Typo Content Management System Architecture Documentation

Nicholas Chen

nchen@uiuc.edu

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Chapter 1

Introduction

This document is a architectural documentation of the Typo Content Management System as part of the project for CS527: Advanced Topics in Software Engineering at the University of Illinois at Urbana-Champaign.

Usually when we think about documentation, we envision a form of reference that we can use look up the API and function definitions and how to use those functions. While that form of documentation is certainly useful it is not what this document is trying to accomplish. Instead, this document serves as an architectural documentation. An architectural documentation is *different* from the usual document because it captures the components of the system and attempts to describe the relations between those components. From those relationships, we try to infer the design rational behind that architecture.

Garlan and Perry gives a practical definition of what software architecture is:

> The structure of the components of a program/system, their interrelationships, and principles and guidelines governing their design and evolution over time.

Every system out there has its own architecture. This architecture might not be obvious or it might just be a large *ball of mud*. Nonetheless, a big ball of mud is also a form of architecture — perhaps the most common. Therefore, Typo itself has its own architecture that needs to be discovered and distilled. That is our goal in this document.

Because Typo itself is constantly evolving[1]— the current stable version is 4.03 — any detailed documentation will soon become obsolete and worthless. Instead, this document presents an abstract or conceptual model for Typo. This level of architecture is concerned with the large-scale subsystems within Typo itself and how they interact. This model is most useful for entry-level developers who are interested in modifying the Typo functionalities.

We believe that concrete examples are the best way to illustrate important concepts. Thus this document will make use of screenshots and code excerpts to illustrate a concept that we are trying to make. Whenever possible, references to the files in the Typo system or external sites that illustrate certain concepts better will be provided. Thus, this documentation also serves as a *pointer* for learning the more advanced features of Rails and Typo.

[1]The next version of Typo will support the RESTful features in Ruby on Rails 1.2 and reduce reliance on web services

All examples are tested on Rails 1.1.6 and Typo 4.03 running on the webbrick server interfacing with a MySQL database[2].

Since Typo is built on the Ruby on Rails framework (or just Rails), we will assume that the reader is familiar with it. The reader should be comfortable with the basic modules in Rails: `Active Record`, `Action Controller` and `Action View`. Detailed and up-to-date information on Rails can be found at Ruby on Rails official site.

This documentation is written loosely following the style advocated by [2] but with a more pragmatic style of writing to make this work accessible to more readers.

[2]The easier way of running Typo is to install it as a ruby gem and then use the Mongrel server and interface it with the SQLite3 database. However this method still has some bugs so we are sticking with the conventional way of installing and running Typo.

Chapter 2

Typo Documentation Roadmap

2.1 Overview of Documentation

There are three main chapters for this document. Each section examines a particular architectural viewtype. A viewtype describes the architecture of a system from a particular perspective. Different architectural viewtypes give us different perspective on how Typo works. Each viewtype has its own strengths and weaknesses. By presenting three different viewtypes, we get a more comprehensive understanding of the architecture behind Typo.

Each viewtype is accompanied by one or more views. Whenever possible, we will describe the view using standard notations such as UML. Each view is accompanied by a textual description.

Module view Shows the different modules in Typo, their functionalities and their relations with one another.

Connector and Connection view Shows how various components are interact at run time.

Allocation view Shows how the Typo directory is organized and where the relevant files reside.

Instead of having a separate chapter as suggested in [2] dedicated to describing the relations between the three views, each chapter will include enough description to tie it to the other two chapters.

Our main stakeholders are Rails developers and web designers. Therefore this documentation caters to them and assumes background knowledge in Rails.

Chapter 3

Typo Overview

3.1 Background

Typo is a free, open source blogging engine written using the Ruby on Rails framework. Typo 4.0.3 was released on August 17, 2006 and this documentation will focus on that version. Typo should not be confused with Typo3 which is another content management system written in PHP and uses the MySQL database. To prevent confusion with Typo3, the release number for Typo jumped from version 2 to version 4.

