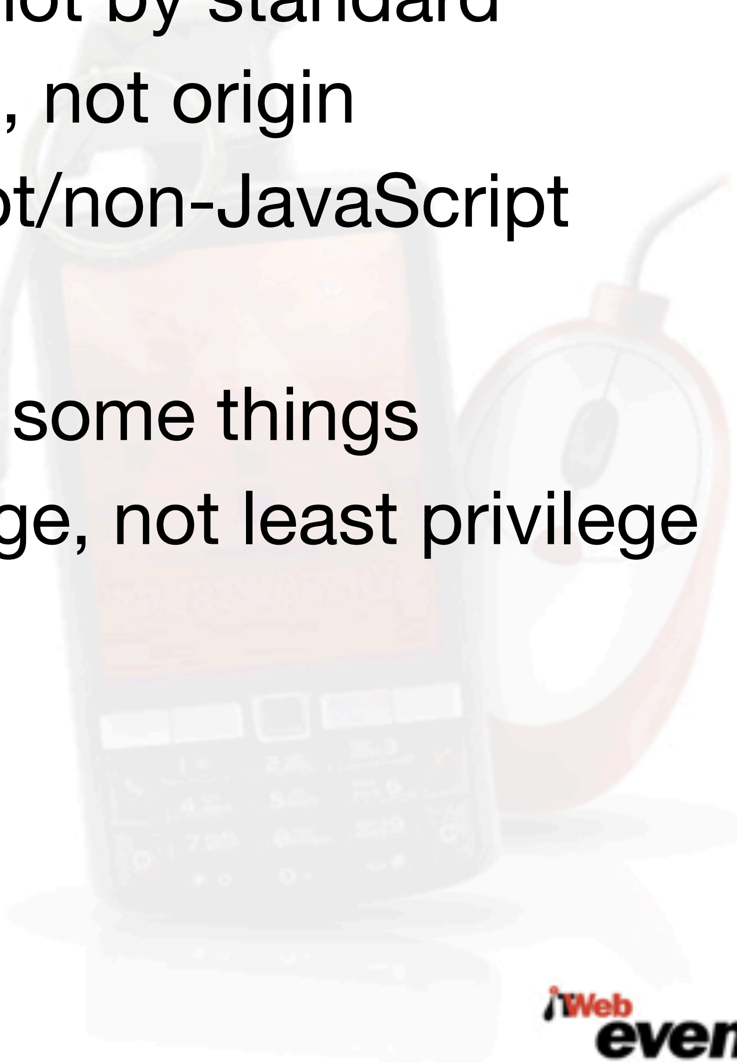
```
  for(i=0; i<10; i++) { db.scores.save({a: i, exam: 5}) };

Try that, then enter
  db.scores.find();
to see if the save succeeded. Since the shell only displays 10 results at time,
you'll need to enter the 'it' command to iterate over the rest.

(enter 'next' when you're ready)

> next

5. Basic Queries
You've already tried a few queries, but let's make them more specific.
How about finding all documents where a == 2:
  db.scores.find({a: 2});

Or what about documents where a > 15?
  db.scores.find({a: {'$gt': 15}});
```

JavaScript: Client(?!) Code

- The global scope of superglobals
- The prototypes of mass assignment
- The eval() of SQL injection
- The best way to create powerful browser apps
- The main accomplice to HTML5

Node.js is a platform built on Chrome's JavaScript runtime for easily building fast, scalable network applications. Node.js uses an event-driven, non-blocking I/O model that makes it lightweight and efficient, perfect for data-intensive real-time applications that run across distributed devices.

