From CGI to mod_perl 2.0, Fast!

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Fast!

```
$> wget http://perl.apache.org/download/mod_perl-2.0-current.tar.gz
$> tar zxvf mod_perl-2.0-current.tar.gz
[...]
$> cd mod_perl-2.0.*/
$> perl Makefile.PL MP_APXS=`which apxs`
Configuring Apache/2.0.52 mod_perl2/2.0.2 Perl/v5.8.6
[...]
$> make
cd "src/modules/perl" && make
[...]
$> make test

$> make install
$> perl -pi -e's/cgi_module/perl_module/g' `apxs -q SYSCONFDIR`/httpd.conf
$> perl -pi -e's/mod_cgi/mod_perl/g' `apxs -q SYSCONFDIR`/httpd.conf
$> perl -pi -e's/cgi-script/perl-script/g' `apxs -q SYSCONFDIR`/httpd.conf
$> `apxs -q SBINDIR`/apachectl configtest
Syntax OK
$> `apxs -q SBINDIR`/apachectl restart
```

Faster!

```
$> wget -O- http://gozer.ectoplasm.org/talks/ApacheCon/2005/US/mod_perl-2.0-cgi-fast/fast.sh | sh -x
```

Better!

```
$> yum install mod_perl

$> apt-get mod_perl

$> fink install mod_perl

$> pkg_add -r mod_perl

$> emerge mod_perl
```

Thank You!

Do we still have time?

Let's get serious!

You have

- Apache 2.x
- mod_cgi
- A bunch of Perl CGI scripts
- A working web site
- A good job

Common Gateway Interface

- CGI is simple
- CGI is easy
- CGI just works

How about mod_perl?

- mod_perl is simple
- mod_perl is easy
- mod_perl just works

How about mod_perl?

- mod_perl is simple
- mod_perl is easy
- mod_perl just works BETTER

How about mod_perl?

- mod_perl is simple
- mod_perl is easy
- mod_perl just works FASTER

How about mod_perl?

- mod_perl is simple
- mod_perl is easy
- mod_perl just works EASIERer

But why switch?

- CPU cycles
- Memory
- Servers
- $$$
- Apache::* module on CPAN

The CGI model

- Forking
- Startup
- Teardown

The CGI model

- httpd fork()s
- httpd exec(/var/www/cgi-bin/myscript.pl)
- OS find #!/usr/bin/perl in /var/www/cgi-bin/myscript.pl
- OS fork()s
- OS exec()s /usr/bin/perl
- Perl opens, initializes and parses myscript.pl
- Perl runs the script

The CGI model

2x fork()
2x exec()
Perl startup
Perl shutdown

EXPENSIVE

The mod_perl model

- Embedded Perl
- One time startup
- One time teardown

The mod_perl model

- Perl locates the correct subroutine to invoke
- Perl calls it

CHEAP_{er}

Getting there from here

mod_cgi setup

```
LoadModule cgi_module libexec/mod_cgi.so

ScriptAlias /cgi-bin/ /var/www/cgi-bin
```

mod_cgi setup

ScriptAlias is just shorthand

```
LoadModule cgi_module libexec/mod_cgi.so

Alias /cgi-bin /var/www/cgi-bin
<Location /cgi-bin>
  SetHandler cgi-script
  Option +ExecCGI
</Location>
```

mod_cgi setup

/var/www/cgi-bin/hello.pl

```
#!/usr/bin/perl

use CGI;

my $q = new CGI;

print $q->header('text/html');

print <<"EOF";
<html><body>
<h1>Hello world!</h1>
<pre>
GATEWAY_INTERFACE: $ENV{GATEWAY_INTERFACE}
MOD_PERL: $ENV{MOD_PERL}
</pre>
</body></html>
EOF
```

mod_cgi setup

How fast is that ?

