Fathom: A Browser-based Network Measurement Platform

Christian Kreibich
International Computer Science Institute

Mohan Dhawan, Justin Samuel, Renata Teixeira, Mark Allman, Nick Weaver, Vern Paxson
User/edge-centric measurement
User-centric measurement

- Dasu
- Homenet Profiler
- Hostview
- Netalyzr
- Shaperprobe
- Speedtests
User-centric measurement

- Dasu
- Homenet Profiler
- Hostview
- Netalyzr
- Shaperprobe
- Speedtests

Vuze plugin, Java
Java app
native app
Java applet
native app
JavaScript, Flash
A better platform?

+ Everywhere
+ All the time

‒ No real API
‒ Security model
Wouldn't this be sweet?

```html
<html>
<body>
  <script type="text/javascript">
    function tr_callback(results) { ... }
    measurements.traceroute("google.com",
                       tr_callback);
  </script>
</body>
</html>
```
Wouldn't this be sweet?

HarrierMan Level 1

What is up with Google Maps? It is either incredibly slow or pages just don't appear unless I click on the 'Still loading ...Slow? Try Basic HTML' button that has started to appear at the of of the page. This has happening for at least a week, maybe much longer. My connection runs at about 6Mb/sec and is fine for other sites so this is a google map issue. I notice many other posts over the last year where people have had problems at times when I haven't so is just my turn to be frustrated?
Wouldn't this be sweet?

Hiya,

To make progress with this, we'll need some more information from you. Ideally, answers to these questions from everyone:

1) When did
2) Can you now it takes back" etc.
3) Which br
4) What oth etc installed
5) If you kn maxed out c
6) Which are country-lv

Any information you can provide will be very helpful.
The browser design space

• In-page JavaScript
  • Pervasive, portable, lacking features
• Browser extensions
  • User privileges, lacking portability
• Runtime plugins
  • Portable, lacking features & security
• Custom plugins
  • Powerful, large effort, lacking portability
• Browser changes
  • Simply unrealistic

Intrusiveness
Fathom:
A measurement platform for Firefox

• Just one browser, but ...  
• ... very nice sweet-spot of features!
  • Popular browser
  • JavaScript-only extension (→ open source)
  • Portable (across Firefox's platforms)
  • Extension need “only” control mediation
Fathom?
Fathom?
Architecture

Fathom
- fathom object & APIs
- Socket workers
- FathomScript
- Active/passive measurement scripts

Firefox
- DOM
- Rendering Engine
- JavaScript Engine
- XPCOM
- Network Engine
- js-ctypes
- NSPR

Shell
Storage
Network
## API

<table>
<thead>
<tr>
<th>API</th>
<th>Availability in</th>
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<tbody>
<tr>
<td>fathom.socket.tcp.*</td>
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<td>fathom.socket.udp.*</td>
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<td>fathom.utils.browser.*</td>
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<td>fathom.utils.metrics.*</td>
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JavaScript & DOM access: ● ○ ○
Security model: 5 mechanisms

- Client policy
  - Defines conditions enabling API access
- User confirmation
  - Not a great if relied upon heavily
- Script manifests
  - Declares desired resources up-front
- Server manifests
  - Controlled departure from same-origin policy
- Code signing
  - Establishes identity, permission management
Demonstration
Conclusion

• Fathom: a browser-based measurement platform
• Early stage, but usable
• Contribute! Code, interns, browser gurus, ...

http://fathom.icsi.berkeley.edu