MVC Framework Introduction

lesson #basic01

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Agenda

1. Frameworks
2. Models
3. Controllers
4. Views
5. Support Components
6. Your CI Webapp!

Setup

Setup

This lesson mentions source code files from the Example Contacts demo webapp. Please download that project first, and extract it locally, so that you can refer to the source files during the lesson.

Frameworks

Frameworks

An MVC framework is one with conventions and pre-built components that encourage or enforce good programming practices.

CodeIgniter is one such framework.

Others include CakePHP, Fat-Free, FuelPHP, Kohana, Laravel, Symfony2, Yii and Zend

Design Pattern Driven!

Model-View-Controller is a design pattern.

It is an "industry-accepted best practice", that says that it is good to keep separate concerns apart from each other.

CodeIgniter has base classes for models and controllers, and it has components to build presentation content separate from these. This is not conventional PHP scripting!

A typical MVC framework incorporates many other design patterns:

- DAO (DB access)
- Business delegate (framework itself)
- Session facade (session library)
- Front controller (index.php)
- Intercepting filter (hooks)
- Active record (model)

Categorizing MVC Frameworks

Frameworks come in all sizes.

They differ in philosophy, scope, management tools & included plugins.

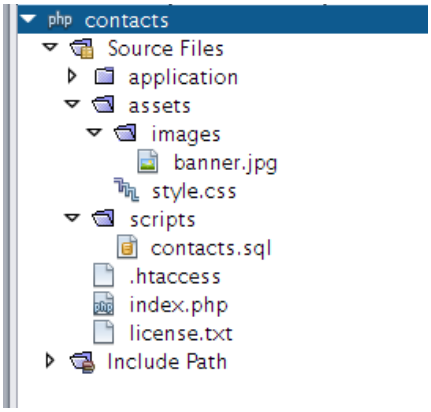
Category	Adds	Size	Example
Micro	MVC, plugins, routing, instance	0.3MB	Fat-Free
Lean	Config, templates	2MB	CodeIgniter
Normal	Scaffolding, auth, ORM, CLI, IDE plugin	10MB	CakePHP
Enterprise	Engines (templating, ORM), included plugins, installer, starter, generators	24MB+	Symfony2

Project Files

A CodeIgniter project contains application logic and support files.

"index.php", in the document root, *is* the front controller, i.e. entry point.

".htaccess" is an Apache configuration file, to eliminate the need to explicitly have "index.php" in URLs.



Class Loader

CodeIgniter has its own class loader.

It uses the folder structure to locate classes (per MVC)

```
$this->load->model('customers');
$this->customers->get(...);
```

It enforces naming conventions too.

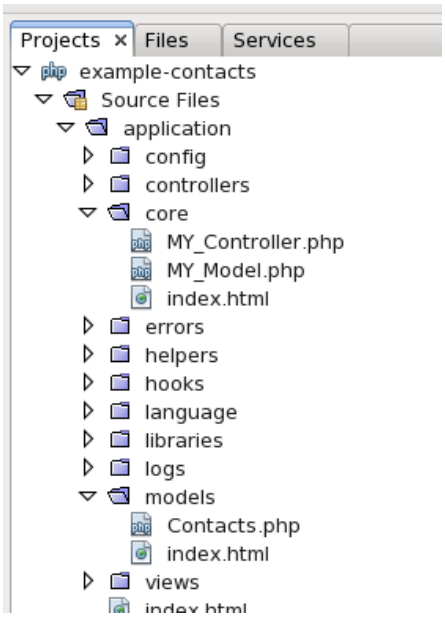
Routing

CodeIgniter normally routes requests to controllers by convention, i.e. using the URI segment and looking in the controllers folder.Other frameworks often handle routing a bit differently.

Models

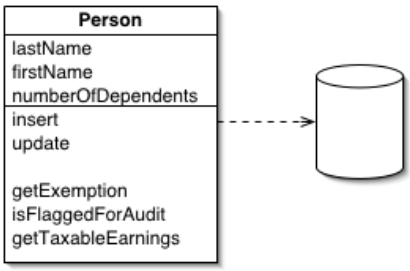
Models encapsulate data sources or entities.