- Apache Bench (ab)
- Nice benchmarking tool
- Will work for us nicely
- Comes with Apache

How fast is that ?

```
$> ab -c1 -n50 http://localhost:8529/cgi-bin/hello.pl
Benchmarking 127.0.0.1 (be patient).....done
Requests per second:    5.57 [#/sec] (mean)
Time per request:       179.448 [ms] (mean)
Transfer rate:          1.67 [Kbytes/sec] received
```

mod_perl time

```
$> wget http://perl.apache.org/download/mod_perl-2.0-current.tar.gz
$> tar zxvf mod_perl-2.0-current.tar.gz
[...]
$> cd mod_perl-2.0.*/
$> perl Makefile.PL MP_APXS=`which apxs`
Configuring Apache/2.0.52 mod_perl2/2.0.x Perl/v5.8.6
[...]
$> make
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[...]
$> make test

$> make install
$> perl -pi -e's/cgi_module/perl_module/g' `apxs -q SYSCONFDIR`/httpd.conf
$> perl -pi -e's/mod_cgi/mod_perl/g' `apxs -q SYSCONFDIR`/httpd.conf
$> perl -pi -e's/cgi-script/perl-script/g' `apxs -q SYSCONFDIR`/httpd.conf
$> `apxs -q SBINDIR`/apachectl configtest
Syntax OK
$> `apxs -q SBINDIR`/apachectl restart
```

mod_perl time

Download & unpack

```
$> wget http://perl.apache.org/download/mod_perl-2.0-current.tar.gz
$> tar zxvf mod_perl-2.0-current.tar.gz
[...]
$> cd mod_perl-2.0.*/
```

mod_perl time

Configure

```
$> /usr/bin/perl Makefile.PL MP_APXS=/usr/sbin/apxs
Configuring Apache/2.0.52 mod_perl2/2.0.x Perl/v5.8.6
[...]
```

mod_perl time

Build, test, install

```
$> make
$> make test
$> make install
```

mod_perl time

Check your distro!

mod_perl is supported by lots of them

mod_perl time

httpd.conf

```
LoadModule cgi_module modules/mod_cgi.so
LoadModule perl_module modules/mod_perl.so

Alias /cgi-bin /var/www/cgi-bin
Alias /perlrun /var/www/cgi-bin

<Location /cgi-bin>
  SetHandler cgi-script
  Option +ExecCGI
</Location>
<Location /perlrun>
  SetHandler perl-script
  Option +ExecCGI
  PerlHandler ModPerl::PerlRun
</Location>
```

