



“Even though I am in the thralls of Perl 6, I still do all my web development in Perl 5 because the ecology of modules is so mature.”

http://blogs.perl.org/users/ken_youens-clark/2016/10/web-development-with-perl-5.html

Web development and Perl 6

Bailador

BreakDancer

Crust

Web

Web::App::Ballet

Web::App::MVC

Web::RF

Bailador

Nov 2016

BreakDancer

Mar 2014

Crust

Jan 2016

Web

May 2016

Web::App::Ballet

Jun 2015

Web::App::MVC

Mar 2013

Web::RF

Nov 2015

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Crust

Web

Bailador

to the rescue

Bailador config

```
my %settings;
multi sub setting(Str $name) {
    %settings{$name}
}
multi sub setting(Pair $pair) {
    %settings{$pair.key} = $pair.value
}

setting 'database'      => $*TMPDIR.child('dancr.db');
# webscale authentication method
setting 'username'      => 'admin';
setting 'password'      => 'password';
setting 'layout'        => 'main';
```

Bailador DB

```
sub connect_db() {  
    my $dbh = DBIish.connect(  
        'SQLite',  
        :database(setting('database').Str)  
    );  
    return $dbh;  
}
```

```
sub init_db() {  
    my $db = connect_db;  
    my $schema = slurp 'schema.sql';  
    $db.do($schema);  
}
```

Bailador handler

```
get '/' => {  
  my $db = connect_db();  
  my $sth = $db.prepare(  
    'select id, title, text from entries order by id desc'  
  );  
  $sth.execute;  
  layout template 'show_entries.tt', {  
    msg          => get_flash(),  
    add_entry_url => uri_for('/add'),  
    entries      => $sth.allrows(:array-of-hash)  
                  .map({$_<id> => $_}).hash,  
    session     => session,  
  };  
}
```

Bailador - Logging in

```
post '/login' => sub (*@a) {
  my $err;

  # process form input
  if request.params<username> ne setting('username') {
    $err = "Invalid username";
  }
  elsif request.params<password> ne setting('password') {
    $err = "Invalid password";
  }
  else {
    session<logged_in> = True;
    set_flash('You are logged in.');
```

return redirect '/';

```
  }

  # display login form
  layout template 'login.tt', {err => $err};
}
```

Bailador helpers

```
sub uri_for($path) {  
    return $path;  
}
```

```
sub layout($content) {  
    template 'layouts/' ~ setting('layout') ~ '.tt', {  
        css_url      => '/css/style.css',  
        login_url    => uri_for('/login'),  
        logout_url   => uri_for('/logout'),  
        session      => session,  
        content      => $content,  
    };  
}
```

“Even though I am in the thralls of Perl 6, I still do all my web development in Perl 5 because the ecology of modules is so mature.”

http://blogs.perl.org/users/ken_youens-clark/2016/10/web-development-with-perl-5.html

Bailador on Crust

```
use Dancr;
```

```
my $app = Dancr.to-app();
```

Bailador on Crust

http server is ready: http://127.0.0.1:5000/
(pid:21285, keepalive: 1)

Bailador on Crust

http server is ready: http://127.0.0.1:5000/
(pid:21285, keepalive: 1)

No such method 'decode' for invocant of type
'IO::Blob' in block at
/home/nine/rakudo/install/share/perl6/site/sources/597E1F971BE2BD4CFA4FD551B0AC356F
2F8D64DC (Bailador::Request) line 45



PERL

• SINCE 2009 •

PERL
DANCER

• is FUN •

AGAIN

First dancing steps

```
use Dancer2:from<Perl5>;
```

```
get '/' => sub {  
    'Hello World!';  
};
```

```
start;
```

First dancing steps

```
use Dancer2:from<Perl5>;  
  
get '/' => sub ($app) {  
    'Hello World!';  
};  
  
start;
```

First dancing steps

```
use Dancer2:from<Perl5>;
```

```
get '/' => {  
    'Hello World!';  
};
```

```
start;
```

Dancr

```
use v6.c;
```

```
unit class Dancr;
```

```
use Dancer2:from<Perl5>;
```

```
use DBI:from<Perl5>;
```

```
use Template:from<Perl5>;
```

```
set 'database' => $*TMPDIR.child('dancr.db');
```

```
set 'session' => 'Simple';
```

```
set 'template' => 'template_toolkit';
```

```
set 'logger' => 'console';
```

```
set 'log' => 'debug';
```

```
set 'show_errors' => 1;
```

```
set 'startup_info' => 1;
```

```
set 'warnings' => 1;
```

```
set 'username' => 'admin';
```

```
set 'password' => 'password';
```

```
set 'layout' => 'main';
```