Each model is a class that wraps a data source.



Active Record

CodeIgniter encourages the Active Record design pattern which says you build CRUD methods into models.



Query Builder

CodeIgniter comes with a QueryBuilder library, to make it easier to access your databases.

```
$this->db->select('*')->from
->group_start()
->where('a', 'a')
->or_group_start()
->where('b', 'b')
->where('c', 'c')
->group_end()
->group_end()
->where('d', 'd')
->get();
```

Model Classes

In CodeIgniter, models are classes that extend CI_Model.

Each data source, eg. RDB table, has its own model.

```
public class Orders extends
    public function add_item
    public function calc_tot
}
```

Model Methods

CRUD

Some business logic

Work with objects or associative arrays

* not * beans, i.e. entity models

Do not generate views, but generate or provide data to be passed to views

Usage: $this->load->model('goodies');

Base Model

You can provide your own base model, MY_Model, with common methods. See core/MY_Model in the example webapp. The application/core folder holds any classes you make that build on those built into the framework, and you can configure the prefix (MY_) that you use.

This could be used to provide a simple object-relational map.

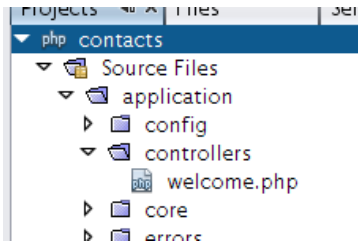
Sample properties: $_tableName, $_keyField

Sample methods: create() get($key), add($record), update($record), delete($key), exists($key)

Controllers

Controllers handle incoming requests.

A Controller serves as an intermediary between the Model, the View, and any other resources needed to process an HTTP request and generate a web page.

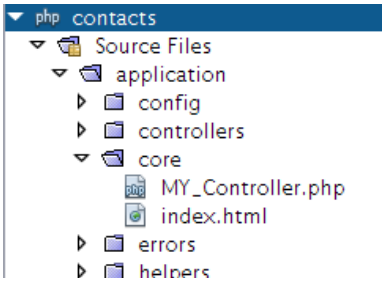


CI Controllers

In CI, controllers are classes that extend CI_Controller or your base controller

Our base controller implements view templating, through render()

See application/core/MY_Controller.php



App Controllers

Each of your webapp controllers builds on your base controller

Normally, each usecase has its own controller

Additionally, controllers or subcontrollers are used for services

See application/controllers/Welcome.php

Controller Methods

URLs are segment based, with the pattern "example.com/class/function/parm1/parm2"

The index() method is the default handler function, while other public methods are treated as sub-controllers

Parameters are passed positionally.

An example: given the URI "/products/shoes/sandals/123", the segments could be interpreted as the controller (Products), method inside it (shoes), and then two parameters passed to that method (sandals and 123).

Confusion is possible ... application/controllers/business/work refers to the Work controller inside the business subfolder with the controllers!

Example Base Controller

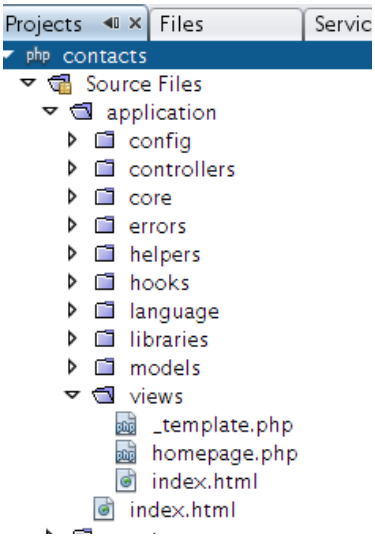
core/MY_Controller.php

```
class Application extends CI_Controller {
    // fields

    function __construct() {
        parent::__construct();
        // make sure we play the game nicely
        $this->load->helper('common');
        $this->load->helper('url');
    }

    function render() {...}
}
```

Views

Views are the components that deal with presentation, typically for a web browser.