Typo offers the following features[1]:

- Uses caching. Typo only creates the served files when needed, and serves static copies to the readers.
- Single level reader comments.
- Spam protection, customizable blacklists and Akismet[2] support.
- Textile, Markdown, and SmartyPants support, plus you can create your own text filters
- Ping and TrackBack.
- Categories and tags for articles.
- Ta-Da List, del.icio.us, Flickr, 43 Things, and Upcoming.org syndication.
- Ajax support for adding comments and articles.
- Full text search with live preview.
- RSS2 and Atom 1.0 syndication feeds as well as feeds for comments and trackbacks.
- Supported databases: MySQL, SQLite, and PostgreSQL.
- Simple URL format for all of the permalinks.

[1] This list is modified from the one on Wikipedia

[2] The Akismet web service maintains a repository of comments and trackbacks that come from different sites and uses that information to detect spam. When a comment or trackback comes to our site, it can be optionally forwarded to Akismet to flag it as spam or not.

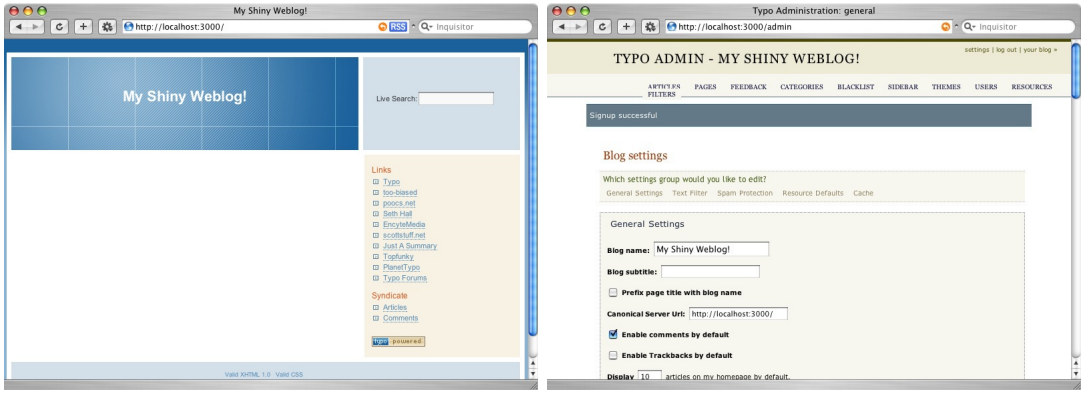
- Web based administration and posting interface, plus support for all 3 major external client API's (Blogger, MetaWeblog and MovableType Extensions).
- Migration scripts from MovableType 3.x, Textpattern 1.x, WordPress 1.5x-2.0 as well as plain RSS.

3.2 Typo look and feel

By default, Typo comes with the *Azure* theme installed. This is what it looks like. The look and feel of our weblog can be easily customized using themes. The ability to create themes is a useful feature for web designers and will be discussed in 4.6.

Figure 3.1 Two different views for Typo: the public view and the administrative view

(a) The default weblog interface with no posts yet **(b)** The administrative view for Typo



3.3 Resources for Typo

For the past few weeks, the official Typo website has been down due to excessive spam. In the mean time, most of the communication and development has moved over to the forums and mailing list.

The current version of Typo can be checked out from the Subversion repository at leetsoft.com. Instructions for installing Typo can be found from the README in the distribution or from the typo forums.

Chapter 4

Typo Module Viewtype

4.1 Model View Controller in Typo

Rails is a framework for developing web applications according to the Model-View-Controller pattern. This pattern maintains a clean separation between the business logic and display logic. Making a conscious effort to preserve this separation leads to code that is easier to maintain. Because the business logic is not tied down to the user interface, either of them can modified without affecting the other. Model-View-Controller is an example of the Layered Architecture pattern advocated in Evans in [3] for creating a rich domain model for an application.

Typo takes advantage of those features and has well-partitioned layers. In the following sections, we describe each layer in isolation. In 5 we shall see how these parts interact.