DBI

```
sub connect_db() {  
    return DBI.connect(  
        'dbi:SQLite:dbname='  
        ~ setting('database'),  
        Any,  
        Any,  
        ${sqlite_unicode => 1}  
    ) or die $DBI::errstr;  
}
```

Hooks

```
hook before_template_render =>
sub (%tokens) {
  %tokens<css_url>
    = request.base ~ 'css/style.css';
  %tokens<login_url>
    = uri_for('/login');
  %tokens<logout_url>
    = uri_for('/logout');
}
```

Performance

```
get '/' => {
  my $db = connect_db();
  my $sql = 'select * from entries order by id desc';
  my $sth = $db.prepare($sql) or die $db.errstr;
  $sth.execute or die $sth.errstr;

  template 'show_entries.tt', Map.new((
    msg          => get_flash(),
    add_entry_url => uri_for('/add'),
    entries      => $sth.fetchall_hashref('id'),
  )).item;
}
```

Context

```
post '/add' => {
  send_error("Not logged in", 401)
    unless session('logged_in');

  my $db = connect_db();
  my $sql = 'insert into entries (title, text)'
    ~ 'values (?, ?)';
  my $sth = $db.prepare($sql) or die $db.errstr;
  $sth.execute(
    body_parameters.get('title'),
    body_parameters.get('text')
  ) or die $sth.errstr;

  set_flash('New entry posted!');
  redirect '/';
}
```

Performance comparison

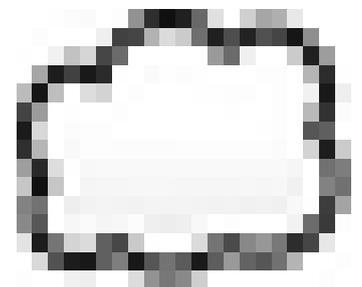
Dancer2:

Requests per second: 174.18 [#/sec] (mean)

Bailador:

Requests per second: 4.16 [#/sec] (mean)

mojolicious



Mojolicious spaces

```
use Mojolicious::Lite:from<Perl5>;

get '/' => sub ($c) {
    $c.render(text => 'Hello World!');
}

app.start;
```

Mojolicious templates

```
use Mojolicious::Lite:from<Perl5>;
```

```
get '/' => sub ($c) {  
    $c.stash(:one<23>);  
    $c.render(:template<magic>, :two<24>);  
}
```

```
app.start;
```

```
=finish
```

```
@@ magic.html.ep
```

The magic numbers are `<%= $one %>` and `<%= $two %>`.

Mojolicious fat comma

```
# Render the template "index.html.ep"
```

```
get '/' => sub ($c) {
```

```
    $c.render;
```

```
}, 'index';
```

```
# Render the template "hello.html.ep"
```

```
get '/hello';
```

Mojolicious Regexes

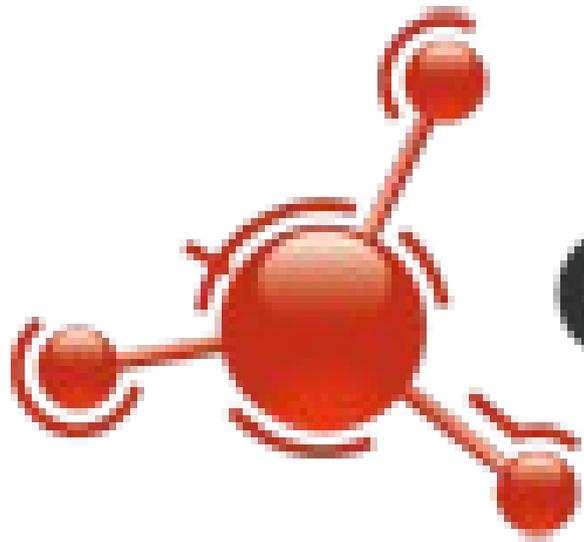
```
# /1
```

```
# /123
```

```
any('/:bar' => [bar => rx/\d+/], sub ($c) {  
    my $bar = $c.param('bar');  
    $c.render(  
        text => "Our :bar placeholder matched $bar",  
    );  
};
```

Mojolicious Websockets

```
websocket '/echo' => sub ($c) {  
  $c.on(json => sub ($c, $hash) {  
    $hash<msg> = "echo: $hash<msg>";  
    $c.send(${json => $hash});  
  });  
}
```



catalyst

Web Framework

Catalyst Controller

```
package XStats::Controller::Root;
use Moose;
use namespace::autoclean;

BEGIN { extends 'Catalyst::Controller'; }

#
# Sets the actions in this controller to be registered with no prefix
# so they function identically to actions created in MyApp.pm
#
__PACKAGE__->config(namespace => '');

__PACKAGE__->meta->make_immutable;

...
```

Catalyst Controller cont.