History of Web Designs



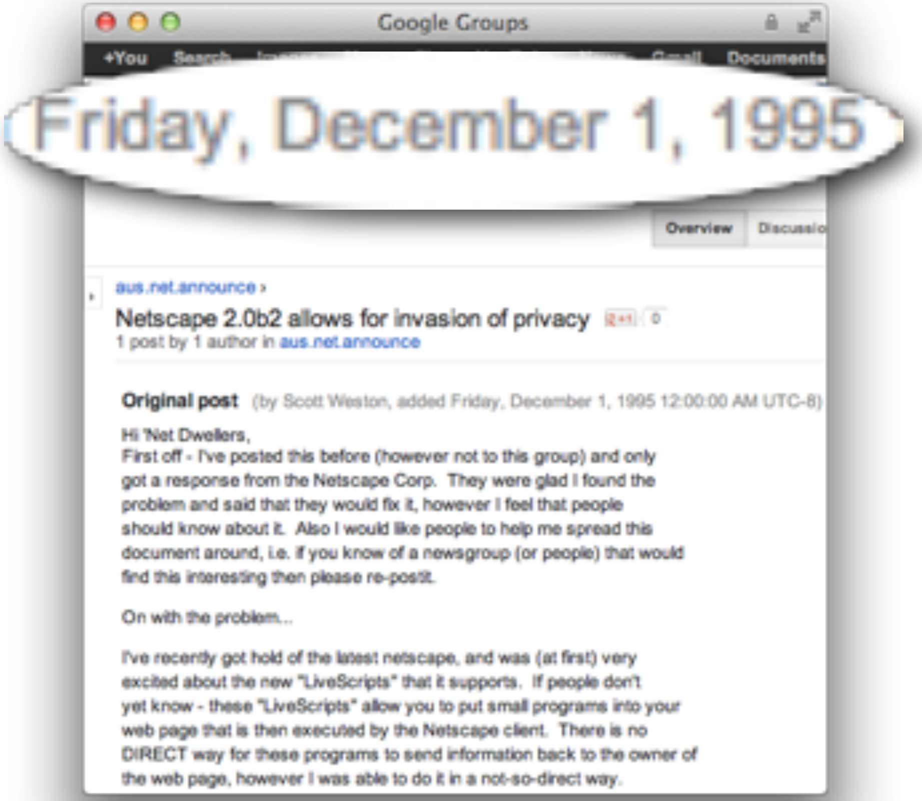
- Cookies
  - Implementation by fiat, not by standard
  - A path of ornamentation, not origin
  - HTTP/HTTPS, JavaScript/non-JavaScript
- Same Origin Policy
  - Access everything, read some things
  - No privilege or all privilege, not least privilege
- User Agent sniffing
- HTTPS
  - Not the default
  - Relies on DNS

The Dramatic Journey to HTML5

- (WAP, WML)
- (XHTML)
- CSRF
- Clickjacking
- <video>
- WebGL
- WebSocket API

Mixing Markup & Methods

HTML2 (1995)



Friday, December 1, 1995

aus.net.announce ›

Netscape 2.0b2 allows for invasion of privacy

1 post by 1 author in aus.net.announce

Original post (by Scott Weston, added Friday, December 1, 1995 12:00:00 AM UTC-8)

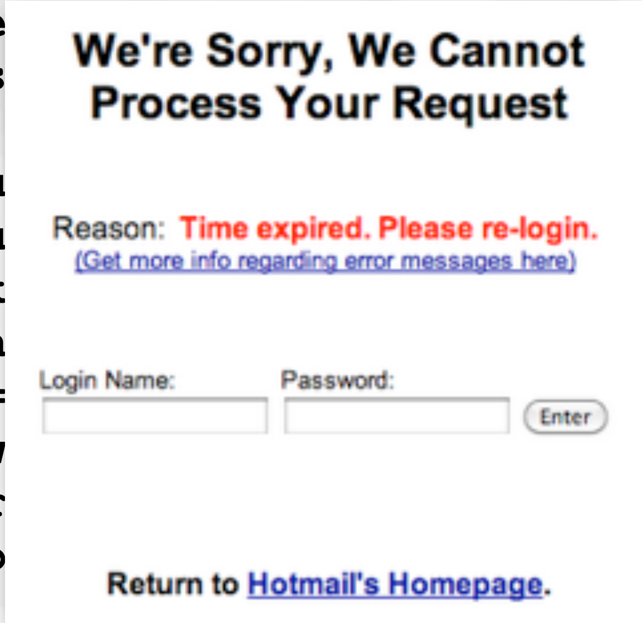
Hi 'Net Dwellers,
First off - I've posted this before (however not to this group) and only got a response from the Netscape Corp. They were glad I found the problem and said that they would fix it, however I feel that people should know about it. Also I would like people to help me spread this document around, i.e. if you know of a newsgroup (or people) that would find this interesting then please re-post it.

On with the problem...

I've recently got hold of the latest netscape, and was (at first) very excited about the new "LiveScripts" that it supports. If people don't yet know - these "LiveScripts" allow you to put small programs into your web page that is then executed by the Netscape client. There is no DIRECT way for these programs to send information back to the owner of the web page, however I was able to do it in a not-so-direct way.

