



# Securing Web Content

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Joakim took the **What would you do if you were a...** quiz and the results are... **Fun!**

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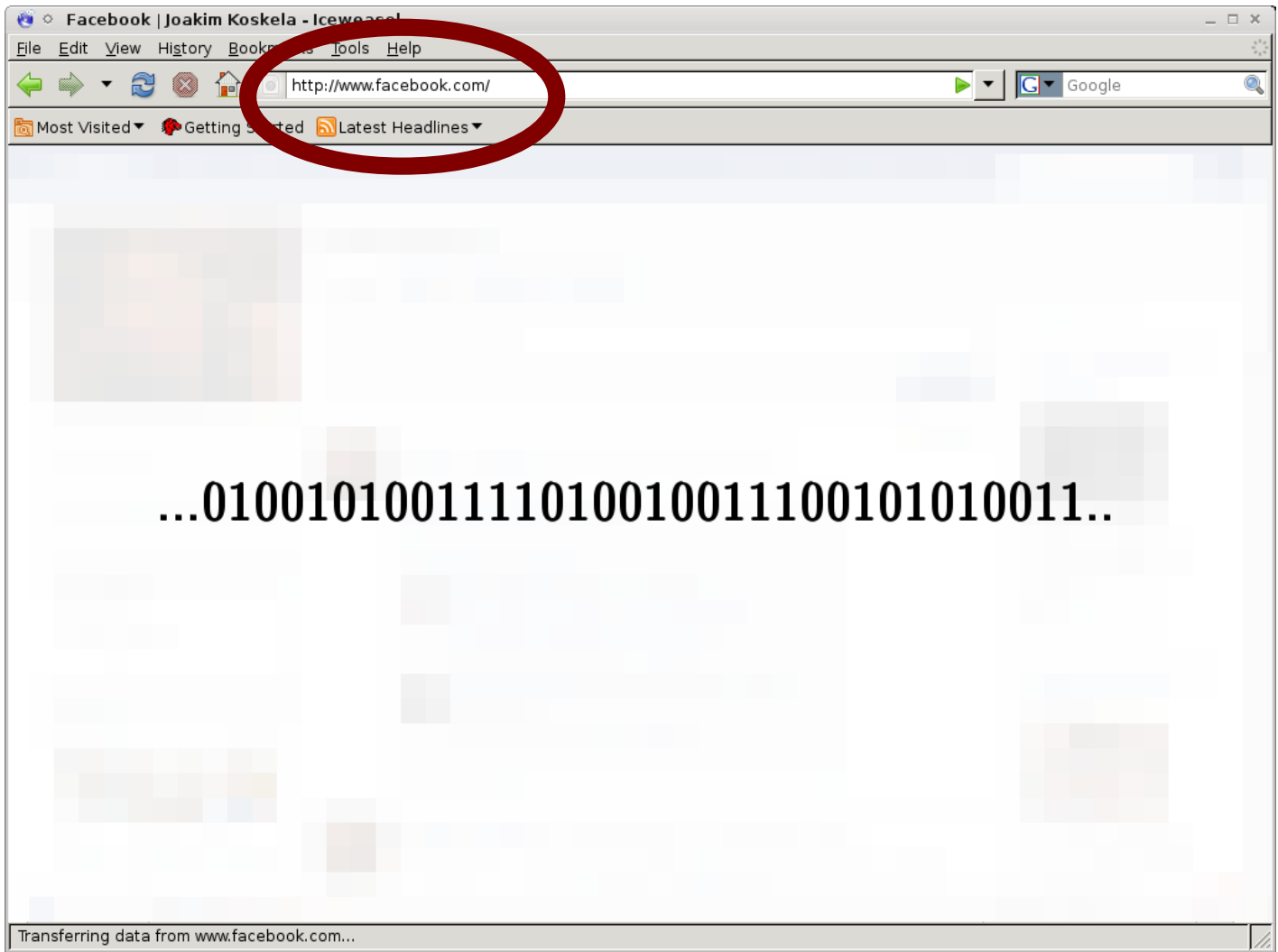
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# How do we protect the user without dwarfing the web experience?

