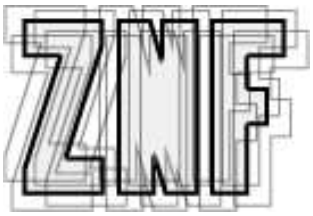

PHP5 MVC framework
for enterprise web applications

http://www.zeronotice.org

version 0.7.10, updated on Wednesday, 14 November 2007, 23:47

ZERONOTICE
INFORMATION TECHNOLOGY SOLUTIONS

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Chapter 1

Introduction

NOTE: The project is abandoned, read more at http://www.zeronotice.org/.

The goal of this project is to provide an open source framework for building PHP5 enterprise web applications. The core of the ZNF framework is a flexible control layer based on standard technologies like PHP5 and XML. ZNF encourages application architectures based on the Model 2 approach, a variation of the classic Model-View-Controller (MVC) design paradigm.

ZNF provides its own controller component and integrates with other technologies to provide the model and the view. For the model, ZNF can interact with database abstraction layers like PEAR::MDB2 and PDO. For the view, ZNF works well with Smarty template engine and XSL Transformations.

The ZNF framework provides the invisible underpinnings every professional web application needs to survive. ZNF helps you create an extensible development environment for your application, based on published standards and proven design patterns.

The official ZNF web site is http://www.zeronotice.org/.

1.1 Features

- Customizable front controller
- XML configurations to define handling of run-time events
- Authorization

- Input filtering and validation
- Localization
- Themes
- Transparent caching engine
- Remote components
- Model integration with PEAR::MDB2 and PDO
- View integration with Smarty template engine and XSL Transformations
- Capability to run in a E_STRICT environment
- PEAR compatible package

1.2 Advantages

ZNF consists in a robust, modular, secure and well documented implementation of a Model 2 framework. It offers all the advantages coming from proven design patterns on which ZNF is based, especially Model 2 that separates design concerns (data persistence and behaviour, presentation and control), decreasing code duplication, centralizing control and making the application more easily modifiable. Model 2 also helps developers with different skill sets to focus on their core skills and collaborate through clearly defined interfaces.

Some of the basic ideas behind the project are taken from the Apache Struts 1.x framework. In particolar we ported what could have been successful in a PHP5 environment, like the main flow of control and the naming conventions. The rest of the features has been developed keeping in mind the absence of an application server, that means that for each request the data structures are created and destructed.

For example the configurations are is defined in XML files. What happens in Struts is that these files are parsed and, thanks to the application server, kept in memory for all the time of the execution of the application. In PHP this is not possible, but it is also unacceptable that the configuration files are parsed at each request, like happens in many others PHP frameworks. So we made a chaching mechanism that, at the first request, parses and loads the configurations in associative arrays and serializes them to the filesystem. For each successive request, if the XML configuration files are left

untouched, the framework loads and works only with these arrays instead of XML trees, making it extremely fast compared to other solutions.

The implementation take all the advantages of PHP5 new features, especially the new powerful object-oriented Zend Engine 2, and the renewed XML and SOAP handling.

As said ZNF can interact with de-facto standard technologies in the PHP community, like PEAR::MDB2, PDO and Smarty. They are well integrated with the framework but is not mandatory to use them, you can always use your preferred technology for model and view.

Last but not least ZNF has a complete developer's guide and the code is fully commented with PHPDoc syntax, so a full API description is available.

1.3 Philosophy behind

The project has been developed with a lot of criticism. Before it was publicly released, the framework has been rewritten from scratch at least 3 times.

After spending a lot of time studying existing open source frameworks we decided to reimplement a brand new framework from scratch for many reasons. First of all, lot of frameworks are still based on PHP4 and we believe that the Zend Engine 1 is too limited for developing enterprise level web application. At the same time code is often written without a rigorous approach (coding conventions, compliance to W3C standards, output of notice/warnings, lack of documentation/examples). Moreover, lot of projects are shipped with a poor documentation, leaving them very difficult to understand.

The objective of this project is not to provide thousand features, but to provide a discrete set of features well engineered, coded and documented.

1.4 Coding standards

The PHP code of ZNF follows the PEAR coding standards. You can find it in the Chapter 4 of the PEAR Manual, `http://pear.php.net/manual/en/standards.php`. The scripts should not output any notice or warning. Morover, XHTML and CSS code should be fully compliant to W3C XHTML 1.1 and CSS 2.0 standards respectively.

1.5 Feedback

If you found the project interesting and want to contribute do not wait to subscribe and post in the mailing list, you can find all the instructions in the chapter 5.8. The role of the community is very important because is the best way to have feedback with a critical eye. Some of the new features have been added only after some detailed request in our mailing list. Any kind of bug signalling and/or proposals are welcome and encouraged.

1.6 Known bugs

Currently there are no known bugs, but the project is still in beta state so be careful using it in production environments!

1.7 Special thanks

All the Struts development team, for releasing to the community a great framework. Amleto Di Salle and Fabio Mancinelli, for the hours spent with us explaining the Struts structure. Alfonso Pierantonio and Davide Di Ruscio, for giving us ideas and a lot of MVC articles to read. Giuseppe Della Penna, for giving us hints to optimize the code. Henry Muccini, for guiding us in the UML modeling. Sara D'Alia, for giving us the ZNF logo. OpenLUG Linux Users Group of L'Aquila, for supporting our work.

Chapter 2

MVC

Model-View-Controller (MVC) is the recommended architectural design pattern for interactive applications. It organizes them into three separate modules:

- the first for the application model with its data representation and business logic;
- the second for views that provide data presentation and user input;
- the third for a controller to dispatch requests and control flow.

Most web-tier application frameworks use some variation of the MVC design pattern.

The MVC design pattern provides a host of design benefits. MVC separates design concerns (data persistence and behaviour, presentation and control), decreasing code duplication, centralizing control and making the application more easily modifiable. MVC also helps developers with different skill sets to focus on their core skills and collaborate through clearly defined interfaces. For example, a project may include developers of views, application logic and database functionality. An MVC design can centralize the control of such application facilities as security, logging and screen flow. New data sources are easy to add to an MVC application by creating code that adapts the new data source to the existing code. Similarly, new client types are easy to add by adapting the new client type to operate as an MVC view. MVC clearly defines the responsibilities of participating classes, making bugs easier to track down and eliminate.

2.1 MVC for the web-tier

The original version of MVC born in the Xerox laboratories and was meant for the development of GUI applications in Smalltalk environment. The literature on web-tier

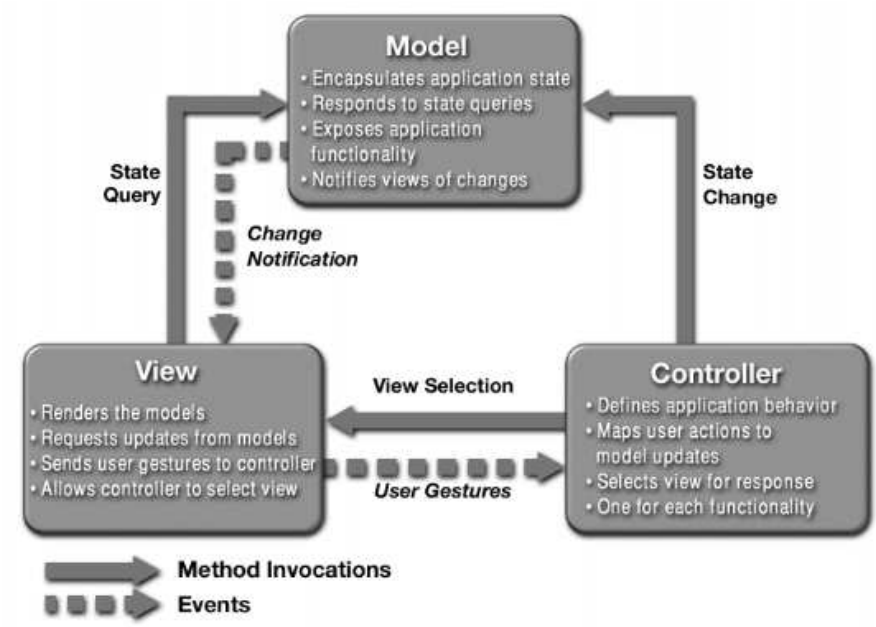


Figure 2.1: The Model View Controller pattern

technology, especially the one of J2EE, frequently uses the terms Model 1 and Model 2 without explanation.