HTML4 (1998)

```
<img
src="javascript:errurl='http://
site/users/anon/hotmail/
getmsg.htm';nomenulinks=top.subme
nu.document.links.length;for(i=0;
i<nome
{top.s                                i].ta
rget='
top.su                                ].hre
f=erru
nowork                                t.lin
ks.len
for(i=
{top.w                                targe
t='wor
top.wo                                ref=e
rrurl;
```



We're Sorry, We Cannot Process Your Request

Reason: Time expired. Please re-login.
(Get more info regarding error messages here)

Login Name:
Password:

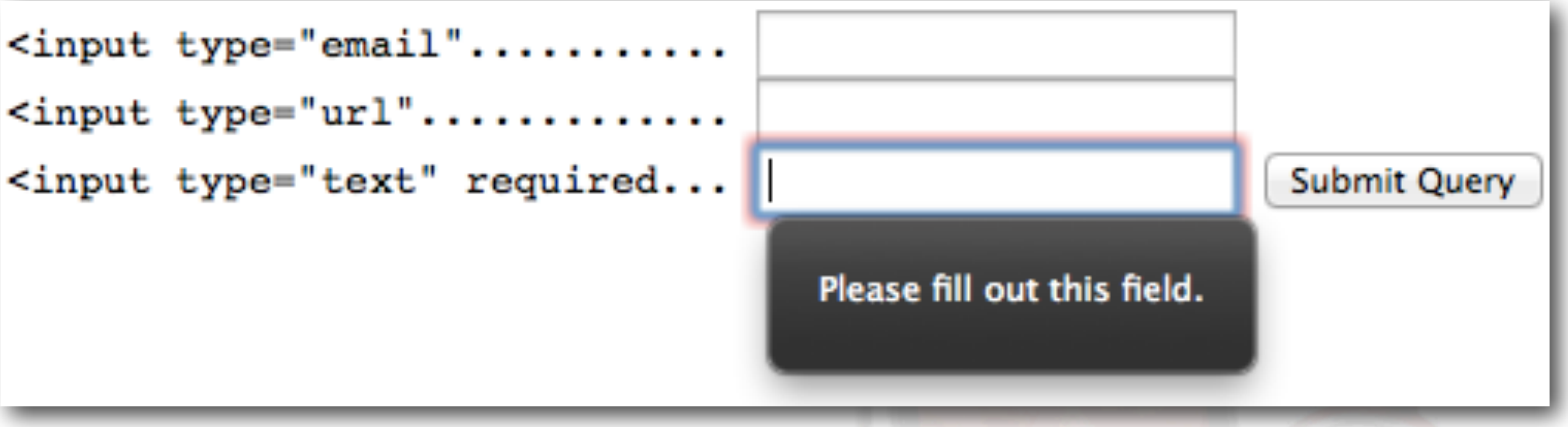
Return to Hotmail's Homepage.

HTML5 Injection

- Legacy and “non-standard” modes won’t disappear
- Look at this from the historical perspective of design and implementation
- Section 8.2 unifies parsing HTML
- Same old same origin

```
<div id=mycode style="BACKGROUND: url('java
script:eval(document.all.mycode.expr)')"
expr="..."></div>
```

HTML5 Form Validation



```
<input type="email"...........
<input type="url".............
<input type="text" required...
```

Please fill out this field.

```
<input pattern="[A-Z]+" name="alpha_only"...

<input ... autofocus onfocus="...
```

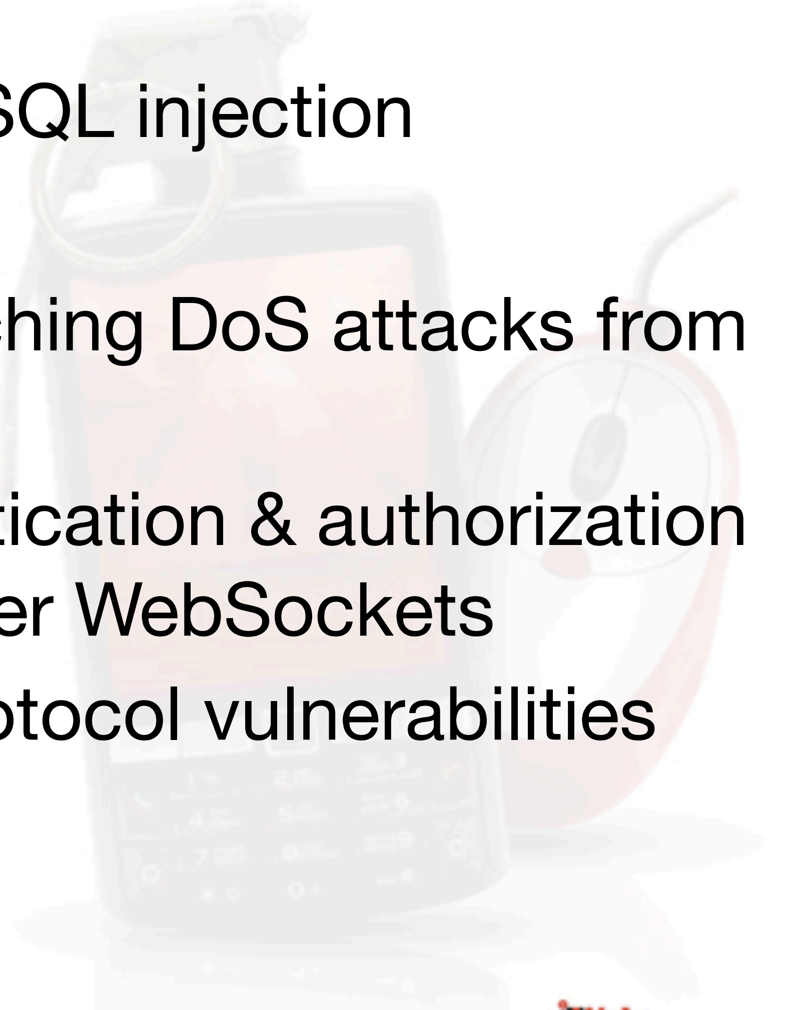
"Yes, you can re-add that logic server-side, but why would you want to add that kind of logic twice." -- illustrative mailing list comment from 2011