4.2 Models in Typo

Models in Rails are subclasses of the `ActiveRecord` class. `ActiveRecord` wraps a row in a database table, encapsulates the database access and adds domain logic on that data. `ActiveRecord` is inspired by a similarly named pattern from [4].

In Rails, the default naming convention for connecting models and database tables is based on pluralization. The database table names are always the pluralized form of the class name. For instance, if we have an `ActiveRecord` class called `Post` then the corresponding table would be called `Posts`. To ensure that common cases of pluralization works, Rails has a fairly complete set of rules for pluralization in its `ActiveSupport` module. Rails is able to pluralize words such as sheep (sheep) and octopus (octopi).

This tight coupling between the table names and class names has its advantages and disadvantages. It is usually trivial to find the corresponding table given the class name and vice versa. This can help in debugging. However, this tight coupling also makes it harder to refactor the database and the class separately. The developer has to have control over both the class and the database. While this is not a problem in smaller development teams, for larger projects sometimes a separate database administrator is in-charge of the database. Both developer and database administrator would have to work closely to ensure that the table and class are in sync.

To alleviate this tight coupling, Rails allows `ActiveRecord` classes to configure the name of the corresponding table. This is done using the `set_table_name` method. `set_table_name` takes a string that is the name of the table. This is a useful feature for dealing with legacy tables.

A diagram[1] of all the classes that have corresponding database tables is shown in Figure 4.1. A standalone version of the diagram is available from here.

The classes recorded in the Figure 4.1 have important information that need to be persisted to the database. There are other classes in **app/models** but since they do not have a corresponding table, they have no persistent values. These other classes provide notification functionalities. For instance, when a comment or a trackback has been added, a e-mail or jabber notification can be sent to the author of that article.

The six main classes of Typo are `Content`, `Article`, `Page`, `Feedback`, `Comment` and `Trackback`. The relationship among these classes are shown in Figure 4.2. Together, these classes implement the main functionality that allows Typo to function as a content management system.

Even though there is a hierarchy between these six classes, it is not immediately obvious from Figure 4.1. Class inheritance cannot be directly represented in a database. Instead certain patterns have to be implemented to *simulate* this effect. Rails offers the Single Table Inheritance pattern for representing class hierarchies. Single Table Inheritance represents an inheritance hierarchy of classes as a single table that has columns for all the fields of the various classes. The type of a class is differentiated by the `type` string in the database table. Single Table Inheritance and other patterns for simulating inheritance in databases can be found in [4].

All objects of type `Content` have different states associated with them. They can be *new*, *draft*, *published*, etc. For a list of possible states that `Content` objects can assume, refer to **app/models/content_state** This is what Typo uses to filter out spam and post notifications when the article changes state (from unpublished to just published) The roles of the concrete classes are described below.

Article An article is the main type of content in Typo. Articles can have comments and trackbacks. Articles can also be scheduled for immediate posting or future posting at a preset time. Articles can have individual RSS feeds associated with them.

Page A page is a simplified version of an article. A page does not have comments or trackbacks associated with it. Pages are meant to be static contents with semi-hidden URLs. There is no way to navigate to a page without knowing its exact URL or using the admin interface. For a discussion on possible uses of pages in Typo, please refer to this thread on the mailing list.

Comment A comment is associated with an article and is left by visitors to that article. Comments contain a visitor's name, message and optionally his or her e-mail and web site. At the moment, Typo only supports single level comments.

Trackback Trackbacks are sent when another site quotes information from our site. It is a type of ping that notifies the author of the article that someone else has used the information from his or her post on a different site. Each article in Typo has a special trackback URI for this. On the other hand, Typo automatically sends trackbacks to *other* sites if our article contains references to those sites. Before an article is published, Typo

The functionalities of other notable classes are described below.

[1] This diagram was generated with the help of the `visualizemodels` plugin for Rails. The plugin goes through the classes that have corresponding tables in the database and generates a graph of their relations.