...

```
use v6-inline;
```

```
use CatalystX::Perl6::Component::Perl5Attributes;
```

```
method index($c) is Path is Args(0) {
```

```
    $c.stash({
```

```
        template => 'index.zpt',
```

```
        uri_graph => $c.uri_for('graph'),
```

```
    });
```

```
}
```

CatalystX::Perl6::Component::Perl5Attributes

```
use Inline::Perl5;
```

```
multi trait_mod:<is>(Routine $declarand, :$Path!) is export {  
  unless $declarand.does(Inline::Perl5::Perl5Attributes) {  
    $declarand does Inline::Perl5::Perl5Attributes;  
  }  
  $declarand.attributes.push(  
    'Path' ~ ($Path.isa(Bool) ?? " !! ('$Path')"  
  );  
}
```

“~~Even though~~ **As** I am in the thralls of Perl 6, I still do all my web development ~~in~~ **with** Perl 5 because the ecology of modules is so mature.”

Y

Thank You!

<http://niner.name/talks/>
<http://github.com/niner/>

A couple of months ago, Perl weekly linked to a blog post about web development with Perl 5.
It started like this:

“Even though I am in the thralls of Perl 6, I still do all my web development in Perl 5 because the ecology of modules is so mature.”

http://blogs.perl.org/users/ken_youens-clark/2016/10/web-development-with-perl-5.html

When I read this sentence, it kind of rubbed me the wrong way. Here's someone who likes Perl 6, yet cannot use it for what he needs to be doing.

This is unacceptable.

I cannot believe that after so many people poured so much time into Perl 6, it should not be ready for something as mundane as web development.

So I set out on my quest to show that this sentence is misguided or just obsolete.

Web development and Perl 6

So, where do we begin?

How do we show that everything is not as bad as this blogger believes?

Well I did a little survey of modules.perl6.org and had a look at everything that sounded like a web framework to me.

These are the results:

Bailador	
BreakDancer	
Crust	
Web	
Web::App::Ballet	
Web::App::MVC	
Web::RF	

As you can see, it's a reasonably short list. In itself that's not a bad thing as the list of actively developed web frameworks for Perl 5 probably is not much longer.

Of course, there are lots and lots and lots of failed attempts or abandoned frameworks on CPAN.

This raises the second question: to which category do these belong?

Bailador	Nov 2016
BreakDancer	Mar 2014
Crust	Jan 2016
Web	May 2016
Web::App::Ballet	Jun 2015
Web::App::MVC	Mar 2013
Web::RF	Nov 2015

To answer this question, I had a look at the date of the last commit.

Keep in mind that the first stable release of Perl 6 as a language was cut on December 25th 2015 and in the months immediately before this release, we did a whole lot of semantic changes that we knew we had to do before we would want to commit to stability in the language.

So everything that has not been changed in or after those months can be considered either very lucky or probably bitrotted and unmaintained.

Web::App::Ballet for example claims that it will be merged with Bailador in the near future. Curious about when that could be I had a look at the git repo for when exactly this was written. Turns out the claim was made in March 2013.

So with this filter applied, we are left with 3 contenders:

“Even though I am in the thralls of Perl 6, I still do all my web development in Perl 5 because the ecology of modules is so mature.”

http://blogs.perl.org/users/ken_youens-clark/2016/10/web-development-with-perl-5.html

No, no, no. Let's not jump to conclusions.
3 can still be a very decent pool to chose from.
Just have a look.

Crust

Crust is in short a PSGI implementation in Perl 6. It is a glue between the web framework and the web server.

PSGI let us centralize the code for supporting different ways to connect to a frontend web server like FastCGI or plain HTTP if the frontend is a proxy.

Though certainly very useful, this is probably not the first thing, you'll be looking for. But let's keep it in mind for now. We'll come back to it later.