Defense from Design

- Sandboxing iframes, form submission, javascript execution
  - Improving granularity of Same Origin Policy
- Cross Origin Resource Sharing
  - Better than JSONP
- Content Security Policy
  - Monitor/enforce eases adoption

The Other HTML5

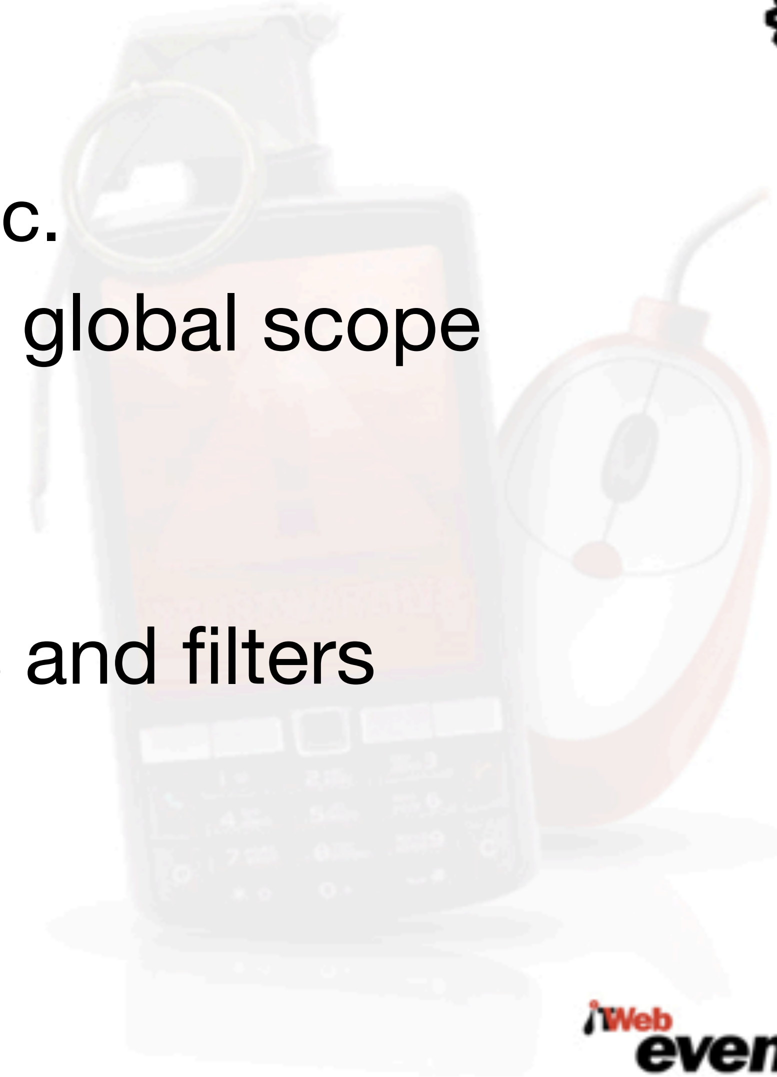
- Web Storage API
  - – Transparent resource
  - – Privacy extraction, not SQL injection
- WebSocket API
  - – Another vector for launching DoS attacks from the browser
  - – Does not confer authentication & authorization to a protocol layered over WebSockets
  - – A chance to reinvent protocol vulnerabilities