Figure 4.1 Models in Typo

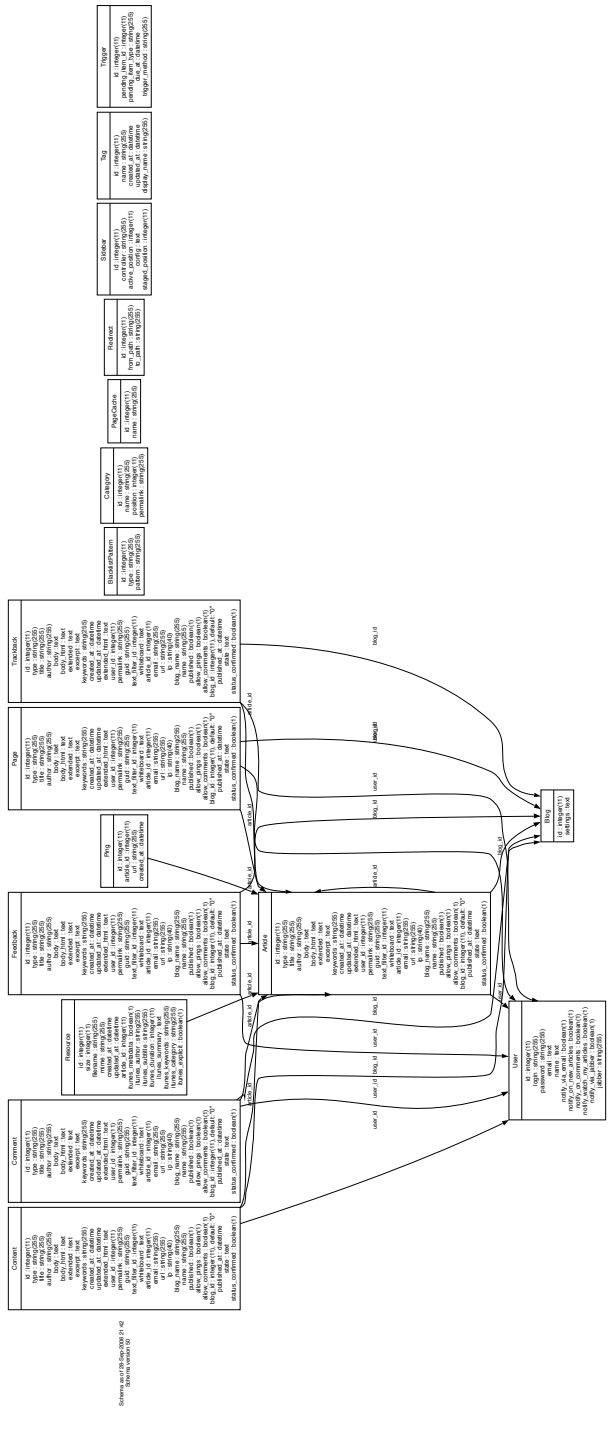
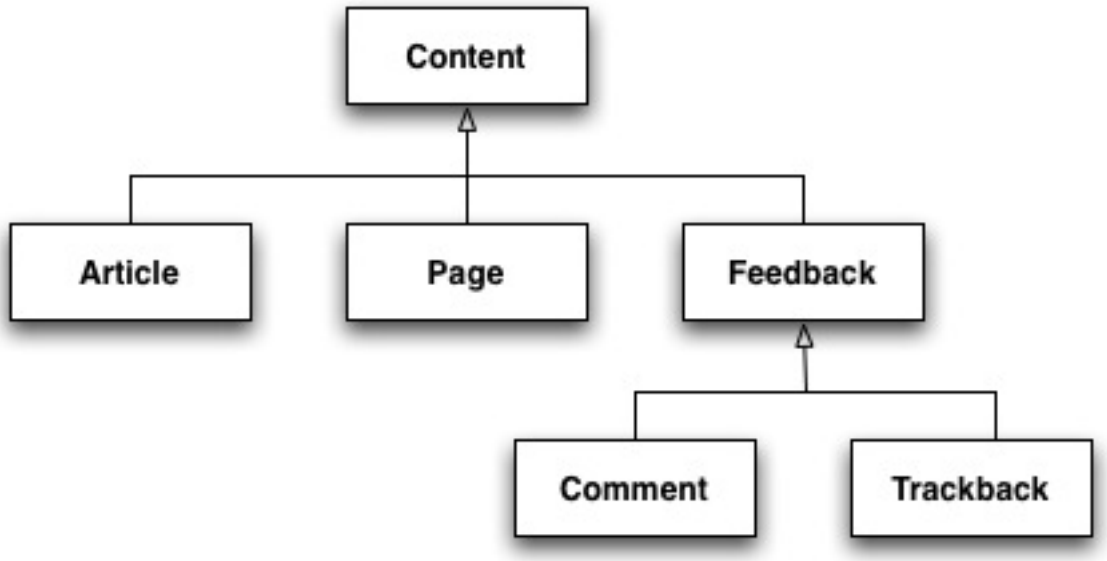