Views generate the information presented to a user, for instance a web page.



View Templates

A normal practice is to build a view template, which wraps the "real" webpage body, whose name is passed as a parameter; this is managed by the base controller

Such a template is meant to provide a consistent layout across a number (perhaps all) of pages in your webapp, with placeholders for the pieces appropriate to a given page.

CI has a template parser built-in, which lets us eliminate most PHP script from a view.

See application/views/_template.php

View Fragments

Each of your view fragments is stored in its own file, using the substitution fields for passed parameters.

A view fragment provides a portion or piece of a complete page. It is typically well-formed - a complete with any nested content.

Substitution fields are enclosed in braces inside your view file.

See application/views/homepage.php

View Usage

Javascript libraries are not well-supported in CI; you can use them, but effectively client-side

Do use CSS to control the appearance

Usage: $this->load->view('showoff',$data); or $this->parser->load('showoff',$data);

;

Spoiler: JS/CSS integration coming :)

View Methods

Seriously?

If you need functionality, use helpers

Support Components

Support Components

An MVC framework comes with a number of pre-built classes or scripts to make your webapp development easier and more consistent.

These are collectively referred to as support components

Libraries

Any classes that you would like to use can be put into the application/libraries folder

Usage: $this->load->library('whatever');

Examples: third party classes, bean-like classes?

Library Reference

- Libraries
  - Benchmarking Class
  - Caching Driver
  - Calendaring Class
  - Shopping Cart Class
  - Config Class
  - Email Class
  - Encrypt Class
  - Encryption Library
  - File Uploading Class
  - Form Validation
  - FTP Class
  - Image Manipulation Class
  - Input Class
  - Javascript Class
  - Language Class
  - Loader Class
  - Migrations Class
  - Output Class
  - Pagination Class
  - Template Parser Class
  - Security Class
  - Session Driver
  - HTML Table Class
  - Trackback Class
  - Typography Class
  - Unit Testing Class
  - URI Class
  - User Agent Class
  - XML-RPC and XML-RPC Server Classes
  - Zip Encoding Class

Example Library: Product

libraries/Product.php

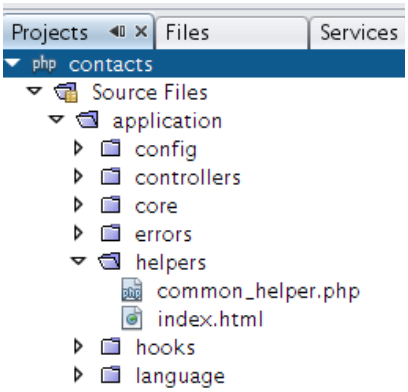
Use for object model for entities stored in an XML document or RDB table