Reinventing Protocol Vulns

- Prefixed strings
- Identification
- Authorization
- Information leakage
- Replay
- Spoofing
- eval()

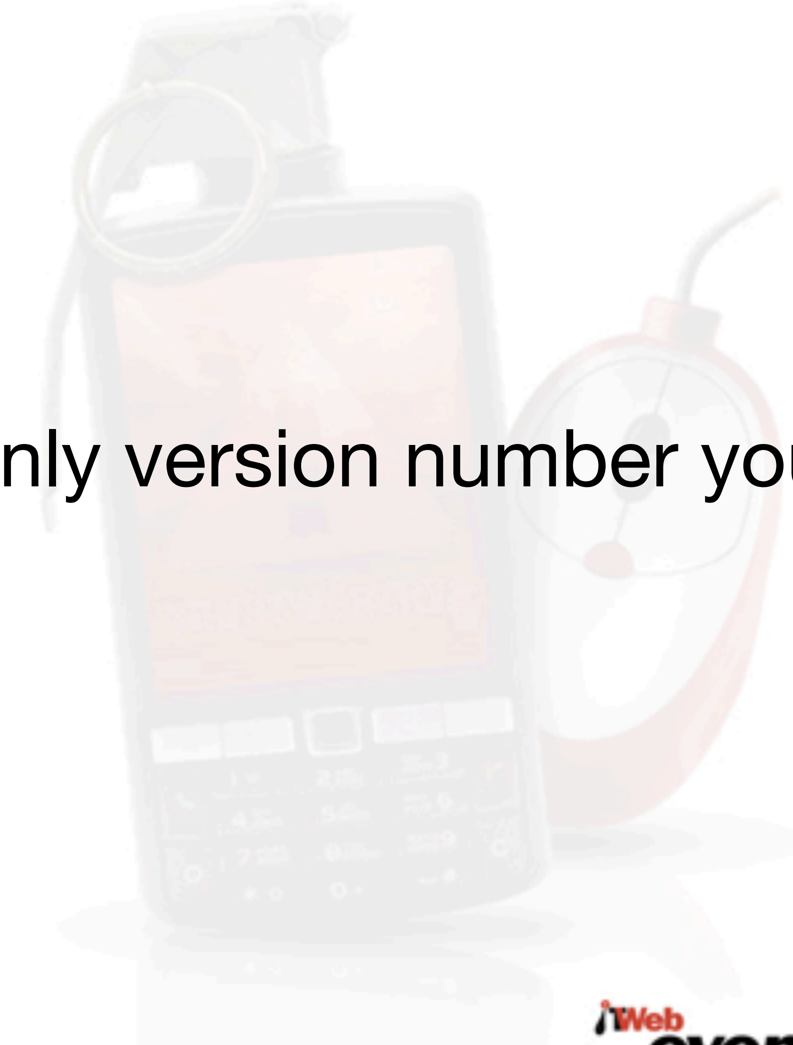
More Processing in the Browser



- Same Origin Policy still a coarse-grained control
- Bring HTML5 to HTML4
  - Emulate IndexedDB, etc.
- Leveraging JavaScript’s global scope
- DOM-based XSS
- evals, xhrs
- More work for blacklists and filters

Improving Browsers

- Process separation
- Sandboxed plugins
- Bug bounties
- X-Frame-Options
- XSS Auditors
- HTML5 should be the only version number you need



Never Mind the IDN, Here's the...

Mobile: What Design?

- User expectations
  - Who cares about the URL anymore? It’s hardly even visible.
- Embedded browser-like features are not embedded browsers
  - Same Origin Policy enforcement
  - Certification verification
- User tracking