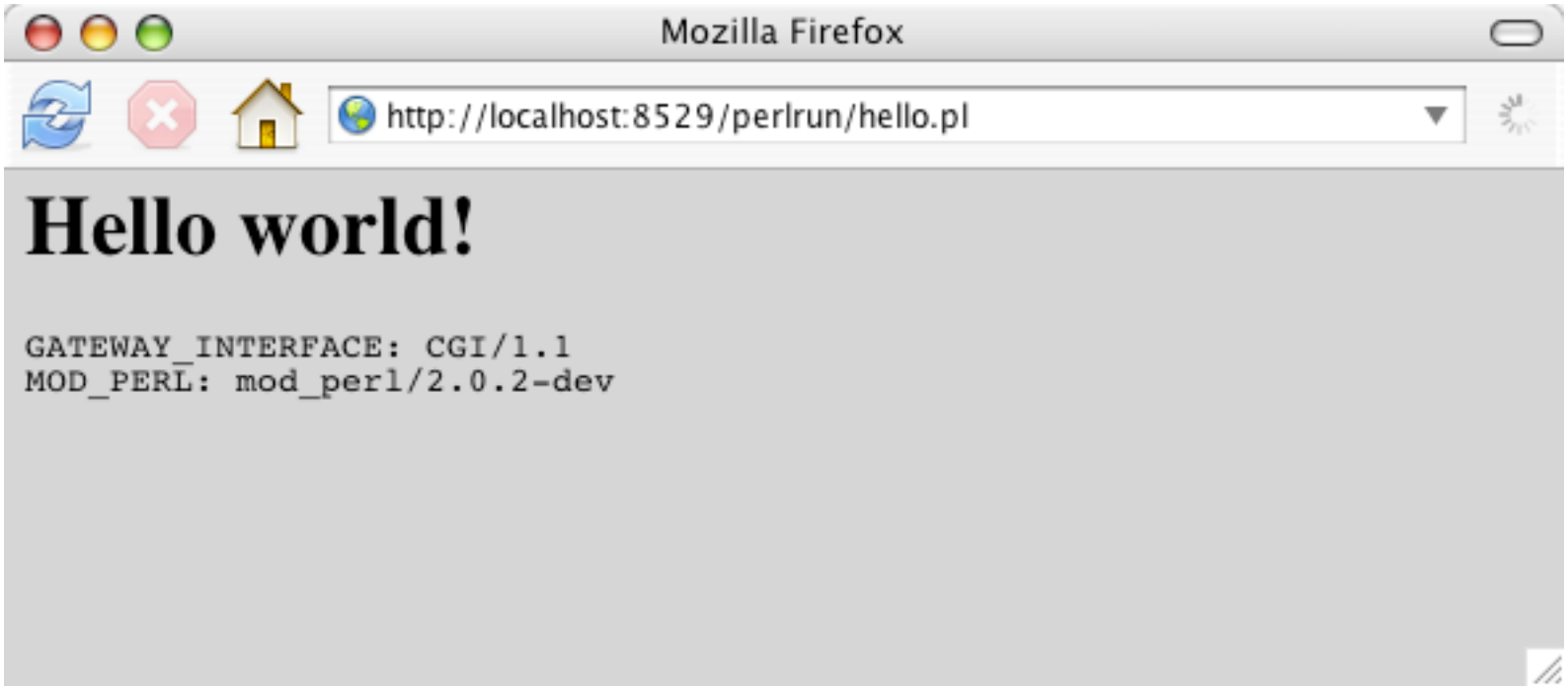
mod_perl time

- SetHandler
- PerlHandler
- ModPerl::PerlRun

mod_perl time

```
$> apachectl restart
[notice] Apache/2.0.52 (Unix) mod_perl/2.0.x Perl/v5.8.7 configured
```

mod_perl time



it works!

- $ENV{MOD_PERL} = “mod_perl/2.0.x”;

How fast is THAT ?

```
$> ab -c1 -n50 http://localhost:8529/perlrun/hello.pl
Benchmarking 127.0.0.1 (be patient).....done
Requests per second:    83.15 [#/sec] (mean)
Time per request:       12.027 [ms] (mean)
Transfer rate:          26.61 [Kbytes/sec] received
```

How fast is THAT ?

mod_cgi

```
$> ab -c1 -n50 http://localhost:8529/cgi-bin/hello.pl
Benchmarking 127.0.0.1 (be patient).....done
Requests per second:    5.57 [#/sec] (mean)
Time per request:       179.448 [ms] (mean)
Transfer rate:          1.67 [Kbytes/sec] received
```

ModPerl::PerlRun

```
$> ab -c1 -n50 http://localhost:8529/perlrun/hello.pl
Benchmarking 127.0.0.1 (be patient).....done
Requests per second:    83.15 [#/sec] (mean)
Time per request:       12.027 [ms] (mean)
Transfer rate:          26.61 [Kbytes/sec] received
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How fast is THAT ?

mod_cgi

```
$> ab -c1 -n50 http://localhost:8529/cgi-bin/hello.pl
Benchmarking 127.0.0.1 (be patient).....done
Requests per second:    5.57 [#/sec] (mean)
Time per request:       179.448 [ms] (mean)
Transfer rate:          1.67 [Kbytes/sec] received
```

ModPerl::PerlRun

```
$> ab -c1 -n50 http://localhost:8529/perlrun/hello.pl
Benchmarking 127.0.0.1 (be patient).....done
Requests per second:    15x(mod_cgi) [#/sec] (mean)
Time per request:       15x(mod_cgi) [ms] (mean)
Transfer rate:          16x(mod_cgi) [Kbytes/sec] received
```

ModPerl::PerlRun

- mod_perl's bundled module
- closest CGI emulation available

ModPerl::PerlRun

On every request for the script:

- Found
- Loaded
- Parsed
- BEGIN {}
- Executed
- END {}
- Destroyed

ModPerl::Registry

httpd.conf

```
Alias /cgi-bin /var/www/cgi-bin
Alias /perlrun /var/www/cgi-bin
Alias /registry /var/www/cgi-bin

<Location /cgi-bin>
  SetHandler cgi-script
  Option +ExecCGI
</Location>
<Location /perlrun>
  SetHandler perl-script
  Option +ExecCGI
  PerlHandler ModPerl::PerlRun
</Location>
<Location /perlrun>
  SetHandler perl-script
  Option +ExecCGI
  PerlHandler ModPerl::Registry
</Location>
```

ModPerl::Registry

How fast is THAT ?