5 minutes

Web

Web can be considered one level above Crust in the stack. It gives you request and response objects and a dispatcher.

Not luxurious, but sounds like a start. Except for that it apparently does not even support fancy features like file uploads yet.

There's another thing missing that I'd consider a somewhat essential part. I will come back to this later.

For now, let's move on to the first thing we should have considered.

Bailador

to the rescue

Bailador is pretty much a straight forward port of the popular Dancer framework to Perl 6. It's light weight, is being actively developed (though slowly) and brings much of what you'd expect from a web framework.

It is a little thin on the documentation and examples.

But since it's a Dancer port, I resolved to just porting a canonical Dancer example to Bailador to see how well it does.

The program is sort of a minimalistic blog. You can log in and post something insightful which is then displayed on the front page.

Bailador config

```
my %settings;
multi sub setting(Str $name) {
    %settings{$name}
}
multi sub setting(Pair $pair) {
    %settings{$pair.key} = $pair.value
}

setting 'database'    => $*TMPDIR.child('dancer.db');
# webscale authentication method
setting 'username'    => 'admin';
setting 'password'    => 'password';
setting 'layout'      => 'main';
```

Bailador does not have any configuration system integrated, so first off, I wrote an extremely sophisticated one which you can see here. Well, at least it lets me stick as close as possible to the original Dancer example.

Bailador DB

```
sub connect_db() {
    my $dbh = DBIish.connect(
        'SQLite',
        :database(setting('database').Str)
    );
    return $dbh;
}

sub init_db() {
    my $db = connect_db;
    my $schema = slurp 'schema.sql';
    $db.do($schema);
}
```

Here we have just a bit of database set up, nothing special. Though I have to mention that I very much like that DBIish uses named arguments instead of parsing some connection string.

Though its odd, that the SQLite driver doesn't cope too well with getting a proper IO::Path object for the database so I have to explicitly turn the path into a string here.

Bailador handler

```
get '/' => {
  my $db = connect_db();
  my $sth = $db.prepare(
    'select id, title, text from entries order by id desc'
  );
  $sth.execute;
  layout template 'show_entries.tt', {
    msg          => get_flash(),
    add_entry_url => uri_for('/add'),
    entries      => $sth.allrows(:array-of-hash)
                  .map({$_<id> => $_}).hash,
    session     => session,
  };
}
```

Now if you know a bit of Dancer, you'll feel right at home here, as this is pretty much the same as you'd write in Perl 5.

We define a route for GET requests to the root and give Bailador a code block to execute when the route matches.

Again DBIish's interface is a bit cleaner than good old DBI. The advantage of being able to start over really.

5 minutes

Bailador - Logging in

```
post '/login' => sub (*@a) {  
    my $err;  
  
    # process form input  
    if request.params<username> ne setting('username') {  
        $err = "Invalid username";  
    }  
    elsif request.params<password> ne setting('password') {  
        $err = "Invalid password";  
    }  
    else {  
        session<logged_in> = True;  
        set_flash('You are logged in.');
```

```
        return redirect '/';  
    }  
  
    # display login form  
    layout template 'login.tt', {err => $err};  
}
```

The login handler seems a good example for how to access parameters, sessions and redirects.

Very straight forward, easy to use, very familiar from Dancer.

So have I convinced you, that Perl 6 is absolutely ready?

Who of you noticed the interesting bit in the last line? Instead of just calling the template function as you'd do in Dancer, I pass the result to a function called layout. Why is that?

Bailador helpers

```
sub uri_for($path) {  
  return $path;  
}  
  
sub layout($content) {  
  template 'layouts/' ~ setting('layout') ~ '.tt', {  
    css_url    => '/css/style.css',  
    login_url  => uri_for('/login'),  
    logout_url => uri_for('/logout'),  
    session    => session,  
    content    => $content,  
  };  
}
```

Well Bailador simply hasn't seen as much development as Dancer or Mojolicious.

It has yet to gain builtin support for layout templates or hooks, so I had to write a little helper. Nothing bad really.

There's also no facility to construct URIs. So for now our little example application cannot be run with a path prefix. This is what is also missing from Web.

Again probably not a deal breaker.

It just shows that Bailador is not as mature a framework as Dancer or Mojolicious.

Wait a minute...

“Even though I am in the thralls of Perl 6, I still do all my web development in Perl 5 because the ecology of modules is so mature.”

http://blogs.perl.org/users/ken_youens-clark/2016/10/web-development-with-perl-5.html

Doh!