Privacy: 1 Billion Reasons To Care

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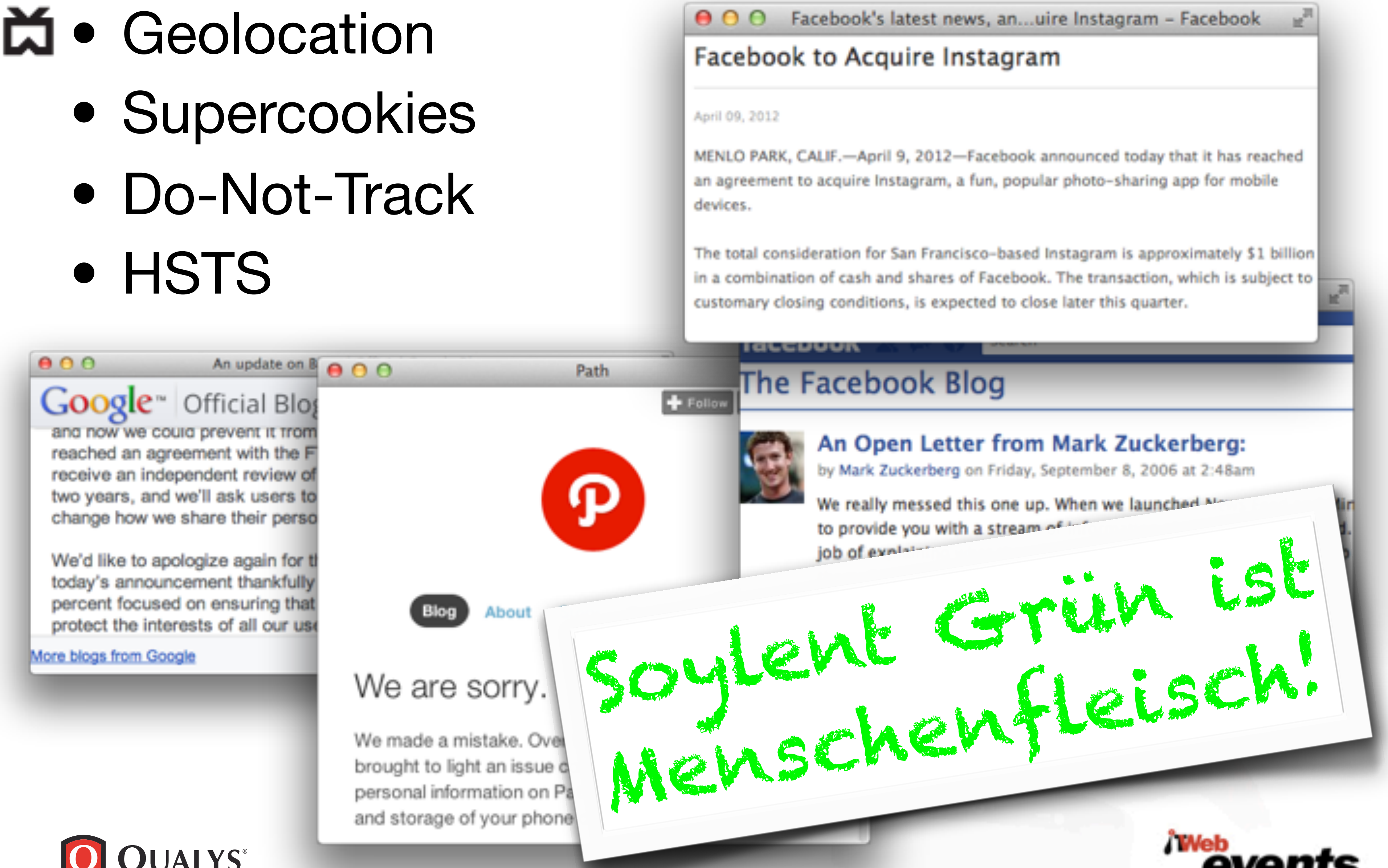
- Geolocation
- Supercookies
- Do-Not-Track
- HSTS



Facebook's latest news, an...uire Instagram – Facebook

Facebook to Acquire Instagram

April 09, 2012

MENLO PARK, CALIF.—April 9, 2012—Facebook announced today that it has reached an agreement to acquire Instagram, a fun, popular photo-sharing app for mobile devices.

The total consideration for San Francisco-based Instagram is approximately $1 billion in a combination of cash and shares of Facebook. The transaction, which is subject to customary closing conditions, is expected to close later this quarter.

An update on B

Google™ Official Blog

and now we could prevent it from reached an agreement with the F receive an independent review of two years, and we'll ask users to change how we share their perso

We'd like to apologize again for t today's announcement thankfully percent focused on ensuring that protect the interests of all our use

More blogs from Google

Path

Follow

Blog About

We are sorry.

We made a mistake. Ove brought to light an issue c personal information on Pa and storage of your phone

The Facebook Blog

An Open Letter from Mark Zuckerberg:

by Mark Zuckerberg on Friday, September 8, 2006 at 2:48am

We really messed this one up. When we launched N to provide you with a stream of i job of expl

Soylent Grün ist Menschenfleisch!