```
$> ab -c1 -n50 http://localhost:8529/registry/hello.pl
Benchmarking 127.0.0.1 (be patient).....done
Requests per second:    156.37 [#/sec] (mean)
Time per request:       6.395 [ms] (mean)
Transfer rate:          50.04 [Kbytes/sec] received
```

How fast is THAT ?

mod_cgi

```
$> ab -c1 -n50 http://localhost:8529/cgi-bin/hello.pl
Benchmarking 127.0.0.1 (be patient).....done
Requests per second:    5.57 [#/sec] (mean)
Time per request:       179.448 [ms] (mean)
Transfer rate:          1.67 [Kbytes/sec] received
```

ModPerl::PerlRun

```
$> ab -c1 -n50 http://localhost:8529/perlrun/hello.pl
Benchmarking 127.0.0.1 (be patient).....done
Requests per second:    83.15 [#/sec] (mean)
Time per request:       12.027 [ms] (mean)
Transfer rate:          26.61 [Kbytes/sec] received
```

ModPerl::Registry

```
$> ab -c1 -n50 http://localhost:8529/registry/hello.pl
Benchmarking 127.0.0.1 (be patient).....done
Requests per second:    156.37 [#/sec] (mean)
Time per request:       6.395 [ms] (mean)
Transfer rate:          50.04 [Kbytes/sec] received
```

How fast is THAT ?

mod_cgi

```
$> ab -c1 -n50 http://localhost:8529/cgi-bin/hello.pl
Benchmarking 127.0.0.1 (be patient).....done
Requests per second:    5.57 [#/sec] (mean)
Time per request:       179.448 [ms] (mean)
Transfer rate:          1.67 [Kbytes/sec] received
```

ModPerl::PerlRun

```
$> ab -c1 -n50 http://localhost:8529/perlrun/hello.pl
Benchmarking 127.0.0.1 (be patient).....done
Requests per second:    15x(mod_cgi) [#/sec] (mean)
Time per request:       15x(mod_cgi) [ms] (mean)
Transfer rate:          16x(mod_cgi) [Kbytes/sec] received
```

ModPerl::Registry

```
$> ab -c1 -n50 http://localhost:8529/registry/hello.pl
Benchmarking 127.0.0.1 (be patient).....done
Requests per second:    28x(mod_cgi) [#/sec] (mean)
Time per request:       28x(mod_cgi) [ms] (mean)
Transfer rate:          30x(mod_cgi) [Kbytes/sec] received
```

ModPerl::Registry

- mod_perl's bundled module
- Faster, but CGI emulation laking

ModPerl::Registry

On every request for the script:

- Load from file if:
  - Not found in cache
  - Cache entry is older than the file
- BEGIN {}
- Executed
- END {}

ModPerl::(PerlRun|Registry)

- Try ModPerl::Registry first
  - faster
  - might break some CGIs
- Try ModPerl::PerlRun after
  - slower
  - might break some CGIs

ModPerl::(PerlRun|Registry)

- Simple Perl modules
- Designed to run perl scripts from mod_perl pretending it's a CGI
- Derives from ModPerl::RegistryCooker
- New ones can be made in a pinch

```
package ModPerl::PerlRun;
use base qw(ModPerl::RegistryCooker);

sub handler : method {
    my $class = (@_ >= 2) ? shift : __PACKAGE__;
    my $r = shift;
    return $class->new($r)->default_handler();
}

my $parent = 'ModPerl::RegistryCooker';
my %aliases = (
    new             => 'new',
    init            => 'init',
    default_handler => 'default_handler',
    run             => 'run',
    can_compile     => 'can_compile',
    make_namespace  => 'make_namespace',
    namespace_root  => 'namespace_root',
    namespace_from  => 'namespace_from_filename',
    is_cached       => 'FALSE',
    should_compile  => 'TRUE',
    flush_namespace => 'flush_namespace_normal',
    cache_table     => 'cache_table_common',
    cache_it        => 'NOP',
    read_script     => 'read_script',
    shebang_to_perl => 'shebang_to_perl',
    get_script_name => 'get_script_name',
    chdir_file      => 'NOP',
    get_mark_line   => 'get_mark_line',
    compile         => 'compile',
    error_check     => 'error_check',
    should_reset_inc_hash => 'TRUE',
    strip_end_data_segment              => 'strip_end_data_segment',
    convert_script_to_compiled_handler =>
'convert_script_to_compiled_handler',
);