Figure 4.2 Class diagram for main Typo models **app/models**



BlacklistPattern Stores a string or regular expression that is used to filter out spam.

Blog Stores the settings of the blog as serialized YAML in the database using the `serialize` method of `ActiveRecord`. The settings are modified from the admin page shown in Figure 3.0b.

Category Each article can have zero or more categories associated with it. Categories can be set via the web service API (see 4.5).

PageCache Typo uses its own cache system instead of relying on the default Rails implementation. This implementation is more conservative in sweeping the cache and will not invalidate all the cache when only superficial changes have occured. For a more detailed description of the rationale behind this, refer to this post by a Typo developer.

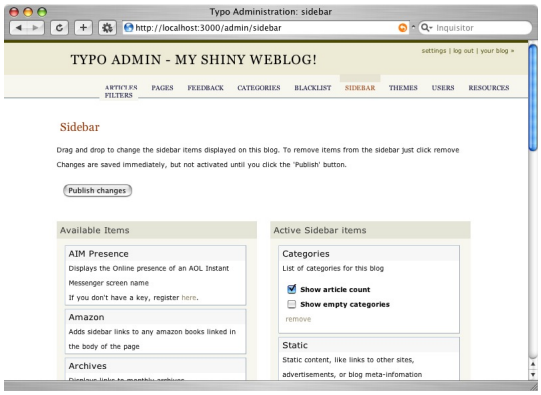
Ping Typo sends out pings when new articles are posted to external websites that keep track of blogs such as Technorati and Blo.gs.

Redirect Stores the old and new URL and redirects the user to the new page using HTTP status 301 when a request comes for the old URL.

Resource A resource is a file associated with each article. This file (usually an podcast) is then sent as an enclosure in the RSS feed. The file is not stored in the database, only the metadata about the file. The file itself is stored in **public/files**

Sidebar The `Sidebar` class keeps track of the sidebars that are activated and their positions. Sidebars can be found on the right hand side of the page in Figure 3.0a. The interface for modifying sidebar settings is done through the admin interface shown in Figure 4.3. For more information on sidebars, refer to 4.6.

Figure 4.3 Typo sidebar setting



Tag Each article can have zero or more tags associated with it. Tags can only be set through the web interface of Typo when editing an article.

Trigger When an event such as future posting has been schedule, it is recorded in this table.

User Stores the information for each author. Typo weblogs can have multiple authors.

When Typo needs to be upgraded, migration scripts are provided to migrate the database schemas. These migration scripts can be found in **db/migrate**. The data from the previous version of Typo is preserved when the migration scripts are run.

4.3 Controllers in Typo

Controllers in Rails are subclass of `ApplicationController`. Incidentally, Application Controller is the name of a pattern in [4]. However, the role of `ApplicationController` is more similar to the Page Controller pattern — also defined in [4]. This discrepancy might lead to some confusion so it is best to mention this.