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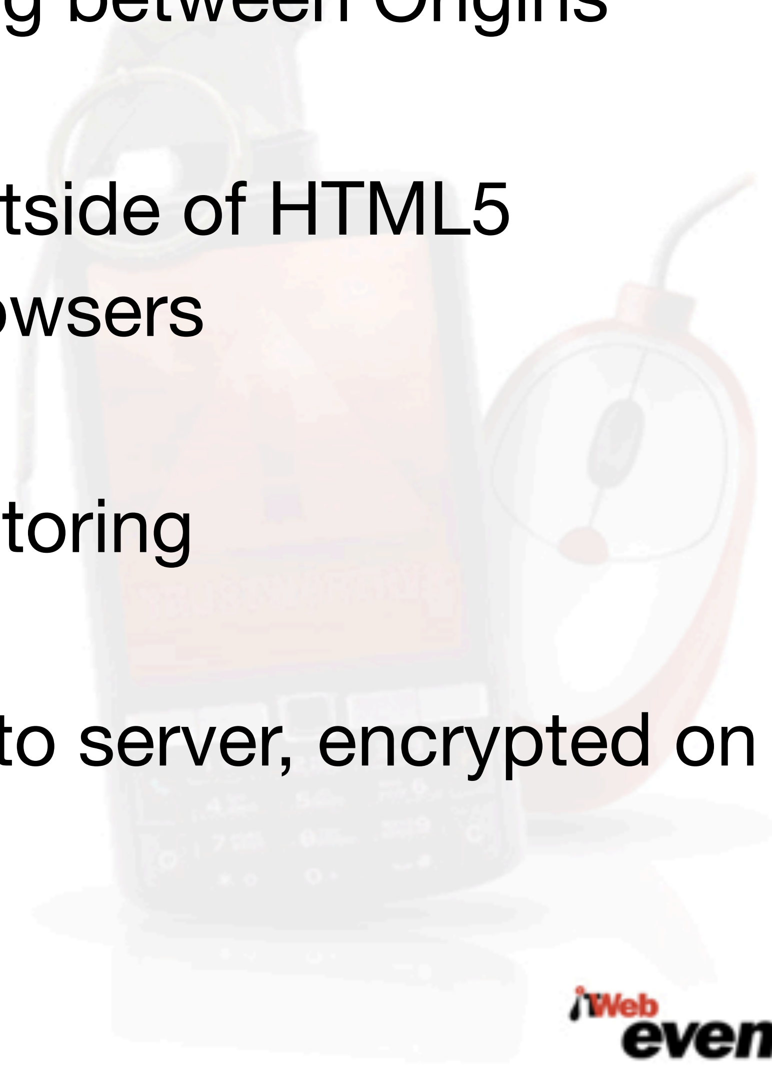
ITWeb events

Threats, Troubles, Trends

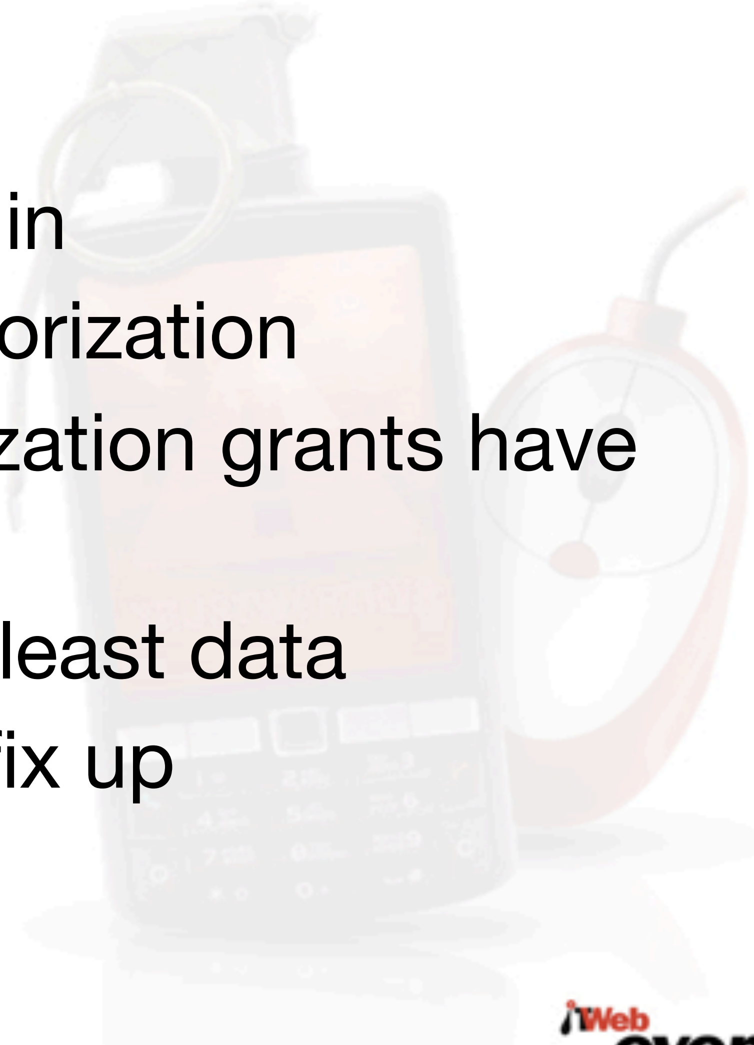
- Frames
  - Sharing, nesting, moving between Origins
- Plugins
  - Outside of sandbox, outside of HTML5
  - Worse security than browsers
- More specs
  - Hardware access, monitoring
- Passwords
  - Plaintext from browser to server, encrypted on server
  - OAuth & OpenID?