Do you remember Crust, the PSGI framework for Perl 6? The cool thing about PSGI is that it allows for sharing so called middlewares between applications and frameworks.

There's tons of middlewares from support for running behind a front end proxy to awesome debug panels. In theory, you could have the same with Crust. But middlewares have yet to appear.

Bailador on Crust

```
use Dancr;  
my $app = Dancr.to-app();
```

Nevertheless Crust is certainly a good base, so we may as well give it a try.

The documentation makes it look much more complicated than it actually is.

This tiny p6sgi file is all that's needed to bring Crust and Bailador together.

Bailador on Crust

```
http server is ready: http://127.0.0.1:5000/  
(pid:21285, keepalive: 1)
```

And this looks extremely promising!
It loads and compiles and displays the front page just fine.
This means we can just go on and be heroes and implement some middleware.
But first, I'm gonna try the login.

Bailador on Crust

```
http server is ready: http://127.0.0.1:5000/  
(pid:21285, keepalive: 1)
```

```
No such method 'decode' for invocant of type  
'IO::Blob' in block at  
/home/nine/rakudo/install/share/perl6/site/sources/597E1F971BE2BD4CFA4FD551B0AC356F  
2F8D64DC (Bailador::Request) line 45
```

Everyone has a point where she just gives up.
The question is only where exactly this point is.
And that will probably depend on, whether you're just
playing around or need to earn some hard currency
with this.

So is there no hope?

Are we really stuck with the choice between a mature
ecology of modules and the devotion to our new
love?

11 minutes



Screw it, I want to have both.
If Dancer2 is where the features are, then Dancer2 I will use.

First dancing steps

```
use Dancer2:from<Perl5>;

get '/' => sub {
    'Hello World!';
};

start;
```

Now this is kind of like the canonical Hello World in Dancer2 taken straight out of its tutorial. This might actually still be simple enough to run. But if I were to try it, it would explode. And why is that?

First dancing steps

```
use Dancer2:from<Perl5>;

get '/' => sub ($app) {
    'Hello World!';
};

start;
```

Well the documentation does not tell you this, but Dancer2 actually passes the application object to your handler routine.

Since Perl 6 does have proper subroutine signatures, it expects you to declare parameters and complains if arguments were passed, but none were expected.

So we could do that to make Perl 6 happy.

But that would also make it more tedious and less pretty!

And we cannot have that, can we?

First dancing steps

```
use Dancer2:from<Perl5>;

get '/' => {
    'Hello World!';
};

start;
```

Luckily, tadzik, who first tried this, found a really pretty way around this issue.

In Perl 6, code blocks are not just syntactic elements, but first class objects.

You can think of subroutines as code blocks with explicit signatures.

Naked code blocks have a default signature with the optional topic variable.

And one argument we don't care about is exactly what we need here.

Now let's have a look at how well we do at the original Dancr example I ported to Bailador.

Dancr

```
use v6.c;  
  
unit class Dancr;  
  
use Dancer2:from<Perl5>;  
use DBI:from<Perl5>;  
use Template:from<Perl5>;  
  
set 'database'    => $*TMPDIR.child('dancr.db');  
set 'session'    => 'Simple';  
set 'template'   => 'template_toolkit';  
set 'logger'     => 'console';  
set 'log'        => 'debug';  
set 'show_errors' => 1;  
set 'startup_info' => 1;  
set 'warnings'   => 1;  
set 'username'   => 'admin';  
set 'password'   => 'password';  
set 'layout'     => 'main';
```

I'm not gonna show the full source code, that would mostly be just boring like this bunch of code.

Interesting bits may just be to point out that I do stick with the tutorial closely, so I do use Perl 5's DBI and Template Toolkit.

Also one of the little improvements of Perl 6 that matter so much in daily life as a programmer is that we have File::Spec's functionality integrated into the language.

So we can just use the \$*TMPDIR variable and its convenient child method for platform independent storing of our database file.

DBI

```
sub connect_db() {  
    return DBI.connect(  
        'dbi:SQLite:dbname='  
        ~ setting('database'),  
        Any,  
        Any,  
        ${sqlite_unicode => 1}  
    ) or die $DBI::errstr;  
}
```

As I mentioned, I just use the DBI which all of you should know.

So this will look familiar to you but also a little strange. First of all, undef is gone.

Even undefined values are typed in Perl 6.

The closest equivalent to a plain undef is an undefined Any.

Now what the hell is this Dollar-Hash thingy?