$aliases{$_} = $parent . "::" . $aliases{$_} for keys %aliases;
__PACKAGE__->install_aliases(\%aliases);
```

CGI emulation

- It's an emulation
- It ain't the real thing
- things can go wonky

I remember

```
#!/usr/bin/perl

use CGI;

my $q = new CGI;

print $q->header('text/plain');

$counter++;

print <<"EOF";
counted $counter
EOF
```

I remember

```
#!/usr/bin/perl

use CGI;

my $q = new CGI;

print $q->header('text/plain');

$counter++;

print <<"EOF";
counted $counter
EOF
```

$> GET http://localhost:8529/cgi-bin/count.pl
counted 1
$> GET http://localhost:8529/cgi-bin/count.pl
counted 1
$> GET http://localhost:8529/cgi-bin/count.pl
counted 1

I remember

```
#!/usr/bin/perl

use CGI;

my $q = new CGI;

print $q->header('text/plain');

$counter++;

print <<"EOF";
counted $counter
EOF
```

$> GET http://localhost:8529/registry/count.pl
counted 1
$> GET http://localhost:8529/registry/count.pl
counted 2
$> GET http://localhost:8529registry/count.pl
counted 3
$> GET http://localhost:8529registry/count.pl
counted 1
$> GET http://localhost:8529registry/count.pl
counted 4

That can’t be right?

```
#!/usr/bin/perl

use CGI;

my $q = new CGI;

print $q->header('text/plain');

$counter++;

print <<"EOF";
counted $counter
EOF
```

That can't be right?

- Code is cached
- Perl sticks around
- Great for speed
- Globals are suddently **VERY GLOBAL**

That can’t be right?

```
#!/usr/bin/perl

use CGI;

my $q = new CGI;

print $q->header('text/plain');

$counter++;

print <<"EOF";
counted $counter
EOF
```

That can’t be right?

```
#!/usr/bin/perl

use CGI;

my $q = new CGI;

print $q->header('text/plain');

$main::counter++;    # GLOBAL!

print <<"EOF";
counted $counter
EOF
```

That can be right!

```
#!/usr/bin/perl

use CGI;

my $counter;
my $q = new CGI;

print $q->header('text/plain');

$counter++;

print <<"EOF";
counted $counter
EOF
```

Globals will stick

- Globals will stick around
- Use my

- Try ModPerl::PerlRun

CGI emulation

- It's an emulation
- It ain't the real thing
- things can go wonky

I still remember

```
#!/usr/bin/perl

use CGI;
use strict;
use warnings;

my $q = new CGI;
my $counter;

print $q->header('text/plain');

counter_up();

sub counter_up {
    $counter++;
    print "Counter: $counter\n";
}
```

$> GET http://localhost:8529/registry/count.pl
Counter: 1
$> GET http://localhost:8529/registry/count.pl
Counter: 2
$> GET http://localhost:8529/registry/count.pl
Counter: 3
$> GET http://localhost:8529/registry/count.pl
Counter: 1
$> GET http://localhost:8529/registry/count.pl
Counter: 4

But, what the..?

- I used my so it's not a global...
- To Perl, all code lives in subroutines
- mod_perl turns scripts into subroutines
- subroutines can create closures

subification*

```
#!/usr/bin/perl

use CGI;
use strict;
use warnings;

my $q = new CGI;
my $counter;

print $q->header('text/plain');

counter_up();

sub counter_up {
    $counter++;
    print "Counter: $counter\n";
}
```

* the process of making a subroutine, obviously

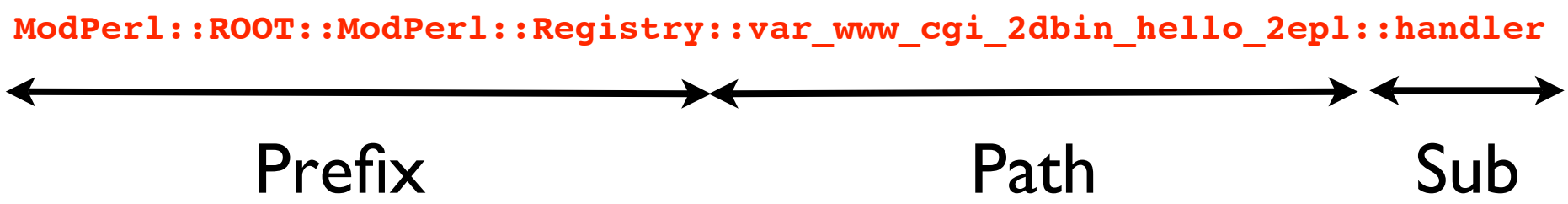
subification*

- subroutine needs a name
- filepath is a convenient naming

* the process of making a subroutine, obviously

subification*

/var/www/cgi-bin/hello.pl



* the process of making a subroutine, obviously

subification*