2.1.1 Model 1

Model 1 is the architecture on which, unfortunately according to us, most developers base the design of web applications. Consists of a browser directly accessing web-tier pages, like PHP scripts. The page access data that represent the application model and the next view to display is determined either by hyperlinks selected in the source document or by request parameters. A Model 1 application control is decentralized, because the current page being displayed determines the next page to display. In addition, each page or class processes its own inputs (parameters from GET or POST).

2.1.2 Model 2

Model 2 is the web variant of the MVC pattern, it differs from the original because the view has not the capability to “hear” the model in order to receive notifications of changes in the state. In web applications in fact, views are generated on demand and not in real-time as happens in GUI applications.

A Model 2 architecture differs from Model 1 because introduces a controller class between the browser and the content being delivered. The controller centralizes the logic for dispatching requests to the next view based on the request URI, input parameters and application state. The controller also handles view selection, which decouples pages and classes from one another. Model 2 applications are easier to maintain and extend, because views do not refer to each other directly. The Model 2 controller class provides a single point of control for security and logging and often encapsulates incoming data into a form usable by the back-end MVC model. For these reasons, the Model 2 architecture is recommended for most interactive applications.

An MVC application framework can greatly simplify implementing a Model 2 application. Projects such as ZNF include a configurable front controller class and provide abstract classes that can be extended to handle request dispatches. Some frameworks include macro languages or other tools that simplify application construction.

2.1.3 Model 1 or Model 2?

The Model 1 architecture can provide a more lightweight design for small, static applications. Model 1 architecture is suitable for applications that have very simple page flow, have little need for centralized security control or logging, and change little over time. Model 1 applications can often be refactored to Model 2 when application requirements change.

2.2 Model-View-Controller and ZNF

The ZNF contribution to the controller component of the MVC design pattern is as follows: the main ZNF class handles run-time events in accordance with a set of rules that are provided at deployment time. Those rules are contained in some ZNF configuration files and specify how the system responds to every outcome received from the business logic. Changes to the flow of control require changes only to the configuration files. ZNF also provides a `ZNF_Action_Action` class, which a PHP developer subclasses to create an concrete action. At run-time, the ZNF class is said to "execute actions", which means that the class invokes the execute method of each of the instantiated action classes. The object returned from the execute method directs the ZNF class to what action or PHP page to access next. We recommend that you promote reuse by invoking business logic from the action class rather than including business logic in that class.

The ZNF contribution to the view component of the MVC design pattern is twofold: it provides the `ZNF_Action_ActionForm` class, which a PHP developer subclasses to create a form bean. At run-time, the bean is used in two ways:

- when a PHP view prepares the related HTML form to display, it accesses the bean, which holds values to be placed into the form. Those values are provided from business logic or from previous user input.
- when user input is returned from a browser, the bean validates and holds that input either for use by business logic or, if validation failed, for subsequent re-display.

ZNF also provides the `ZNF_Presentation_Smarty` class, based on Smarty Template engine, and `ZNF_Presentation_XSLT` class, which handles XSL Transformations, that a PHP developer may use for presentation of contents.

The ZNF contribution to the model component of the MVC design pattern is minimal: it only provides the `ZNF_Business_MDB2` and `ZNF_Business_PDO` classes, based on the PEAR::MDB2 and PDO packages respectively, that a PHP developer may use to interact with relational databases.

2.3 Best choice?

Is ZNF the best choice for every project? No. If you need to write a very simple application, with a handful of pages, then you might consider a Model 1 solution. But if you are writing a more complicated application with dozens of pages that need to be maintained over time, then ZNF can help.

Chapter 3

Installation

3.1 Requirements

ZNF framework is operating system independent. It requires an Apache Web Server version 2.0.30 or better with PHP module version 5.1 or better (5.2 recommended). The Apache Web Server installation must have support for `.htaccess` files in order to use additional configuration directives like access restrictions for almost all the subdirectory of the framework. The PHP module has to be compiled with `dom` extension.

The default testing platform is GNU/Linux, so bugs signalling for other platform is encouraged.

3.2 ZNF installation

ZNF is distributed using a PEAR channel, so you need to be familiar with the PEAR package manager (refer to http://pear.php.net/manual/en/installation.cli.php).

To add our channel to your PEAR install, use:

```
pear channel-discover pear.zeronotice.org
```

Then you will be able to install our framework by using:

```
pear install zeronotice/ZNF
```

Note that the `docs` directory of your PEAR install will contain the ZNF documentation and the skeleton to use as a base for your next application.

3.3 Sample application installation

To have a better understanding of the framework, after reading the chapter 3.3 you can install our sample application.

- download news manager package from

  http://prdownloads.sourceforge.net/znf/znf-news-0.7.6.tar.bz2?download

- unpack the package in a directory of the document root of your web server
- initialize a new database (replace `<username>`, `<password>`, `<host>` and `<directory>` with your values.

  – create the database

  ```
  #> mysqladmin create znf
  ```

  – grant privileges to the user

  ```
  mysql> GRANT ALL PRIVILEGES ON znf.* TO
  <username>@localhost IDENTIFIED BY '<password>';
  ```

  – load tables from the DDL file in the `sql` directory of the News and User packages

  ```
  $> mysql -u<username> -p<password> znf <
  <path>/News/sql/News.ddl.sql
  <path>/News/sql/News.dml.sql
  $> mysql -u<username> -p<password> znf <
  <path>/User/sql/User.ddl.sql
  <path>/User/sql/User.dml.sql
  ```

  – put authentication information into the database configuration file, `znf-db-config.xml`, refer to chapter 4.1.3 for details.

  – open the URI `http://<host>/<directory>/` in your browser, ZNF should display the news manager system. To login in the administration area use the `admin/admin` username/password.

Chapter 4

Usage

In this chapter we describe how to use the key features of the framework.

4.1 Configuration

ZNF uses at least two XML configuration files located in the `config` directory: an application configuration file, named `znf-app-config.xml`, and one or more module configuration files, typically named with the syntax `znf-<modulename>-config.xml`.

The application configuration file used to define the application-wise configurations, in particular the default values that the application have to use and the modules that are available. The module configuration file used to initialize the framework resources, like `ZNF_Action_ActionForm` to collect input from the client, `ZNF_Action_ActionMapping` to direct input to server-side actions, and `ZNF_Action_ActionForward` to select output pages. With these configuration files it is possible manage the application without modifying the code of the classes.

If you want to use the model layer classes, ZNF uses another configuration file for the database, named `znf-db-config.xml`, used to connect to the specified relational database.

4.1.1 Application configuration file

The root element of the application configuration file should be `znf-app-config`, possible child elements are `app-settings` and `modules`. For `modules` possible child elements are `module`.

`app-settings` element attributes

- `lang`. String (2-digits), used to specify the default language. The specified language must be configured for all the packages and themes used in the application.
- `langAutodetect`. Boolean value, used to request the language autodetection from the user's browser settings.
- `locale`. String (2-digits + _ + 2-digits), used to specify the default locale.
- `theme`. String, used to specify the default theme. The specified theme must be present in the theme directory.
- `sessionId`. String, used to specify the custom session identifier.

`module` element attributes

- `default`. Boolean value, used to select this module as the default one. Actions belonging to that module can be selected without specifying the module in the URI. The application can have only one default module. The attribute is optional and defaults to `false`.
- `name`. String (without _), used to specify a unique name for the module. The specified name can be used in the URI as a value of the `znfModule` GET variable to do a per-action module selection, or alternatively as a value of the `znfChangeModule` GET variable to do a persistent module selection.
- `processor`. String, used to specify the fully qualified class name of a customized request processor. The specified class must extend `ZNF_Action_RequestProcessor` and will be loaded in place of the default request processor class. It is useful when a customized processing logic flow is needed.

`auth-config` element attributes

- `path`. String, used to specify an action name. The specified action will be invoked in case authentication or authorization restriction are encountered. It is useful to automatcally redirect to a login form.