- Nature of the web has changed
- Simple hyperlinked documents -> complex collages
  - Mashups, cross-site delegation, Flash, JavaScript..
- Single producer -> collection of providers
- Security model outdated

# Securing content

- Add accountability to individual content components
- Handled according to the preferences and experiences of the user
  - Opportunistic Personas
  - History with an actor, the *trackrecord*

# Securing the page structure

- Sign the page with the site's key
  - Integrity (as in SSL)
- Sets the general attitude
  - Browser caches, pre-filled input fields
  - Detect phishing attempts

# Content components

- Add signature to HTML content blocks
  - `<div>s`
  - Signature and key as attributes
- Different strategies
  - Sign tag contents as-is
  - *Decorate* the tag interiors
    - Fill child elements with data from a signed block

# Decoration example

- `op_*` attributes identifies the div

```
<div id="sdiv5" class="entry"  
  op_data="header=Hi&message=Testing+123"  
  op_signature="OyjONQTCAR6Mv/sBjRaF.." "  
  op_key="LS0tLS1CRUdJTiBQVUJMSUMgS0..">  
<div>Posted 11:43:51</div>  
<div id="sdiv5_header"></div>  
<div id="sdiv5_message"></div>  
</div>
```



# Decoration example

- `op_*` attributes identifies the div
- `<div>`s id is prefixed to the id of child elements

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# Decoration example

- `op_*` attributes identifies the div
- `<div>`s `id` is prefixed to the `id` of child elements
- `op_key` and `op_signature` contain author's key & signature

```
<div id="sdiv5" class="entry"  
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  op_signature="OyjONQTCAR6Mv/sBjRaF.." "  
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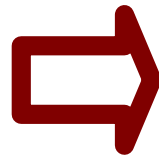
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- `op_data` is the signed key-value data

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```

# Decoration example

- `op_*` attributes identifies the div
- `<div>`s id is prefixed to the id of child elements
- `op_key` and `op_signature` contain author's key & signature
- `op_data` is the signed key-value data
- Data is inserted into child elements, matching value keys with element ids

```
<div id="sdiv5" class="entry"
  op_data="header=Hi&message=Testing+123"
  op_signature="OyjONQTCAR6Mv/sBjRaF.."
  op_key="LS0tLS1CRUdJTiBQVUJMSUMgS0..">
  <div>Posted 11:43:51</div>
  <div id="sdiv5_header"></div>
  <div id="sdiv5_message"></div>
</div>
```



```
<div id="sdiv5" class="entry"
  op_status="trusted">
  <div>Posted 11:43:51</div>
  <div id="sdiv5_header">Hi</div>
  <div id="sdiv5_message">Testing 123</div>
</div>
```

# External content

- External content can be included by signature in tag attributes
  - `<img>` `<link>` `<video>` etc.

# Partnerships

- *Partners* delivering dynamic content
  - Advertisers, CDNs, search bars
- A method for indicating partnerships
  - Trust is not transitive
  - An indication to expect *something*
- Include partner key in tag attributes

# Trust and security policies

- Framework: the opportunistic personas
  - Track record, Peer review, Web-of-Trust, Trust Databases
- Knowledge of actors
  - What do we know about someone?
  - How do we know that?
  - How well?
- Policies
  - Accept, ignore, sanitize, sandbox

# Prototype

- Firefox plugin, persona (key-) daemon and server library
- Experimented with a subset
  - \_ Page signatures
  - \_ <div> tag signatures and decoration
  - \_ External content
  - \_ Signing content submissions (POSTs)
- Server-side required only a user-space library
- Persona daemon provided the track record
  - \_ Recorded keys from web, e-mail, P2P IM and VoIP
  - \_ Provided *statements* about actors
    - “You trust this person, knowing him well (through browsing and e-mails)”
- Simple security policies



# Conclusions

- The way the web is composed today provides plenty of opportunities for malicious activity
- Our model points out the content that sites will not vouch for

# Thank you for your attention!

joakim.koskela@hiit.fi

<http://www.hiit.fi/netwr>

<http://www.icsi.berkeley.edu>



# Four parts

- Securing the page structure
- Content components
- External content
- Partnerships

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**Antti Mäkelä** *toasting to Arthur: 100 years!*  
September 25 at 5:33pm · Delete

Write a comment...

**Joakim Koskela** *oh, the times it takes to get a...*

Joakim took the *What would you do if you were...* quiz and the results are... *Fun!*

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September 25 at 5:29pm · Delete  
Taru Miettinen (commented) **100 vuotta!**  
September 25 at 5:33pm · Delete  
Write a comment...

**Joakim Koskela** **oh, the contest is over: ingurgitating his...**  
Joakim took the **What would you eat if you were a...** quiz and the results are...  
Toikka...

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Joakim took the **100 years old** quiz and the result is **100 years!**

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Joakim took the **What would you do if you were a wizard?** quiz and the results are... **Fun!**

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September 25 at 5:33pm · Delete

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**Joakim Koskela** **oh, the sweet 100th birthday!**  
Joakim took the **What would you do with 100 million?** quiz and the results: **Finland, Tolkien**

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Markus Andersson (commented) Sep 24 (ago)  
September 25 at 5:33pm · Delete

**Joakim Koskela** ...  
Joakim took the "What media programs will" quiz and the results: Finnish, Telemann...

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