JavaScript Libraries

- Ext JS 1.1.1 to 4.0.7
- jQuery 1.0.2 to 1.2.5
- Modernizer 1.1 to 2.5.3
- MooTools 1.1 to 1.4.5
- Prototype 1.3.0 to 1.7.0
- YAHOO 2.2.0 to 2.9.0
- YUI 3.0.0 to 3.4.1

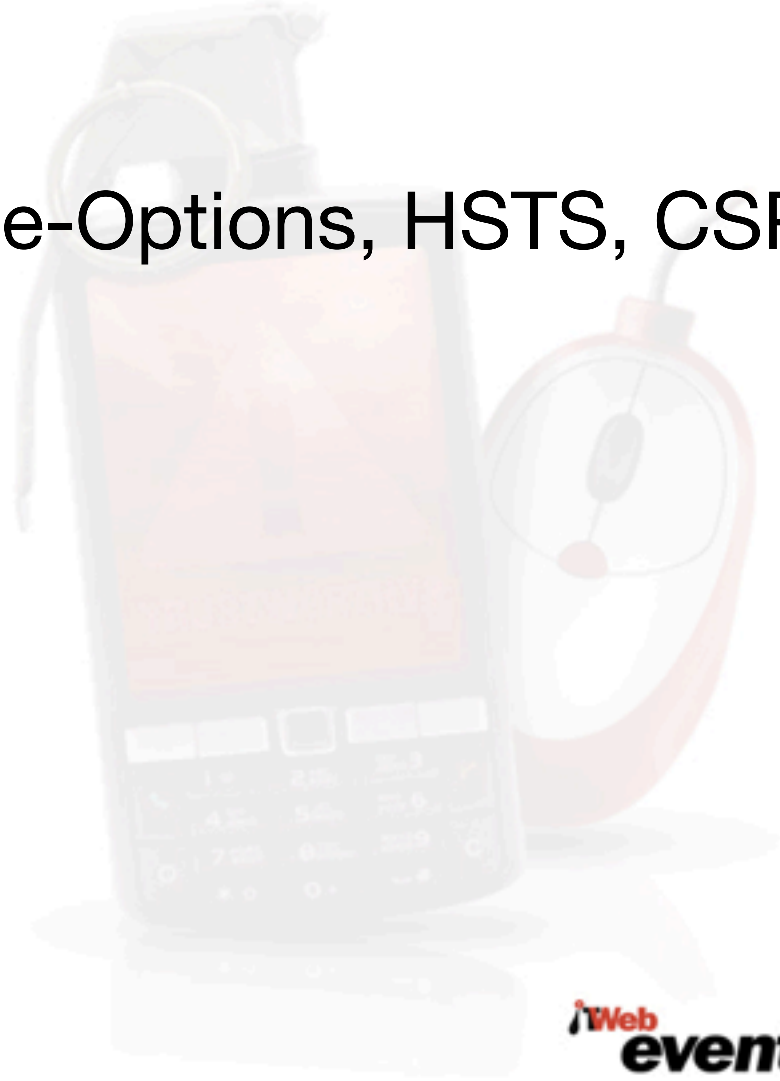
Recognizing Positive Security



- Acknowledges threats intended to counter, and those it doesn't
- Encrypted transport
- Adherence to Same Origin
- Preflight checks for authorization
- Authentication & authorization grants have short lifetimes
- Requires least privilege, least data
- Parsing failures fail, not fix up

HTML5 Is Good For You

- Beware of legacy support for and within old browsers
- Abolish plugins
- Deploy headers: X-Frame-Options, HSTS, CSP
- Data security is better



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Questions?

Thank You!

http://deadliestwebattacks.com/