Application configuration file sample

Here is a sample application configuration:

```
<?xml version="1.0" encoding="utf-8"?>
<znf-app-config xmlns="http://www.zeronotice.org/ZNF/znf-app-config" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.zeronotice.org/ZNF/xsd/znf-app-config.xsd">

  <app-settings
    lang="en"
    locale="en_UK"
    langAutodetect="false"
    theme="default"
    sessionId="ZNFID" />

  <modules>

    <module
      default="true"
      name="news"
      config="znf-news-config.xml" />

    <module
      name="user"
      config="znf-user-config.xml" />

    <module
      name="general"
      config="znf-general-config.xml" />

    <module
           name="contents"
      config="znf-contents-config.xml" />

  </modules>

  <wrong-auth-config
    path="user//wrongAuth" />

  <auth-config
    path="user//login" />

</znf-app-config>
```

4.1.2 Module configuration file

The root element of the module configuration file should be `znf-module-config`, `global-forwards`, `action-mappings` and `form-beans`. For `global-forwards` possible child elements are `forwards`, for `action-mappings` are

`action` and for `form-beans` are `form-bean`.

`action` element attributes

- `default`. Boolean value, used to select this action as the default one for the module. The default action will be invoked when no other actions are specified in the URI. The module can have only one default action. The attribute is optional and defaults to `false`.
- `forward`. String, used to specify an application-relative path to a view script or alternatively an action name. In the first case the control-flow will be forwarded to the specified view script instead of loading an action class, in the second case the control-flow will be redirected to the specified action, so the action itself is only used as an alias for the specified action. Input data will be filtered and and validated before the forward. The attributes `forward` and `type` are mutually exclusive and exactly one must be defined.
- `input`. String, used to specify an action name. The control-flow will be returned to the specified action if a validation error is encountered. It is possible to refer to actions of different modules using the sintax `<modulename>//<actionname>`.
- `name`. String, used to specify a form-bean name. The specified form-bean will be used to process and eventually validate input data. The specified name has to match the name of a defined form-bean element. The attribute is optional.
- `nextPath`. String, used to specify an action name. The specified name will be used to automatically update references in the view scripts, so the control-flow is fully configurable in just the configuraion file.
- `path`. String (without _), used to specify a unique name for the action. The specified name has to be used in the URI as a value of the `znfAction` GET variable to do an action selection.
- `parameter`. String, used as a general purpose configuration parameter. The specified parameter can be used to pass extra information to the action class loaded. The value will be ignored by the request processor and simply stored in the `$_REQUEST` superglobal.

- `roles`. String (`,` separated), used to specify a list of security role names. The specified roles will be allowed to invoke this action. The request processor verifies that the user has at least one of the specified roles before to load an action.
- `scope`. String (`request` or `session`), used to specify in which of the `request` or `session` scopes the form-bean has to be placed. The attribute can be defined only if the `name` attribute is present.
- `type`. String, used to specify the fully qualified class name of the action. The specified class must extend `ZNF_Action_Action`. The attributes `forward` and `type` are mutually exclusive and exactly one must be defined.
- `validate`. Boolean value, used to request the call of the `validate()` method of the form-bean specified in the the `name` attribute. The attribute is optional and defaults to `false`.

The forward element maps a logical name to an URI. The application can then perform a forward or redirect, using the logical name rather than the literal URI. This helps to decouple the controller and model logic from the view. The forward element can be defined in action elements.

`forward` element attributes

- `name`. String, used to specify a unique name for the forward. The attribute is required.
- `path`. String, used to specify an URI or action name. In the first case the control-flow will be forwarded or redirected to the specified URI, in the second case the specified action will be invoked. It is possible to refer to actions of different modules using the sintax `<modulename>//<actionname>`. The attribute is required.
- `redirect`. Boolean value, used to request that the request processor performs a redirect instead of a forward. The attribute is optional and defaults to `false`.

`form-bean` element attributes

- `name`. String (without _), used to specify a unique name for the form-bean. This attribute is required.

- `type`. String, used to specify a fully qualified class name. The specified class must extend `ZNF_Action_ActionForm`. The attribute is required.

Module configuration file sample

Here is a sample module configuration for a login work flow:

```
<?xml version="1.0" encoding="utf-8"?>
<znf-module-config xmlns="http://www.zeronotice.org/ZNF/znf-module-config" xmlns:xsi=
    "http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.
    zeronotice.org/ZNF/xsd/znf-module-config.xsd">

  <action-mappings>

    <action
      path="login"
      forward="User/Presentation/Login.php"
      nextPath="loginSubmit"/>
    <action
      path="loginSubmit"
      type="User_Action_Login"
      name="loginForm"
      input="login"
      validate="true">
      <forward
        name="success"
        path="welcome"/>
      <forward
        name="failure"
        path="login"/>
    </action>

  </action-mappings>

  <form-beans>

    <form-bean
      name="loginForm"
      type="User_Action_LoginForm"/>

  </form-beans>

</znf-module-config>
```

In this example there are defined two actions:

- `login` is the first action that simply forwards to the `Login.php` view that displays the login form;

- `loginSubmit` is the second action that make use of `LoginForm` (extends `ZNF_Action_ActionForm`) to check input data, `Login` action (extends

`ZNF_Action_Action`) to control the application flow and interact with the model and finally redirect the flow to success or failure view.

4.1.3 Database configuration file

The root element of the database configuration file should be `znf-db-config`, possible child element is `db`.

`db` element attributes

- `default`. Boolean value, used to select this database as the one used by the application. The application can only have one default database. The attribute is optional and defaults to `false`.
- `dbms`. String, used to select the DBMS type. The attribute is optional and defaults to `mysql`.
- `username`. String, used to specify the database username. The attribute is required.
- `password`. String, used to specify the database password. The attribute is required.
- `hostname`. String, used to specify the database hostname. The attribute is optional and defaults to `localhost`.
- `dbname`. String, used to specify the database name. The attribute is required.

Database configuration file sample

Here is a sample database configuration:

```
<?xml version="1.0" encoding="utf-8"?>
<znf-db-config xmlns="http://www.zeronotice.org/ZNF/znf-db-config" xmlns:xsi="http://
    www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.zeronotice.org
    /ZNF/xsd/znf-db-config.xsd">

  <db
    default="true"
    dbms="mysql"
    username="znf"
    password="znf"
    hostname="localhost"
    dbname="znf"
```

```
11      tableprefix="znf_"/>
12
13  </znf-db-config>
```

4.2 Localization

ZNF has built-in support for localization, it uses XML files to load translated strings. The behaviour is very simple: in the root of the application and in every package you have to create a directory called `lang`, in which you have to create at least one file for the default language, and one file for every other language you want for your application.

The `lang` directory placed in the root should contain translations of applications-wise text, for example the English word "welcome". Contrary, the `lang` directories placed in every package should contain translation of package-specific text, for example the English word "login" in the `User` package.

The language file should be named with the 2 digits abbreviation of the language, for example `en` for English and `it` for Italian.

4.2.1 Translation file

The root element of the XML document should be `znf-translation`, possible child element is `item`.

`item` element attributes

- `code`. Unique alphanumeric string, used to reference this translation item in the application. The attribute is required.
- `text`. Text translated in the language specified.

Note that you can add language files with not all the items translated, the framework will automatically load untranslated text from the default language.

By default the framework is set to `en` for the language and `en_US` for the locale. If you want to change the default value you have to change the values of the `app-settings` attributes in the configuration file.

You can specify if the `ZNF_Presentation_Translation` should load the translations of a specific package or the global ones, typically used in the whole application. The first parameter of the constructor of `ZNF_Presentation_Translation`

let you to specify the package to use. If you pass a string to this parameter the `ZNF_Presentation_Translation` object will load translations files from the `lang` directory of the specified package. If no string is passed to this parameter the `ZNF_Presentation_Translation` object will load translations files from the `lang` directory of the root of the application.