```
sub
ModPerl::ROOT::ModPerl::Registry::var_www_cgi_2dbin_count_2epl::handler {
package ModPerl::ROOT::ModPerl::Registry::var_www_cgi_2dbin_count_2epl;
no warnings;
local $0 = '/var/www/cgi-bin/count.pl';

use CGI;
use strict;
use warnings;

my $q = new CGI;
my $counter;

print $q->header('text/plain');

counter_up();

sub counter_up {
    $counter++;
    print "Counter: $counter\n";
}
}
```

* the process of making a subroutine, obviously

closures

- Closures are a Perl feature
- Come to be when creating subs
- Normally not an issue
- mod_perl can create some without telling you
- man perlref for more

I still remember

```
#!/usr/bin/perl

use CGI;
use strict;
use warnings;

my $q = new CGI;
my $counter;

print $q->header('text/plain');

counter_up();

sub counter_up {
    $counter++;     # GLOBAL
    print "Counter: $counter\n";
}
```

2 warning signs to look for:
globals

error_log:

```
Variable "$counter" will not stay
shared at /var/www/cgi-bin/
count.pl
```

I still remember

```
#!/usr/bin/perl

use CGI;
use strict;
use warnings;

my $q = new CGI;
my $counter;

print $q->header('text/plain');

counter_up($counter);

sub counter_up {
    my $counter = shift;
    $counter++;     # GLOBAL
    print "Counter: $counter\n";
}
```

Just remember that globals in general are to watch out for

Good advice

- use strict;
- use warnings;
- avoid globals
- look for hints in your error_log file

CGI emulation

- It's an emulation
- It ain't the real thing
- things can go wonky

I used to work

```
#!/usr/bin/perl

use CGI;
use strict;
use warnings;

require "countlib.pl";

my $q = new CGI;

print $q->header('text/plain');

counter_up();
```

```
#countlib.pl

use strict;
my $counter = 0;

sub counter_up {
    $counter++;
    print “Counter: $counter\n”;
}
```

I used to work

error_log:

```
[Sun Oct 23 21:37:44 2005] [error] Can't locate countlib.pl in @INC (@INC
contains: [...]) at /var/www/cgi-bin/hello.pl line 7.\n
```

I used to work

```
#!/usr/bin/perl

use CGI;
use strict;
use warnings;
use Cwd;

my $q = new CGI;

print $q->header('text/plain');
print “Cwd: “, cwd(), “\n”;
```

```
$> GET http://localhost:8529/cgi-bin/cwd.pl
Cwd: /var/www/cgi-bin
$> GET http://localhost:8529/registry/cwd.pl
Cwd: /
```

I used to work

- mod_cgi
  - fork()s
  - chdir()s to the script's directory

Cwd

- mod_perl
  - doesn't fork()
  - doesn't chdir()s
  - could chdir()s

Cwd

- Cwd() is a process proprety
- Apache threaded MPMs
- chdir() isn't thread-safe
- mod_perl doesn't try to break things

Cwd

- You can fix your scripts
  - use lib();
  - require “/fully/qualfied/lib/path.pl”;

Cwd

- If your MPM is Prefork:
  - ModPerl::RegistryPrefork
  - ModPerl::PerlRunPrefork

It ain't magical!

- use strict/warnings
- Think about globals
- watch the error_log

More info

- *mod_perl User's mailing-list*
  - http://perl.apache.org/maillist/modperl.html
  - <modperl@perl.apache.org>
- *mod_perl Developer's Cookbook*
  - http://www.modperlcookbook.org/
- Practical mod_perl
  - http://www.modperlbook.org/
- mod_perl at the ASF
  - http://perl.apache.org/

Thank You!

Slides and bonus material:

http://gozer.ectoplasm.org/talk/