The answer is, that it's an itemized hash.

In other words, it's a hash that should be treated like a single item and that's the important part, not interpolated.

Especially not into the argument list of the method call.

Lastly, this slide shows how to access global Perl 5 variables from within Perl 6, which is exactly like in Perl 5 itself.

15 minutes

Hooks

```
hook before_template_render =>
sub (%tokens) {
  %tokens<css_url>
    = request.base ~ 'css/style.css';
  %tokens<login_url>
    = uri_for('/login');
  %tokens<logout_url>
    = uri_for('/logout');
}
```

On to a more mundane piece of code, the `before_template_render` hook.

As you probably know much better than me, this is just a sub that gets passed a hash in which we can store additional values.

Now please, a quick show of hands: how many of you have forgotten to add the semicolon after the closing curly of the sub at one point or another?

Happens to me all the time, which is why I'm so glad, that Perl 6 has fixed this for us.

Yes, indeed, we do not actually need the semicolon there anymore.

Performance

```
get '/' => {
  my $db = connect_db();
  my $sql = 'select * from entries order by id desc';
  my $sth = $db.prepare($sql) or die $db.errstr;
  $sth.execute or die $sth.errstr;

  template 'show_entries.tt', Map.new((
    msg          => get_flash(),
    add_entry_url => uri_for('/add'),
    entries      => $sth.fetchall_hashref('id'),
  )).item;
}
```

Now this is the heart of our program, the code that actually delivers the page.

The only specialty is the Map thingy there.

Now what is that about?

When we pass a hash from Perl 6 to Perl 5, we expect writes to this hash to be visible in Perl 6.

The way to achieve this is by tying a Perl 5 hash to a Perl 6 hash.

This causes all access to be slower which is quite visible in benchmarks.

Maps on the other hand are immutable hashes in Perl 6. Since they are immutable, we can get away with just copying its contents to a pure Perl 5 hash for added speed.

Context

```
post '/add' => {
  send_error("Not logged in", 401)
    unless session('logged_in');

  my $db = connect_db();
  my $sql = 'insert into entries (title, text)'
    ~ 'values (?, ?)';
  my $sth = $db.prepare($sql) or die $db.errstr;
  $sth.execute(
    body_parameters.get('title'),
    body_parameters.get('text')
  ) or die $sth.errstr;

  set_flash('New entry posted!');
  redirect '/';
}
```

The final piece of Dancer code I'm gonna show is this bit.

There's nothing out of the ordinary here.

In fact, it's actually closer to what the Dancer documentation suggests than the tutorial itself.

I'm talking about using the `body_parameters` accessor instead of the `param` function.

Other than this being the recommended way anyway, there's a reason for this deviation.

`param` is context sensitive.

It behaves different in list context than in scalar context.

Now Perl 6 does not have this distinction and calls all Perl 5 functions in list context because it's the most general.

Performance comparison

Dancer2:

Requests per second: 174.18 [#/sec] (mean)

Bailador:

Requests per second: 4.16 [#/sec] (mean)

Now all this switching between Perl 5 and Perl 6 must surely cost a whole lot of performance. But how much?

Well I benchmarked the little blog application and found that it's actually doing quite fine.

170 requests per second on my laptop is surely enough for many users.

In fact, most websites out there see far less traffic.

For comparison I tried the same with Bailador and was quite stunned.

I didn't expect stellar performance, but 240ms for the simplest of sites?

That's kinda embarrassing.

Sure that I have made some mistake, I dug a little into it and found out, that Template::Mojo parses the template with a grammar, turns it into Perl 6 code and then EVALs the result.

No one ever expected Perl 6 to compile fast.

It's a humongously complex language.

That's why we have precompilation after all.

So doing this double parse for every single request is pretty much the slowest thing you can do.

Of course this is also fixable and quite easily at that.

Again, this is just a symptom of Perl 6 being quite new to the web.



mojolicious

Next I had a look at Mojolicious.

As Mojolicious is quite similar to Dancer, the results were similar as well.

So instead of a boring introduction, I will focus on a couple of stumbling blocks I discovered when porting all the tutorial examples.

Mojolicious spaces

```
use Mojolicious::Lite:from<Perl5>;

get '/' => sub ($c) {
    $c.render(text => 'Hello World!');
}

app.start;
```

This hello world should be pretty much what you expected.

Just note the space before the argument list of the anonymous subroutine. If you leave that out, Perl 6 will think you want to call a function called “sub” and complain about Variable '\$c' not being declared which can be quite confusing.