Translation file samples

Here is a sample translation, `en.xml`, for the default English language:

```
<?xml version="1.0" encoding="utf-8"?>
<znf-translation lang="en" xmlns="http://www.zeronotice.org/ZNF/znf-translation"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://
    www.zeronotice.org/ZNF/xsd/znf-translation.xsd">

  <item code="welcome" text="Welcome to ZNF"/>
  <item code="contacts" text="Contacts"/>

</znf-translation>
```

Here is the Italian translation, `it.xml`.

```
<?xml version="1.0" encoding="utf-8"?>
<znf-translation lang="it" xmlns="http://www.zeronotice.org/ZNF/znf-translation"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://
    www.zeronotice.org/ZNF/xsd/znf-translation.xsd">

  <item code="welcome" text="Benvenuto su ZNF"/>
  <item code="contacts" text="Contatti"/>

</znf-translation>
```

4.3 Presentation

ZNF provides the `ZNF_Presentation_Smarty` class, based on Smarty Template engine, and `ZNF_Presentation_XSLT` class, which handles XSL Transformations, that a PHP developer may use for the presentation of contents. Note that all classes which role is to render pages to display to the user must extend the `ZNF_Presentation_Render` abstract class.

You can find the Smarty Template engine documentation at http://smarty.php.net/docs.php and the XSL Transformation documentation at http://www.w3.org/TR/xslt

4.3.1 Constants

Note that the `$znf` variable is reserved in both Smarty and XSL templates. This variable contains the following attributes, that you can use to simplify and speed up the creation of a view:

- `znf.baseHref`. Concatenation of hostname and relative path of the public script directory, used as prefix in hyperlinks in order to refer to correct URIs.
- `znf.actionIndex`. name of the GET attribute used to select the action to execute.
- `znf.moduleIndex`. name of the GET attribute used to select the module configuration.
- `znf.themePath`. Relative path of the current theme, used as prefix in hyperlinks (css, javascripts, images...) in order to refer to correct paths.
- `znf.packagePath`. Relative path of the package in use, used as prefix in hyperlinks (css, javascripts, images...) in order to refer to correct paths.
- `znf.path`. Current action path.
- `znf.nextPath`. Next action path to request.
- `znf.credits`. ZNF credits.

4.3.2 Template loading mechanism

ZNF supports two different kinds of templates:

- package template: associated to the package, shipped with the package to provide a working component ready to use, generally contains markup for the handling and presentation of data;
- theme template: associated to the whole application, used to build the structure and the look of the application.

If you want to change the layout of a package template you can put the new one, with the same name of the original one, in the `themes/packages` directory specifying the name of the package and the language. For example if you want to customize

the `catList.tpl` english template of the News package, you have to put the new `catList.tpl` in the `themes/packages/News/en` directory.

You can specify if `ZNF_Presentation_Render` should load the template of a specific package or the theme ones. The first parameter of the constructor of `ZNF_Presentation_Render` let you to specify the package to use. If you pass a string to this parameter the `ZNF_Presentation_Render` object will load template files from the `template` directory of the specified package. If no string is passed to this parameter the `ZNF_Presentation_Render` object will load template files from the theme of the application.

4.4 Remote actions

ZNF has built-in support for remote actions. This support is still very experimental. Remote action execution using the framework facilities makes the processing flow divided in 2 sub-flows, one for the remote client (ie. the application with which the user interacts using a browser) and one for the remote server (ie. the ZNF application running on a remote host that executes actions as web services).

The framework mask to the developer the complexity of the remote communication, leaving the configuration of the remote action execution really simple. The remote client sends the path corresponding to the action to be executed and the serialized state of the application to a remote server running ZNF and receives a string used to process the forward. The remote server receives the path corresponding to the action to be executed and the serialized state of the application of the remote client running ZNF and sends a string used to process the forward. The communication is made with SOAP protocol.

If you want to try the remote support you have to use the `Remote` package, creating a new module configuration both in client side and server side.

The client have to configure the actions to be executed remotely with the `path` attribute set to the path used in the remote server for the wanted action and the `parameter` attribute set to the URI of the remote host, like `http://<remotehost>/<directory>`.

The server have to configure one action with the `path` set to `webService` and `default` set to `true`. This action used by the customized request processor `Request_Action_RequestProcessorServer` to intercept all the SOAP requests coming from the client.

Remote module configuration file samples

Here is a sample client module configuration for an action that check updates for the framework:

```
<?xml version="1.0" encoding="utf-8"?>
<znf-module-config xmlns="http://www.zeronotice.org/ZNF/znf-module-config" xmlns:xsi=
    "http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.
    zeronotice.org/ZNF/xsd/znf-module-config.xsd">

  <action-mappings>

    <!-- Updates action begin -->
    <action
      default="true"
      path="checkUpdates"
      parameter="http://www.zeronotice.org">
      <forward
        name="available"
        path="Updates/Presentation/UpdatesAvailable.php"/>
      <forward
        name="unavailable"
        path="Updates/Presentation/UpdatesUnavailable.php"/>
    </action>
    <!-- Updates action end -->

  </action-mappings>

</znf-module-config>
```

Here is a sample server module configuration for an action that check updates for the framework:

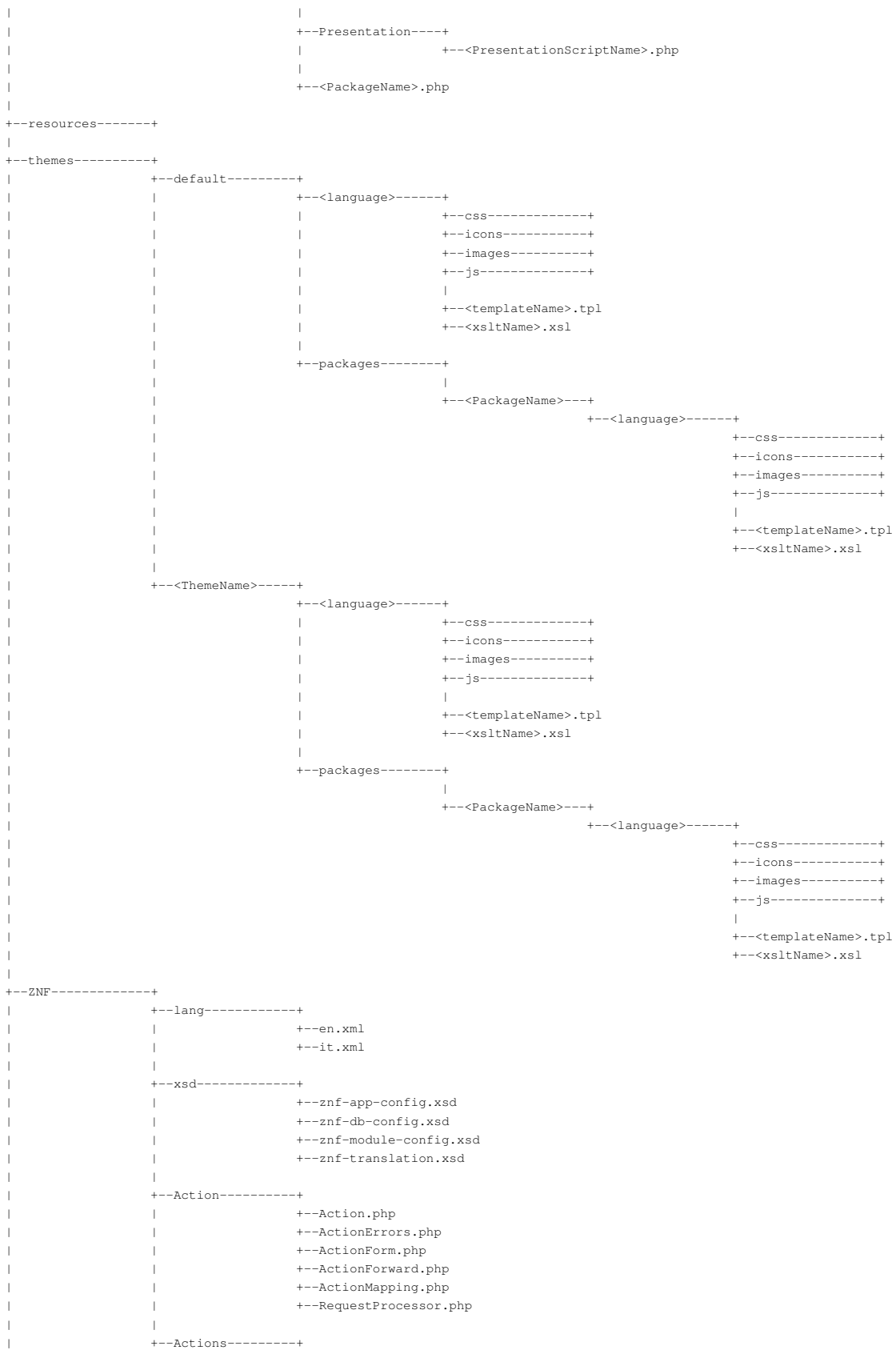
```
<?xml version="1.0" encoding="utf-8"?>
<znf-module-config xmlns="http://www.zeronotice.org/ZNF/znf-module-config" xmlns:xsi=
    "http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://www.
    zeronotice.org/ZNF/xsd/znf-module-config.xsd">

  <action-mappings>

    <!-- Updates action begin -->
    <action
      default="true"
      path="checkUpdates"
      parameter="http://www.zeronotice.org">
      <forward
        name="available"
        path="Updates/Presentation/UpdatesAvailable.php"/>
      <forward
        name="unavailable"
        path="Updates/Presentation/UpdatesUnavailable.php"/>
    </action>
    <!-- Updates action end -->
```

```
19
20   </action-mappings>
21
22 </znf-module-config>
```