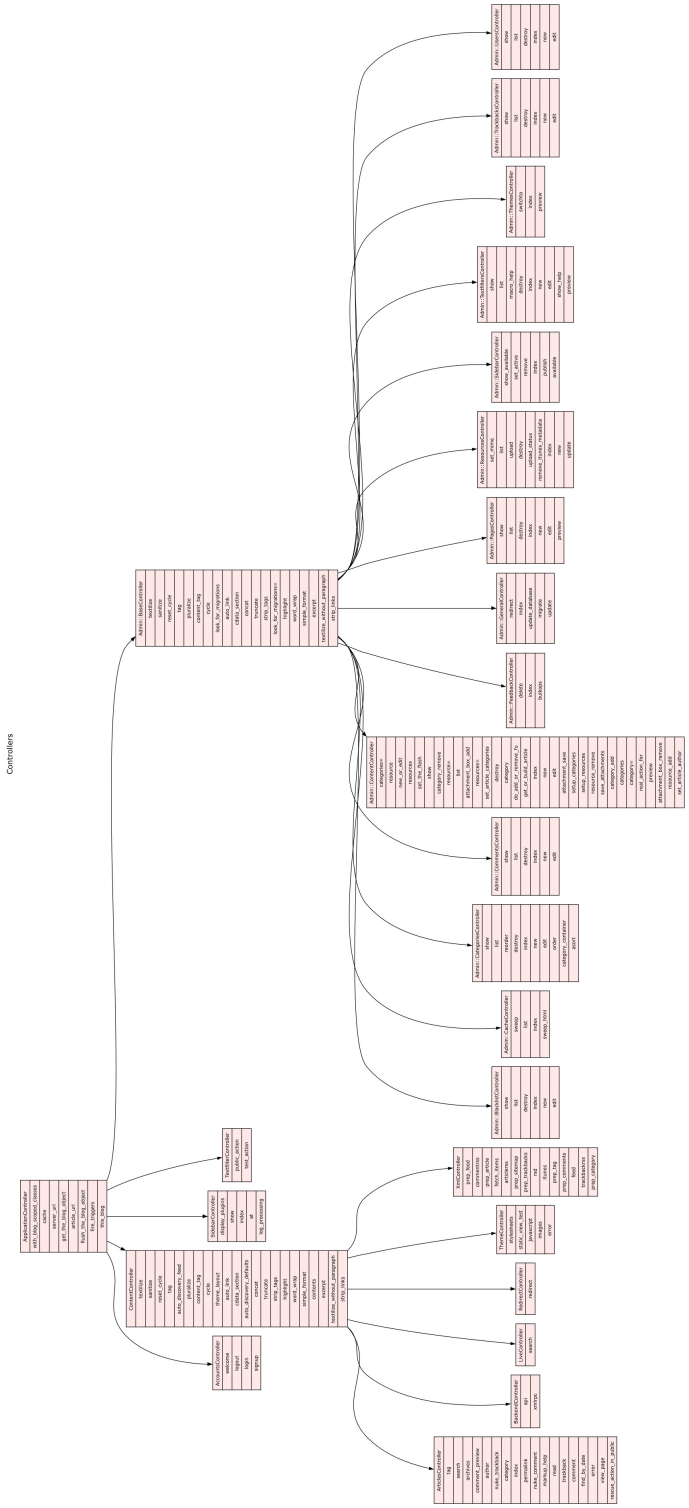
Controllers are invoked when a HTTP request comes. The exact controller is determined via a naming convention. An example incoming request could be of the form `http://www.yourdomain.com/⟨my_controller⟩/⟨my_action⟩/⟨id⟩`. The file <my_controller>_controller.rb handles the request and calls the method <my_action> which must be a public method or an exception is raised.

By default, a controller is only able to access a model that has the *same* name as it. For example, `BaseController` is supposed to access a model called Base which is a subclass of `ActiveRecord`. For a controller to access other models, it needs to declare dependency using the method `model` and pass the names of the models that it uses (separated by commas): `model :model1, :model2`.