Mojolicious templates

```
use Mojolicious::Lite:from<Perl5>;

get '/' => sub ($c) {
    $c.stash(:one<23>);
    $c.render(:template<magic>, :two<24>);
}

app.start;

=finish

@@ magic.html.ep
The magic numbers are <%= $one %> and <%= $two %>.
```

It would be really cool if this example worked as shown. Mojolicious supports storing templates in the `__DATA__` section of your program.

In Perl 6 instead of the magic DATA label, you use the `=finish` POD command to declare the rest of the file as data. But this is not (yet) passed on to Perl 5 code.

So instead we have to move the template code to an external template file. But quite honestly, you should do that anyway. Least of all to get proper syntax highlighting for HTML code.

Mojolicious fat comma

```
# Render the template "index.html.ep"  
get '/' => sub ($c) {  
    $c.render;  
}, 'index';  
  
# Render the template "hello.html.ep"  
get '/hello';
```

When preparing the example showing how to give a route a name, I stumbled over another subtle difference between Perl 5 and 6.

The fat comma operator is now syntax for constructing a Pair object consisting of a key and a value.

If you chain those, you will actually create two nested pairs while the Perl 5 code just expects a flat list of values.

Mojolicious Regexes

```
# /1
# /123
any('/:bar' => [bar => rx/\d+/], sub ($c) {
    my $bar = $c.param('bar');
    $c.render(
        text => "Our :bar placeholder matched $bar",
    );
};
```

Now this is the first example that really doesn't work.

Right now it's unfortunately impossible to pass a regex from Perl 6 to Perl 5.

I even do have a patch to implement this support, but it's still not enough for Mojolicious, as the latter relies on stringification of the regex to embed it in a larger dispatch matcher.

I think it's a problem that can be solved. Just for now, this is an unfortunate restriction.

Mojolicious Websockets

```
websocket '/echo' => sub ($c) {  
  $c.on(json => sub ($c, $hash) {  
    $hash<msg> = "echo: $hash<msg>";  
    $c.send(${json => $hash});  
  });  
}
```

What does work on the other hand is websockets.
And I can't help but find this incredibly cool.
And if you look at this, there's really nothing special
you have to do.



For something that looks a bit different than the last 3 frameworks, Catalyst is an interesting candidate. Catalyst puts a bit more pressure on you to stick to an MVC architecture.

It automatically loads your module, view and controller modules and of course it expects those to be written in Perl 5.

It even goes a step further and generates the boilerplate code for you.

Catalyst Controller

```
package XStats::Controller::Root;
use Moose;
use namespace::autoclean;

BEGIN { extends 'Catalyst::Controller'; }

#
# Sets the actions in this controller to be registered with no prefix
# so they function identically to actions created in MyApp.pm
#
__PACKAGE__->config(namespace => '');

__PACKAGE__->meta->make_immutable;

...
```

This is code which we probably better just leave as it is.

So we also won't waste much time on it.

The far more interesting question is, how do we get our Perl 6 code into there?

Catalyst Controller cont.

```
...  
use v6-inline;  
use CatalystX::Perl6::Component::Perl5Attributes;  
  
method index($c) is Path is Args(0) {  
    $c.stash({  
        template => 'index.zpt',  
        uri_graph => $c.uri_for('graph'),  
    });  
}
```

The answer is by declaring that the rest of the file to be written in Perl 6.

Everything from the “use v6-inline” statement on is plain Perl 6 code.

We have an index method with appropriate Catalyst attributes making the method a Catalyst action.

Of course we get passed the context object and can use the usual methods to get our work done.

This works pretty much out of the box, except for the Catalyst attributes.

In Perl 6, there’s no such thing as subroutine attributes.

Instead, there’s a more general mechanism called Traits.

CatalystX::Perl6::Component::Perl5Attributes

```
use Inline::Perl5;

multi trait_mod:<is>(Routine $declarand, :$Path!) is export {
    unless $declarand.does(Inline::Perl5::Perl5Attributes) {
        $declarand does Inline::Perl5::Perl5Attributes;
    }
    $declarand.attributes.push(
        'Path' ~ ($Path.isa(Bool) ?? " !! "("$Path")")
    );
}
```

Traits can for example be a convenient way to add a role to those method objects.

For Catalyst actions, we want to mix in the `Inline::Perl5::Perl5Attributes` role.