4.5 File system conventions

Last but not least, this a little scheme of the filesystem conventions. Try to adhere always to this conventions if you do not want to have surprises.

```
+--cache-----------+
|
+--config----------+
|                  +--znf-app-config.xml
|                  +--znf-db-config.xml
|                  +--znf-<module>-config.xml
|
+--docs------------+
|                  +--api-------------+
|                  |
|                  +--src-------------+
|                  |                  +--latex-----------+
|                  |                  |
|                  |                  +--uml-------------+
|                  |
|                  +--AUTHORS
|                  +--ChangeLog
|                  +--COPYING
|                  +--README
|                  +--TODO
|                  +--znf-x.x.x.pdf
|                  +--Makefile
|
+--lang------------+
|                  +--<language>.xml
|
+--lib-------------+
|
+--modules---------+
|                  +--<PackageName>---+
|                                     +--docs------------+
|                                     |
|                                     +--lang------------+
|                                     |                  +--<language>.xml
|                                     |
|                                     +--sql-------------+
|                                     |                  +--<PackageName>.ddl.sql
|                                     |                  +--<PackageName>.dml.sql
|                                     |                  +--<PackageName>.drl.sql
|                                     |
|                                     +--templates-------+
|                                     |                  +--<language>------+
|                                     |                                     +--css-------------+
|                                     |                                     +--icons-----------+
|                                     |                                     +--images----------+
|                                     |                                     +--js--------------+
|                                     |                                     |
|                                     |                                     +--<templateName>.tpl
|                                     |                                     +--<xsltName>.xsl
|                                     |
|                                     +--Action----------+
|                                     |                  +--<ActionClassName>.php
|                                     |
|                                     +--Business--------+
|                                     |                  +--<BusinessClassName>.php
```


|
|
+--Presentation----+
|
+--<PresentationScriptName>.php
|
+--<PackageName>.php
|
+--resources-------+
|
+--themes----------+
|
+--default---------+
|
+--<language>------+
|
+--css-------------+
|
+--icons-----------+
|
+--images----------+
|
+--js--------------+
|
|
+--<templateName>.tpl
|
+--<xsltName>.xsl
|
|
+--packages--------+
|
|
+--<PackageName>---+
|
+--<language>------+
|
+--css-------------+
|
+--icons-----------+
|
+--images----------+
|
+--js--------------+
|
|
+--<templateName>.tpl
|
+--<xsltName>.xsl
|
|
+--<ThemeName>-----+
|
+--<language>------+
|
+--css-------------+
|
+--icons-----------+
|
+--images----------+
|
+--js--------------+
|
|
+--<templateName>.tpl
|
+--<xsltName>.xsl
|
|
+--packages--------+
|
|
+--<PackageName>---+
|
+--<language>------+
|
+--css-------------+
|
+--icons-----------+
|
+--images----------+
|
+--js--------------+
|
|
+--<templateName>.tpl
|
+--<xsltName>.xsl
|
+--ZNF-------------+
|
+--lang------------+
|
+--en.xml
|
+--it.xml
|
|
+--xsd-------------+
|
+--znf-app-config.xsd
|
+--znf-db-config.xsd
|
+--znf-module-config.xsd
|
+--znf-translation.xsd
|
|
+--Action----------+
|
+--Action.php
|
+--ActionErrors.php
|
+--ActionForm.php
|
+--ActionForward.php
|
+--ActionMapping.php
|
+--RequestProcessor.php
|
|
+--Actions---------+

```
|                  |                  +--DispatchAction.php
|                  |
|                  +--Business--------+
|                  |                  +--DB.php
|                  |
|                  +--Config----------+
|                  |                  +--AppConfig.php
|                  |                  +--DBConfig.php
|                  |                  +--ModulesConfig.php
|                  |
|                  +--Presentation----+
|                  |                  +--Render.php
|                  |                  +--Smarty.php
|                  |                  +--Template.php
|                  |                  +--Translation.php
|                  |                  +--XSLT.php
|                  |
|                  +--Util------------+
|                  |                  +--Utility.php
|                  |
|                  +--ZNF.php
|
+--autopackage.php
+--index.php
+--Makefile
```

Chapter 5

Project

This chapter is meant for those developers who want to join the development team or simply have a deeper understanding of the framework.

Current generation web applications are becoming very complex, developing this kind of software without a very robust and well-understood process would be foolish. We realized ZNF following some of the best practices described in the RUP methodology, with the only exception that the development team is made by only three people, when in RUP the team is described as a sum of analysts, designers, coders and so on... :)

5.1 UML diagrams not up to date

Before to start describing the project, we need to explain the reasons why in this release we cannot provide an updated version for our UML diagrams.

One of the strongest point of ZNF, compared to other free software projects, was exactly that it has been following the principles of the software engineering. In particular we always delivered lot of UML diagrams attached to the project. For the engineering we used the Community Edition of Poseidon for UML, a CASE tool developed by Gentleware, that started as a fork of the open source ArgoUML project. The Community Edition offered a limited set of functionalities but sufficient to develop our project. For that edition of Poseidon for UML it was possible to automatically retrieve a free licence with a simple registration at the first program start-up, and no fee was required.

Unfortunately, starting from the version 5.0, released in late 2006 the licence model of Gentleware changed radically. Now the Community Edition can be used just paying a "rent subscription" and unfortunately is not possible to retrieve anymore the free

licence with older versions. After some month after the new release (and after some request of clarification from our development team) the company launched an Open Source Sponsorship campaign: they provide free licenses of Poseidon for UML Community Edition for non-commercial open source projects. At first glance it seems a very good idea, but to get the licence you have to agree to some terms. We do not want to absolutely judge these terms, but considering the ZNF purpose the development team do not want to accept them and become a sponsor of Gentleware.

We tried to switch to other CASE tools but unfortunately XMI is still the "standard" less suitable for the interoperability between the tools. XMI v1.0, v 1.1 and v1.2 are native file formats for model storage, but these formats do not specify how to store diagrams. So if you use a tool to open the XMI file, exported with another tool, only the model will be loaded (diagrams and views not).

We did not find yet a CASE tool able to fully import Poseidon for UML project files, so at the time of writing more that one year of design activity can be considered trashed. That is the reason why we will not ship updated diagrams with the v0.7.9 release. The ones shown in this page are still the v0.7.6, and it is likely that they will be left untouched for a long period, considering the big efforts necessary to start up a new design from scratch.

5.2 Traceability conventions

Note that we used a notational convention for the traceability of the elements in the various UML diagrams:

- every requirement is numbered with a number of the form 0.x;
- every use case is numbered with a number of the form 1.x and is followed by a number enclosed in ( ) that represents the requirement to which the use case refer;
- every method of the analysis class diagram is followed by a number enclosed in ( ) that represents the use case to which the method refer;
- traceability from analysis to design model is expressed in a realization diagram.

5.3 Requirements

We started collecting requirements for the whole framework, in order to capture all the constraints that the system must observe.