"models/products" would be the aggregation of these

Again, just one way to do this

Helpers

Put commonly used functions inside a "helper" script

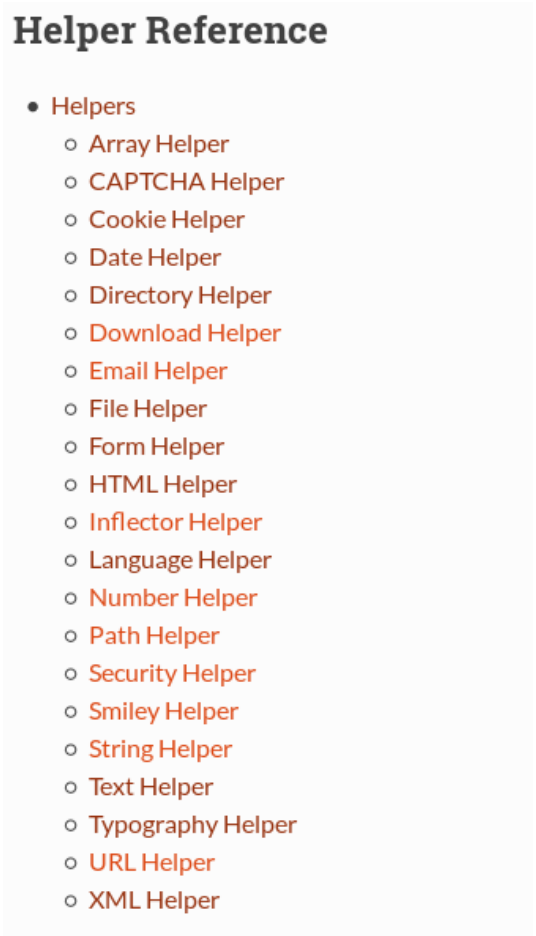


Helpers are "Classic"

Functions in any such loaded helpers are available everywhere

Usage: $this->load->helper('common');

See application/helpers/common_helper.php



Example Helper: common_helper

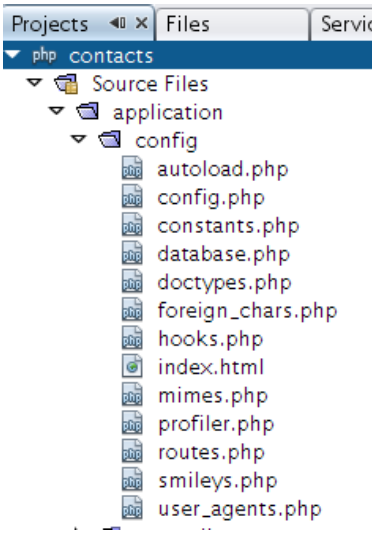
Form field handling, using associative array as data transfer object/buffer

fieldExtract($source,$target,$fields)
-$source – assoc array from form
-$target – corresponding object
-$fields – names of fields in this form

fieldInject($source,$target,$fields)
-$source – original data object
-$target – assoc array for parameters to view
-$fields – names of fields in this form

Configuration

CodeIgniter provides a "config" folder to let you customize your web app



Configuration Practices

index.php points to your system folder

application/config/ contains...

- autoload – specify components to pre-load
- config – specify application parameters
- database – specify RDB parameters
- routes – specify default controller

Your CodeIgniter Webapp!

Your CodeIgniter Webapp!

This is a simplified look at where stuff goes inside your webapp, and the general steps you would follow to build a simple CodeIgniter webapp.

The six slides that follow are *not* the tutorial, but a summary of the tutorial set that you will follow to convert a static website into a CodeIgniter webapp!

Your Folder Structure

CI system → /xampp/htdocs/system3

CI user guide → desktop?

CI starter → copy to /xampp/htdocs and tailor for a new webapp

NOTE: the starter project differs from the official CI download in several ways: base controller with templating, simple "ORM" model, standard config for Apache

Setup Your Webapp

Copy/extract the starter to a folder in htdocs

Open it with NB & rename (proj & folder)

Ensure virtual host mapping

Modify NB project run config?

Create RDB if needed

Configure Your Webapp

config/constants.php – adjust as needed

config/config.php – define menu navbar

Setup Your View Template

Make or visualize a wireframe model for the website.

Tailor views/_template.php to match it

This template contains only the common page elements for the site, with substitutable fields for the menu and content.

Tailor Your Webapp

controllers/?.php – controller per navbar item, bound to corresponding view

models/?.php – model per RDB table

views/welcome.php – tailor your homepage

views/?.php – view per controller

Manage Your Assets

assets/css/style.css – your CSS

assets/images/ - your webapp images

assets/css/ - any imported CSS frameworks

assets/js/ - any imported JS frameworks

Congratulations!

You have completed lesson #basic01: MVC Framework Introduction

If you would take a minute to provide some feedback, we would appreciate it!

The next activity in sequence is: basic01-other MVC Framework Introduction

You can use your browser's back button to return to the page you were on before starting this activity, or you can jump directly to the course homepage, organizer, or reference page.