A diagram[2] of all the controllers in Typo is shown in Figure 4.4. The class name is shown as the first row of each rectangular box. The subsequent rows show the names of the methods (public, protected and private) that each class has. The arrows point from parent class to subclass. A standalone version of the diagram is available from here.

[2]This diagram was generated with the help of the `Rails Application Visualizer` plugin for Rails.

Figure 4.4 Class diagram for Typo controllers **app/controllers**



Controllers in Typo

As can be seen from Figure 4.4, the two most important controllers are `ContentController` and `Admin::BaseController`. The name `Admin::BaseController` means that the `BaseController` is located under a directory called **admin** i.e. **app/controllers/admin/base_controller.rb**. This style of grouping controllers into modules is advocated in [6].

`ContentController` and `Admin::BaseController` separate the types of controllers into two groups: the public controllers (take care of requests for public pages) and the administrative controllers (take care of requests for private administrative pages).

Authentication is required before accessing the administrative pages. Login and authentication is taken care of by the `LoginSystem` module defined in **lib/login_system.rb**. Rails support before, after and around filters. A filter is akin to an *advice* in Aspect-Oriented Programming. The before filter gets run before each method call; the after filter gets run after each method call, and the around filter gets run before and after each method call. We can restrict the methods that get filtered using extra parameters. On line 3 in Figure 4.5, we run the `login_required` method before each method **except** the login and signup methods (if they exist). Filters makes it really convenient to do authentication and verifications.

Figure 4.5 Routing rules in Typo (**app/controllers/admin/base_controller.rb**)

```
1 ...
2
3 before_filter :login_required, :except => [ :login, :signup ]
4 before_filter :look_for_needed_db_updates,
5               :except => [:login, :signup, :update_database, :migrate]
6 ...
```

Most controllers enable access to the create, read, update and delete (CRUD) of the underlying models. Models create the corresponding objects from the models and relay those objects to the view for displaying. For more information on this, refer to 5.

The most convenient way of determining what a controller does is to check the URL that invokes that controller. For instance, in the administrative controllers, there is a separate controller for each page: `PageController`, `SidebarController`, etc.

However, just following the normal Rails conventions for handling HTTP requests based on the URL is not sufficient. Typo has support for *pretty* URLs. For instance, a request for all articles written on a particular month comes in the form `http://www.yourdomain.com/articles/2006/11`. If we were to just follow the convention, then we would require a controller for each year (2006 in this case) and a public method for each month!

Instead Rails has a practical way to do this: by specifying the routes as rules in **app/config/routes.rb**. The excerpt shown in Figure 4.6 shows how one controller can handle different URLs. Using regular expressions, the URL is parsed into year, month and day. These values are then passed to `find_by_date` method in `ArticlesController`. So there is only the need for one controller and one method in that controller to handle the different URLs.

Most of the functions in the controllers should be short. The main purpose of a controller is to intercept a HTTP request and delegate the responsibility to a model. It then collects the return value and passes this value to the view.

Figure 4.6 Routing rules in Typo (**app/config/routes.rb**)

```
...

map.connect 'articles/:year/:month/:day',
  :controller => 'articles', :action => 'find_by_date',
  :year => /\d{4}/, :month => /\d{1,2}/, :day => /\d{1,2}/
map.connect 'articles/:year/:month',
  :controller => 'articles', :action => 'find_by_date',
  :year => /\d{4}/, :month => /\d{1,2}/
map.connect 'articles/:year',
  :controller => 'articles', :action => 'find_by_date',
  :year => /\d{4}/

...
```

Figure 4.7 Routing rules in Typo (**app/controllers/articles_controller.rb**)

```
...

def find_by_date
  @articles = this_blog.published_articles.find_all_by_date(
                params[:year], params[:month], params[:day])
  render_paginated_index
end

...
```

4.4 Views in Typos

For displaying pages, Rails relies on the `ActionView` module. `ActionView` is an implementation of the Template View pattern in [4]. Template View is a pattern for rendering information into HTML by embedding markers in an HTML page.