0.1. The framework is based on the MVC design pattern

- 0.1.1. Application flow is mediated by a central Controller
- 0.1.2. Framework behaviour can be modified by application components

0.2. The Controller portion is focused on receiving requests from the client, typically a user running a web browser

- 0.2.1. Parses a configuration file, which contains a set of mappings that define path match against the request URI
- 0.2.2. Ensures the requesting user has authorization
- 0.2.3. Delegates input data filtering and validation to an input filter
- 0.2.4. Delegates control flow and error handling to a flow controller
- 0.2.5. Delegates presentation of contents to the appropriate View

0.3. The Model represents or encapsulates an application's business logic or state

- 0.3.1. Can be divided into two major subsystems: the internal state of the system and the function that can be executed to change that state
- 0.3.2. The flow controller acts as an adapter between the request and the model
- 0.3.3. Framework architecture provides support for any approach to accessing the model

0.4. The view portion is responsible of producing the next phase of the user interface

- 0.4.1. Provides functionalities to present static or dynamic contents
- 0.4.2. Provides support for internationalization
- 0.4.3. Presents possible errors

5.4 Use case

We captured and expressed detailed system behaviour in 3 use case models, presented in figures 5.1, 5.2 and 5.3.

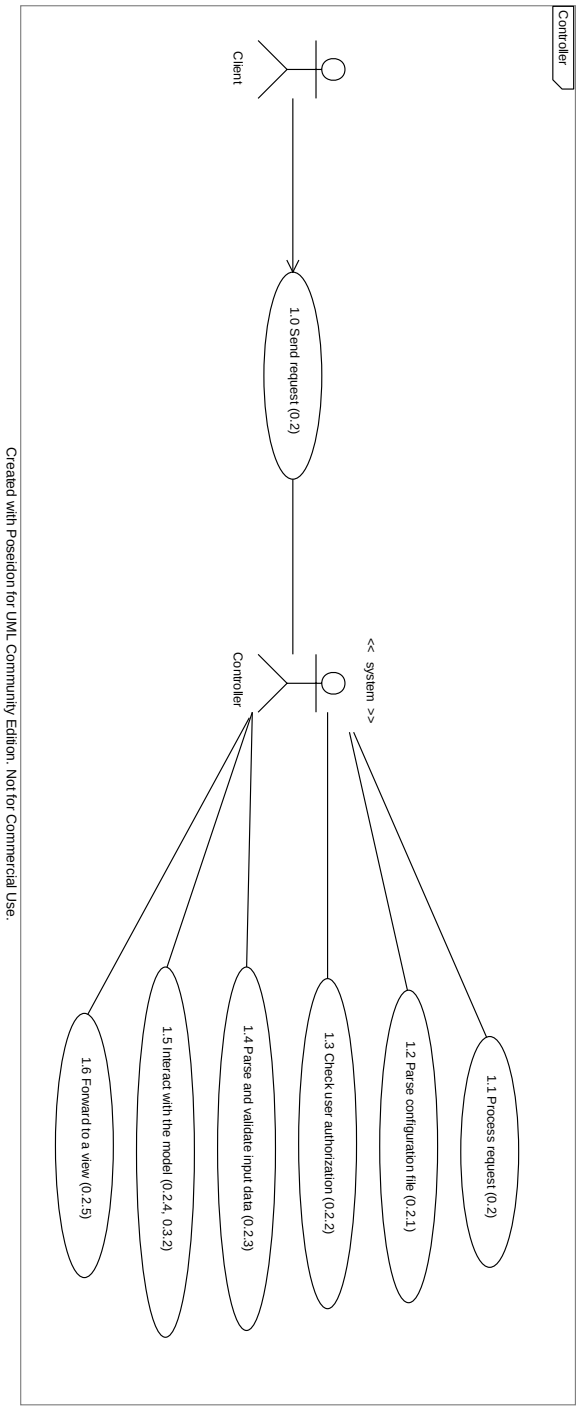


Figure 5.1: UseCase: Controller layer

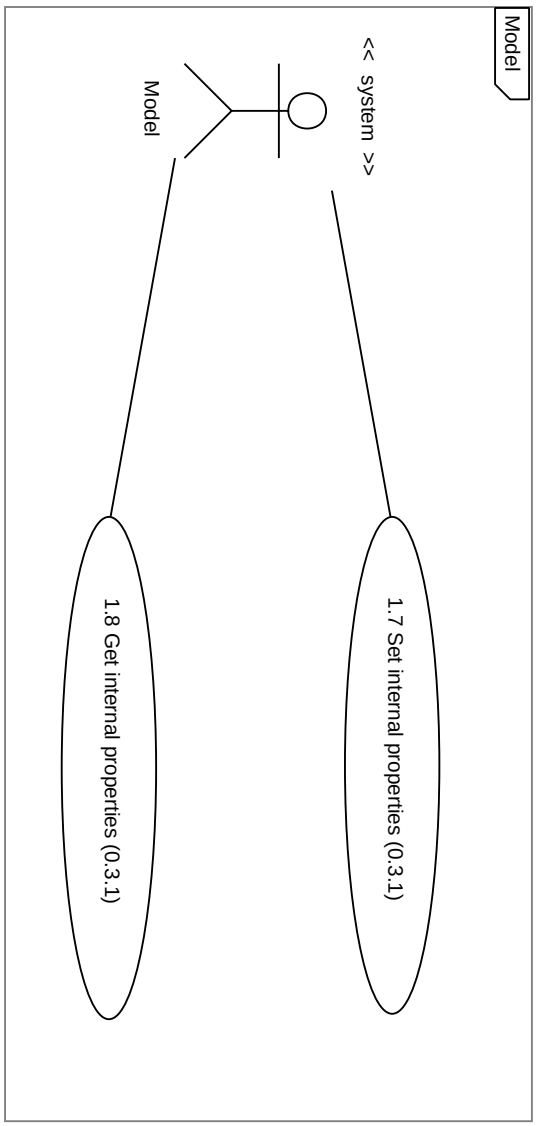


Figure 5.2: UseCase: Model layer

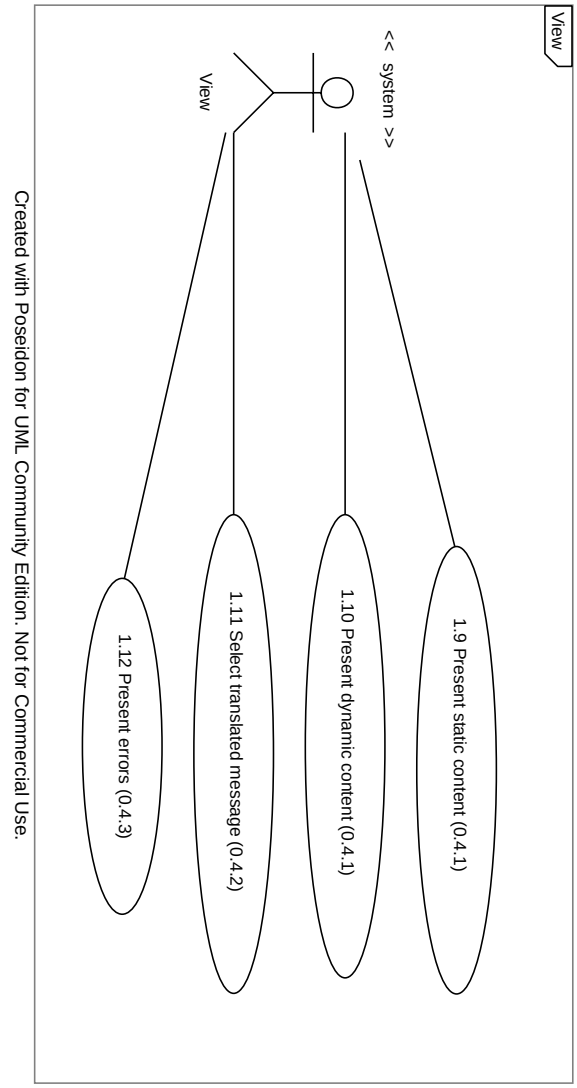


Figure 5.3: UseCase: View layer

5.5 Analysis

Focusing only on the functional requirements and ignoring the architectural constraints of the system we realized a class diagram for the analysis. The class diagram is presented in figure 5.4.

