Varnish

- the http accelerator

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CMS systems

- GET / HTTP/1.1
  - Hang on, I need to look up a few hundred things in my database and then do a lot of editing with some badly written software.
CMS systems

- **GET / HTTP/1.1**
  - Hang on, I need to look up a few hundred things in my database and then do a lot of editing with some badly written software.

- **HEAD / HTTP/1.1**
  - Hang on, I need to look up a few hundred things in my database and then do a lot of editing with some badly written software, and then I will throw the result away.
CMS systems are SLOW!

- Complex content generation process
- Single database prevents clustering
- Expensive software ditto.

=> Need for server side caching.
  - Apache
  - Squid
  - $CALL
Apache as cache

- Not what Apache is built for.
- Not what Apache is good at.
- Square peg, round hole.
Squid is a cache...

- ...built for client side caching.
- Lots of unwanted functionality.
  - Authentication.
  - FTP
- 1980 software design.
- Fragile and buggy.
- Wrong configuration features.
- Wrong policy decisions.
• Akamai will happily take your money.
• But you lose control.
• You're stuck with their service.
dictionary: Varnish

- tr. v. var·nished, var·nish·ing, var·nish·es
  - 1. To cover with varnish.
  - 2. To give a smooth and glossy finish to.
  - 3. To give a deceptively attractive appearance to.
Varnish Cheat-Sheet

- Web-acceleration for slow CMS systems
- Narrow focus on server side speedup
  - No FTP etc.
  - Content provider features
- High Performance
  - 32 & 64bit, large RAM, sendfile, accept filters
  - SMP/Multicore friendly architecture
  - 2006 software design
  - 11 syscall + 7 locks per cache hit
Performance Design

- Don't copy data if we can avoid it
  - Avoid text-processing headers
- Convert Chunked encoding to Direct
- Also cache "cannot be cached" info
- Maximize session usage
  - Pass-through mode understands chunked encoding etc.
  - Pipe mode for weird stuff (selected by VCL)
Varnish is fast!

- 1000 cache hits @ 100 Mbit/sec:

<table>
<thead>
<tr>
<th>Sample</th>
<th>Min</th>
<th>Max</th>
<th>Median</th>
<th>Average</th>
<th>Stddev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full</td>
<td>12,9</td>
<td>3001</td>
<td>16,2</td>
<td>71,1</td>
<td>338,5</td>
</tr>
<tr>
<td>90% fractile</td>
<td>12,8</td>
<td>26</td>
<td>15,9</td>
<td>16,3</td>
<td>1,7</td>
</tr>
</tbody>
</table>

(all times are in microseconds)
Content Provider Features

- Instant URL invalidation
  - Regexp matching
  - Easy Integration to CMS system
- Expiry time control (via VCL)
- Load/Situation mitigation (via VCL)
OaM

• Cluster controller (version 2 feature)
  – Invalidate URL on all caches instantly
  – Change VCL on all caches simultaneously.
  – Aggregate statistics

• Command Line Interface
  – Remote access via ssh/mobile phone
  – Interrogation/configuration/investigation
Varnish Config Language

- Simple domain specific language
  - Compiled via C language to binary
    - Transparantly!
  - Dynamically loaded
- Multiple configs loaded concurrently
  - Instant switch from one VCL to another.
if (client.ip in 10.0.0.0/8) {
    pass;
}

if (req.url.host ~ "cnn.no$") {
    rewrite req.url.host "cnn.no" "vg.no"
}

if (!backend.up) {
    if (obj.exist) {
        set obj.ttl += 10m;
        deliver;
    }
    switch_config "ohhshit";
}
Logging

• Logging to shared memory
  – No slowdown for real workload

• Daemons tailing shm generate ”real” output:
  – Apache format
  – Custom format
  – Realtime views
“Varnishtop”

- Shows an real-time view of log records.
- ”varnishtop -i rxurl”

342.49 /gfk/front/tipsvg.png
340.41 /sistenytt.html
326.53 /gfk/ann/n.gif
307.61 /annonser/telenor/menyknapp/svart/vg115x160_1.html
297.70 /include/global/art.js
276.73 /gfk/ann/ng.gif
273.84 /css/hoved.css
243.01 /
241.85 /annonser/telenor/menyknapp/svart/pil.gif
226.04 /css/kjaerevg.css
"varnishhist"

- Shows response time as real-time histogram:
Statistics

- Stored in shared memory

- Multiple programs can monitor, react to and present stats data.
  - At practically no cost in cpu time.
Varnish 1.0

- Sponsored by Verdens Gang
  - Norwegian Newspaper
- 500,000 Kr ($85K)
- 22,000 lines of code
  - 22 Kr/line ($3.80/line)
- 1000 checkins
  - 500 Kr/checkin ($85/checkin)
Varnish 1.0 Cheatsheet

- WWW.varnish-cache.org
  - Yes, we need to work on the web-page.
- Coded by: Poul-Henning Kamp
  - phk@FreeBSD.org
- Runs on: Any resonable modern UNIX
  - FreeBSD, Linux etc.
- Open Source
  - BSD license