A modern web framework and CMS

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Overview

- Yet another CMS?
- Why Erlang?
- Inside Zotonic
- The future
Websites: a history

- First generation
  - static text, images
- Second generation
  - Database driven, templates, CMS.
- Now:
  - Highly interactive, realtime, data exchange, personalization
Our wish list

- CMS
- Framework
- Connectivity
- Frontender friendly
- Efficient use of hardware
Now: `<?php ?>`

- Slow
  - More code => slower
- Shared nothing
  - Amnesia doesn't make it faster
- Big non threaded web server
  - Forget long living connections...
Now: Python, Ruby...

- One process per core
- Multithreading? Better not
- No sharing of state and data
- Memcache is common state
- On failure your server crashes
Erlang?

- Website is communication hub
- Many kinds of data streams
- Many Parallel connections
- Lots of short requests
- Long living connections
- …this looks like a phone switch!
Why not Erlang?

- Esoteric language
  - Great error/failure handling
  - Very compact
  - Mature
- String processing?
  - Data preprocessing, iolist()s
Demo time!

Media

Media encompasses all uploaded images, movies and documents. Media can be attached to pages.

<table>
<thead>
<tr>
<th>Media overview</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preview</strong></td>
</tr>
<tr>
<td><img src="image/png" alt="Blewup of website detail" /></td>
</tr>
<tr>
<td><img src="image/png" alt="lkPod ports" /></td>
</tr>
</tbody>
</table>
So, what's in the box?

- Multiple sites
- Admin interface
- Member administration
- Page management
- Menu creator
- Commenting
- Image scaling / preview
- Video embedding
- Integrated e-mail sending + receiving (!)
- API OAuth
- i18n
- Atom feeds
- Import CSV / Wordpress
- Mailinglist
Getting technical

- Where we started
- Our data model
- Open source puzzle
- OTP hierarchy
- Modules
- URL dispatching
- The building blocks
Data model: everything is a thing

![Data model diagram]

- Article
  - author: Person
  - depiction: Image
Full data model
Open source puzzle

- Webmachine
  - Forked to webzmachine
- Nitrogen
- ErlyDTL
- Mochiweb, erlang-gettext, erlang-oauth, gen_smtp
- PostgreSQL driver: epqlsql
- Imagemagick (cli)
Modules

- Modules are self-contained:
  - Dispatch rules, resources, templates, css, javascript, images, translations, template filters, actions, validators, API services, models, ...

- Prioritized list

- File lookup mechanism

- Every module can be a gen_server
Notification system

- Is how modules extend and offer functionality
- gen_event-like
- Listen to notifications
- Send notifications:
  - notify, notify1, fold, map, first
  - Both sync and async

% @doc Check if the recipient is a known user, if so redirect the received e-mail
observe_email_received(#email_received{localpart=Recipient} = Received, Context) ->
  case m_identity:lookup_by_username(Recipient, Context) of
    undefined -> undefined;
    Props ->
      case proplists:get_value(is_verified, Props) of
        true ->
URL dispatching

- Dispatch rules per site
  - (and per module)
- Dispatch rules have names

```
{contact, [“contact”], resource_template, [ {template, "contact.tpl"} ]},
```
The page controller

- Webmachine entrypoint for pages
- 404 check
- Authorization check + logon redirect
- Template selection
Template system

- Extended ErlyDTL
  - Expressions: {% if a + b > c %}
  - Tuple and list data types
  - Data access through models: {{ m.rsc[id].title }}

- Templates can be made more specific by category and/or unique page name

- Templates with the same name override each other
  - Uses module priority
{% extends "page.tpl" %}

{% block content_body %}
{% cache 7200 %}

{% for r in m.search[{archive_year cat='project'}] %}
  <div class="grid_9 alpha omega">
    <h2 class="year">{{ r.year }}</h2>
  </div>

  {% for group in m.search[{query publication_year=r.year|append:"" cat='project' sort="-publication_start"}]|chunk:3 %}
    <div class="grid_9 alpha omega">
      {% for id in group %}
        {% catinclude "inc/listitem.tpl" id alpha=forloop.first omega=forloop.last%}
      {% endfor %}
    </div>
  {% endfor %}

{% endfor %}
{% endcache %}

{% endblock %}
Scomps — screen components

- For when you need more logic than a template can handle
- Erlang module
- Cacheable
- Example: {% menu id=id %}
Javascript — Event handling

- Ajax postbacks
- Form submits
- Calls event/2 function
- Communicates back to browser by sending javascript
  - Inspired by Nitrogen

```javascript
{% button postback={click foo="bar"} text="click me" %}

event({postback, {click, Args}, _Trigger, _Target}, Context) ->
z_render:wire({alert, [{text,"hello"}]}, Context).
```
Javascript — Push connections

- Uses either Comet or WebSockets
- Attaches to the page process
- Transports Javascript to the UA
API services

- API method is an Erlang module
- /api/mymodule/mymethod
- In /services module directory
- JSON input / output
- Process GET and POST
Performance optimizations

- Caching (don't hit the database)
- Prevent data copying
- Memo-caching in process dict
- Pre-computed HTML
- Share computations between requests
Compute less

- Parallel requests have similar computations
- Only one time calculated
- Lightweight and simple optimization against ./ effect
- Uses memo functionality of depcache
- Kind of caching, with 0 expire.
Future directions

- Information exchange hub
  - PubSub (XMPP, pubsubhubub)
  - Push & pull (feeds, atom, email)

- Scaling up.... Elastic Zotonic
  - Distributed
  - Fault tolerant
  - Buzzword compliancy :-)
Elastic Zotonic goals

- Scalable
- Robust
- Fault tolerant
- Low maintainance
- Easy to setup
- KISS
- Time scale: first release Q4 2011
The community

- [www.zotonic.com](http://www.zotonic.com) — always improving with latest documentation
- Great mailing list with helpful people
  - [zotonic-users@groups.google.com](mailto:zotonic-users@groups.google.com)
- XMPP chat room
  - [zotonic@conference.zotonic.com](mailto:zotonic@conference.zotonic.com)
Thank you!

- Online resources:
  - MiracleThings website
    http://miraclethings.nl/media/attachment/2011/8/13/arjan_miraclethings_789d763.zip
  - Presentation slides

- … any questions?