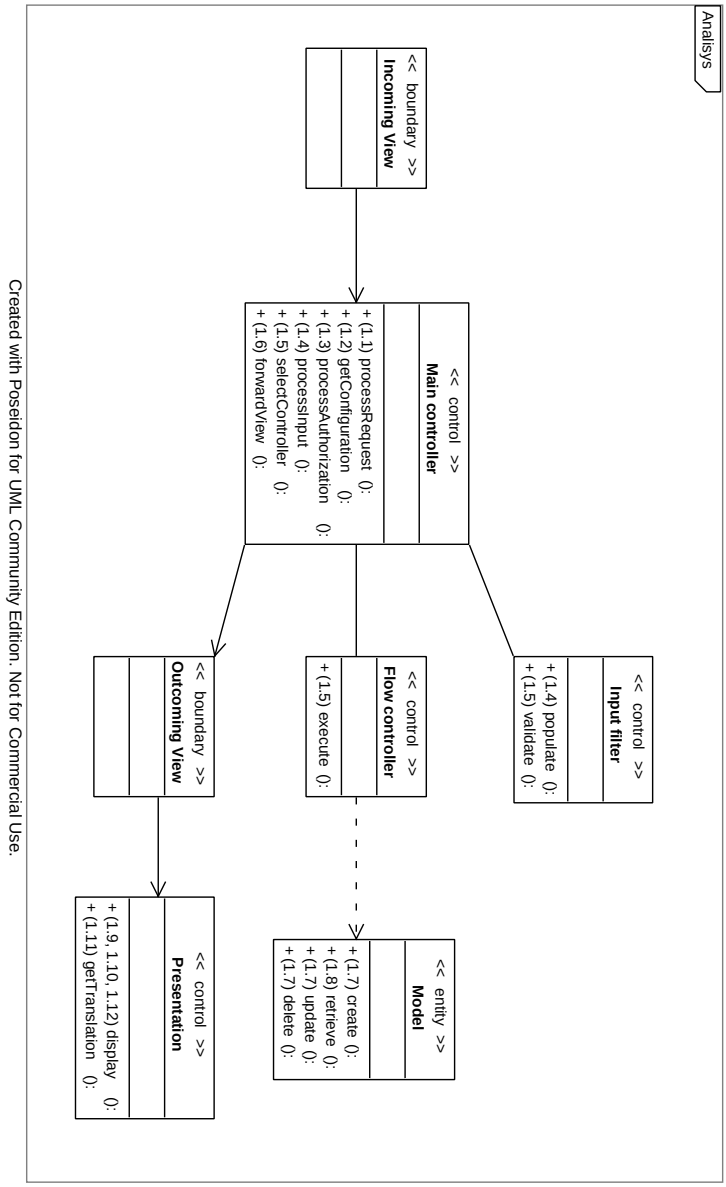


Figure 5.4: Analysis: Class diagram

5.6 Realization

This section outline how we passed from the analysis model to the design one.

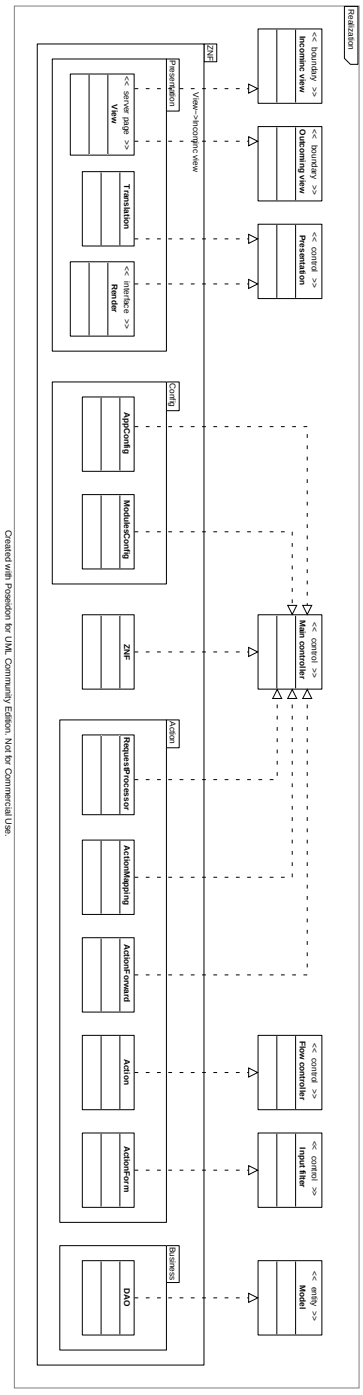


Figure 5.5: From analysis to design: Realization diagram

5.7 Design

Refining the analysis model, such that it can be implemented with components that obey the rules of the architecture, we created a class diagram and a sequence diagram.

5.7.1 Class diagram

The class diagram is presented in figure 5.6.

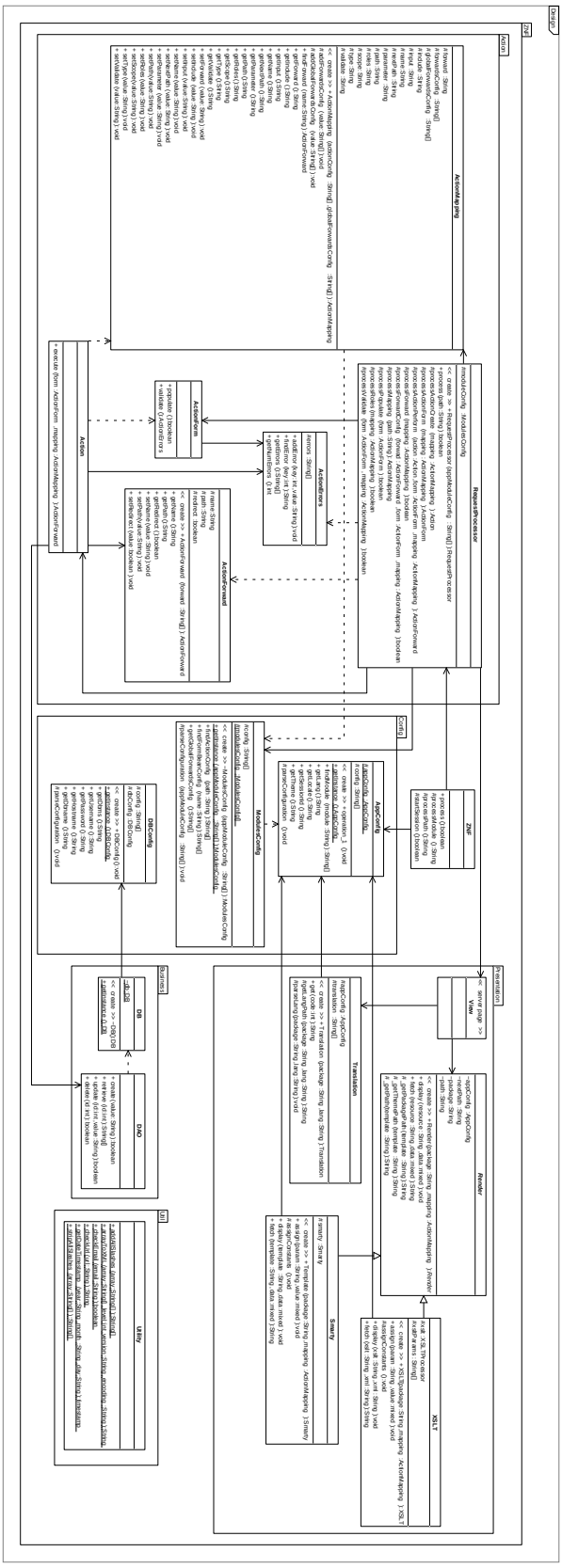


Figure 5.6: Design: Class diagram

5.7.2 Sequence diagram

The sequence diagram is presented in figure 5.7.

Looking at this diagram, especially if you are familiar with UML, you can find atypical that we used a lot of create messages to represent object instantiations, instead of having all object already instantiated, in few words all object aligned at the top of the diagram.