This role provides an “attributes” attribute, which is just a list of attributes to apply to the Perl 5 wrapper method that gets generated for our inlined Perl 6 methods.

The helper module provides two more `trait_mod` functions for supporting the `Args` and `ActionClass` attributes. They look pretty much exactly like this one.

And that’s it.

That’s all you should have to know to be able to use Catalyst in a Perl 6 web application.

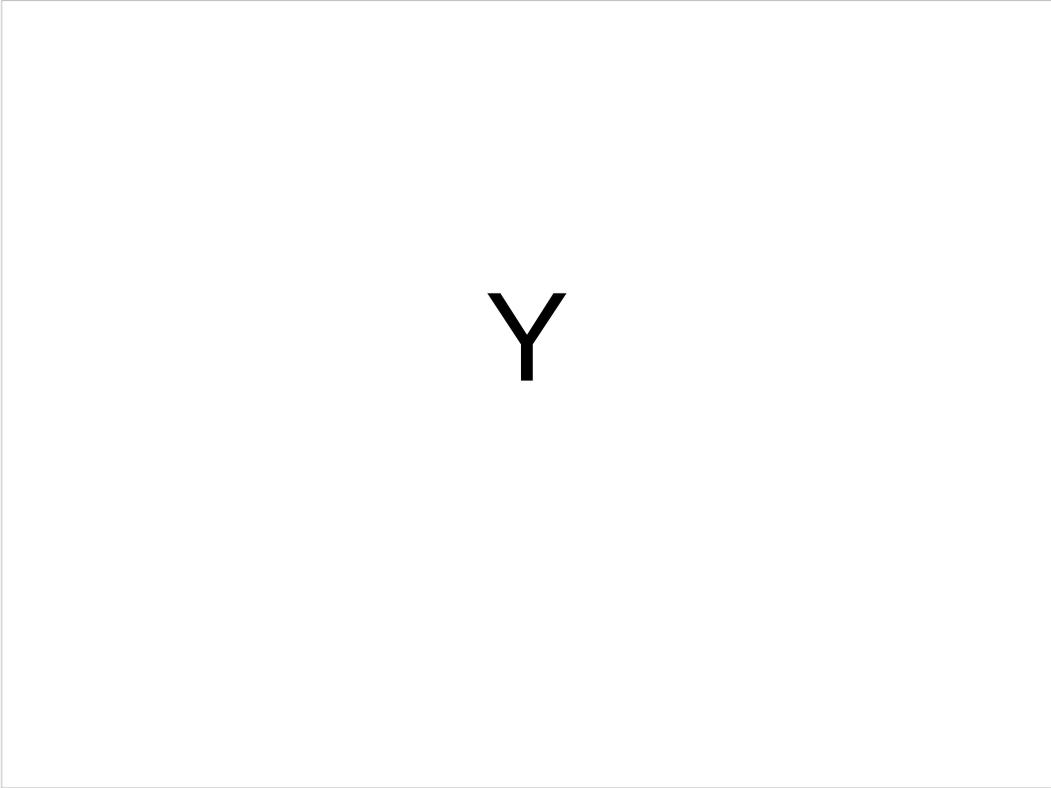
~~“Even though~~ As I am in the thralls of Perl 6, I still do all my web development ~~in~~ with Perl 5 because the ecology of modules is so mature.”

And now I know what’s been bothering me about the sentence that haunted us so far.

It takes just two really tiny changes for me to be able to make peace with it.

Because even though it is certainly fun building a new web framework, I sometimes just need the reliable tools, I’m so familiar with.

Luckily, they are still there for me.



Y

Now the question which I haven't touched yet is: why would I want to?

Why would I want to leave the familiar territory and venture forth into the unknown?

For some the answer would be "Exactly! Because I want to explore!" Some will be attracted by the opportunity to carve out a name for themselves to maybe become the next Sebastian Riedl.

Others will simply feel that Perl 6 as a language is incredibly well suited for web tasks.

Thanks to emoticons, Unicode is huge right now and Perl 6 is at the forefront.

It also covers a sweet spot between having type support that catches a lot of stupid errors and being dynamically typed enough to not get in the way.

And of course, having good parallelism and concurrency support let us finally move into this day and age regarding the use of our computing power.

While the solutions I've shown you today won't get you there immediately, they can be a good first step in the right direction.

Thank You!

<http://niner.name/talks/>
<http://github.com/niner/>

What's really impossible is to find any high resolution logos of any of the covered web frameworks.