Typically a sequence diagrams represents applications with a well defined life cycle. For example in J2EE a web application is typically deployed in an application container that starts its lifecycle and make it ready to receive requests. In PHP we cannot have a "real" lifecycle for an application, for each request variables/objects are created and destructed, so the resulting sequence diagram is the following.

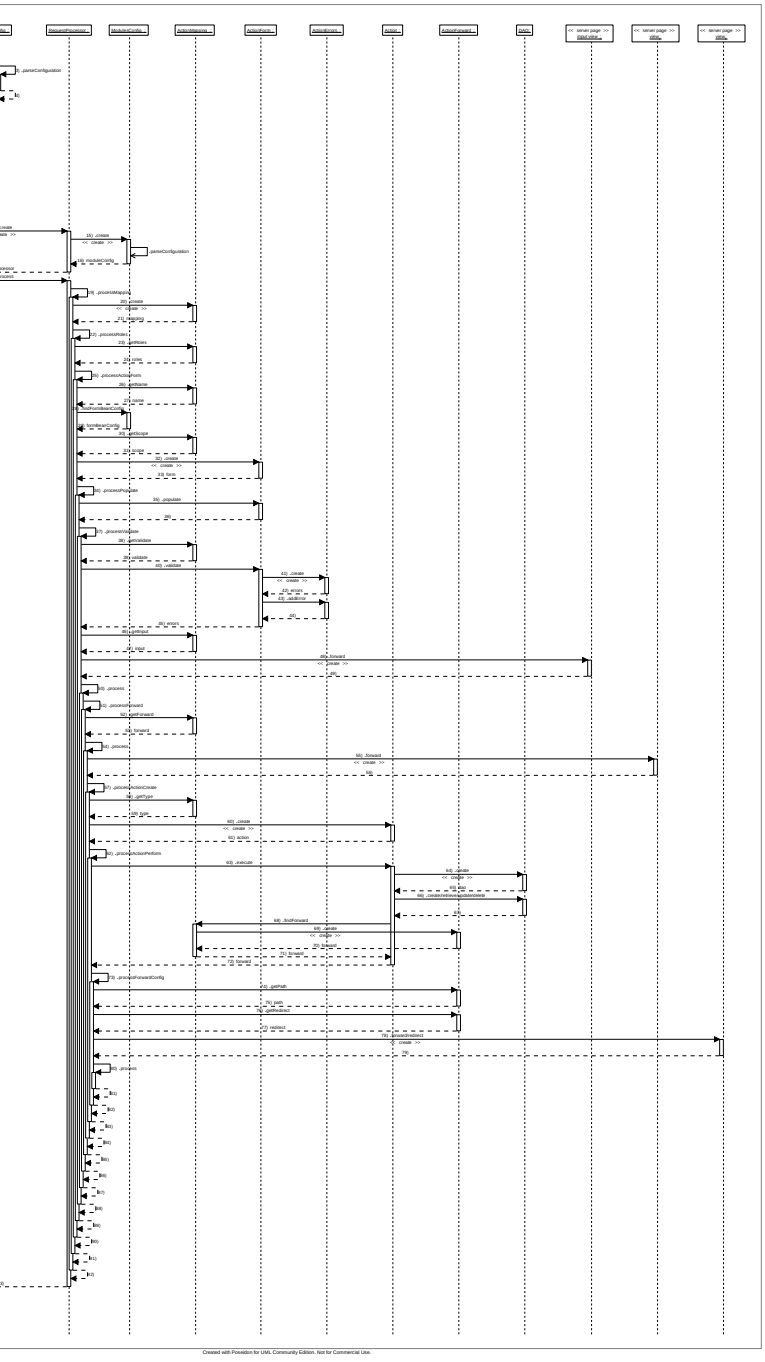


Figure 5.7: Design: Sequence diagram

5.8 Sample application requirements

In order to be complete we also list the requirements that we used for the creation of the news manager system.

0.1. The system provides functions to manage news and categories

0.2. Elements of a category are name, description, image, time and date

0.3. Elements of a news are category, title, summary, body, link, image, views, time and date

0.4. News are grouped by categories

0.5. Each time a news is read the associated views counter must be incremented

0.6. Two kind of actors are supported by the system: guest and administrator

0.7. Guest can list, search and get RSS feeds of the news

0.8. Administrator can also create, retrieve, update and delete news and categories

0.9. During the deletion of a category it is possible to delete all associated news or associate these news to another category

0.10. During updating and deletion of a category it is possible to view the list of categories

0.11. During creation and updating of a news it is possible to view the list of categories

Note that no UML diagrams related to the news manager system are available anymore because the old one were too much old and different compared to the actual implementation, and we did not have time to rebuild them from scratch with a new CASE tool.

Chapter 6

Contribute

ZNF is a free software project, which means that everyone can help improving it. Improving does not always mean writing code. It can also mean reporting bugs, giving feedback, submitting feature requests and even giving financial support.

If you have modified ZNF to expand its functionalities or to fix a bug, you should contribute your changes back to the community. Before creating the patch you must first obtain the latest sources of ZNF from SVN repository by running the follow command command:

```
$> svn checkout https://www.zeronotice.org/svn
```

Now that you have the latest sources you can add your changes. Make sure that your patch is fully compliant to the PEAR coding standards.

After you have finished adding/changing the code test it: we will not accept code that has not been carefully tested. When you are absolutely sure the new code does not introduce bugs, create a unified .diff file which contains your patch.

```
$> svn diff > patch.diff
```

Next step is to submit the patch. Send a mail to `znf-devel@lists.sourceforge.net`. The subject of the mail should be prefixed with "[Patch]" to make it clear you are submitting a patch. Also include a verbose explanation of what the patch does. Do not forget to attach the `.diff` file to the mail.

If you think that you have found a bug in ZNF, please take care that you are using the latest version of ZNF and that your system does meet the requirements. If the bug still persists do not hesitate to fill out a bug report sending a mail to `znf-devel@lists.sourceforge.net`. The subject of the mail should be prefixed with "[Bug]"

to make it clear you are submitting a bug. Also include a verbose explanation of the bug.

Good documentation is essential for users to fully understand any software. Translating documentation is another important task, additional languages are welcome. Help us to improve the internationalization of ZNF sending a mail to `znf-devel@-lists.sourceforge.net`. The subject of the mail should be prefixed with "[Translation]" to make it clear you are submitting a translation.

Chapter 7

FAQ

How does ZNF performs considering the absence of an application server?

Someone could think that ZNF is extremely slow because of the absence of an application server like in the J2EE architecture. This is wrong. We made a chaching mechanism that, at the first request, parses and loads the configurations in associative arrays and serializes them to the filesystem. For each successive request, if the XML configuration files are left untouched, the framework loads and works only with these arrays instead of XML trees, making it extremely fast compared to other solutions.

Is ZNF the best choice for every project?

Not. If you need to write a very simple application, with a handful of pages, then you might consider a Model 1 solution. But, if you are writing a more complicated application, with dozens of pages, that need to be maintained over time, then ZNF can help.

Is it mandatory to use all ZNF classes to develop an application?

Not. For the controller layer it is recommended to extend ZNF controller classes, for the model and view layer ZNF offers helper classes, you can use them or continue using your preferred technologies.

Chapter 8

Credits

Project managers and main developers:

- Alessandro Rossini http://www.alessandrorossini.org
- Graziano Liberati http://www.liberati.org

Main contributors:

- Tomasz Kuter
- Denis A. Konovalyenko

Contributors:

- Guéric Folliot
- Valentin David
- Markus Wigge
- Christian Kassab
- Emad B.

For questions related to the framework (installation problems, bug reports, feature requests...) please refer to our mailing lists, do not mail the authors directly

- General discussions mailing list: znf-general@lists.sourceforge.net
- Developer's mailing list: znf-devel@lists.sourceforge.net

Appendix A

GNU/LGPL License

GNU LESSER GENERAL PUBLIC LICENSE
Version 2.1, February 1999

[This is the first released version of the Lesser GPL. It also counts as the successor of the GNU Library Public License, version 2, hence the version number 2.1.]

Preamble

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When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the “Lesser” General Public License because it does Less to protect the user’s freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users’ freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

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d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

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That's all there is to it!

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