In 4.3 we dissected how a URL was parsed to call the appropriate action in a controller. In our example, `http://www.yourdomain.com/`⟨`my_controller`⟩`/`⟨`my_action`⟩`/`⟨`id`⟩ would invoke <my_controller>_controller.rb and call the method <my_action>. If there is a view associated with that method, then it will be rendered. By default, the view is called <my_action>.rhtml and is found in **app/views/<my_controller>**

Rails supports two kinds of templates natively

- `rxml` templates are used to generate XML responses. This is useful for syndication and web services.
- `rhtml` templates are used to generate HTML that can viewed in web browsers. Ruby code is embedded within the HTML using <%= ... > and <% ... > markers. The results of the

former are displayed in the HTMl whereas the results of the latter are suppressed.

Figure 4.8 rxml template in Typo (**app/views/cache/list.rhtml**)

```
<% @page_heading = 'Cache' %>

<% content_for('tasks') do %>
  <%= task_sweep 'Empty Page Cache' %>
<% end %>
<div id="users">
  <p>There are <%= @page_cache_size %> entries in the page cache</p>
</div>
```

Figure 4.9 rhtml template in Typo (**app/views/xml/_rss20_item_trackback.rxml**)

```
xm.item do
  xm.title "\"#{item.title}\" from #{item.blog_name} (#{item.article.title})"
  xm.description item.excerpt
  xm.pubDate pub_date(item.created_at)
  xm.guid "urn:uuid:#{item.guid}", "isPermaLink" => "false"
  xm.link item.url
end
```

To avoid duplication, similar code in the views can be abstracted into layouts. Layouts determine the overall look and feel of the page. This is useful for creating consistent headers and footers throughout a website. Layouts are located in **app/views/layouts**.

Sometimes there is some logic that is needed to display the page. It could be something as simple as alternating between table row colors or deciding which graphics to switch between pages. These kinds of logic do not have anything to do with the underlying business logic. However, just embedding the logic into the views make it hard to read and debug. Instead, such logic should be abstracted into their own helper methods. Views can then easily call these helper methods and reduce clutter in the presentation code. Typo uses helper methods extensively; they can be found in **app/helpers**.

4.5 Web Services in Typo

Support for web services blogging API is also included in Typo. Currently the only uses for web services is to enable desktop such as Ecto, MarsEdit and Firefox with the Performancing plugin to post new posts of edit current posts without using the Typo web interface. Web services are being being deprecated in favor of REST and future versions of Typo are likely to drop support for Web Services.

Typo currently supports three types of blogging web services standards: Blogger, MetaWeblog and MovableType. Only the minimum features of each standard has been implemented in Typo. The implementation of the MovableType API has the most features among the three.

A SOAP or XML-RPC request for `http://www.yourdomain.com/backend/xmlrpc` is handled by the `Backend` controller. Layered dispatching allows the same controller to be used for the three different blogging standards. This setting is enabled on line 6 in Figure 4.10.

Figure 4.10 The Web Services Controller in Typo (**app/controllers/backend_controller.rb**)

```
1
2  class BackendController < ContentController
3    cache_sweeper :blog_sweeper
4    session :off
5
6    web_service_dispatching_mode :layered
7    web_service_exception_reporting false
8
9    web_service(:metaWeblog)  { MetaWeblogService.new(self) }
10   web_service(:mt)          { MovableTypeService.new(self) }
11   web_service(:blogger)     { BloggerService.new(self) }
12
13   alias xmlrpc api
14 end
```

Depending on the type of blogging standard that is requested, a new `TypoWebService` object is constructed in lines 9 – 11 in Figure 4.10. `MetaWeblogService`, `MovableTypeService` and `BloggerService` are all subclasses of `TypoWebService` as shown in Figure 4.11. Each is a part of the Strategy Pattern from [5] for handling different blogging standards. The authentication method is defined in the `TypoWebService` base class and shared among its subclasses. The actual authentication is delegated to the `User` class.

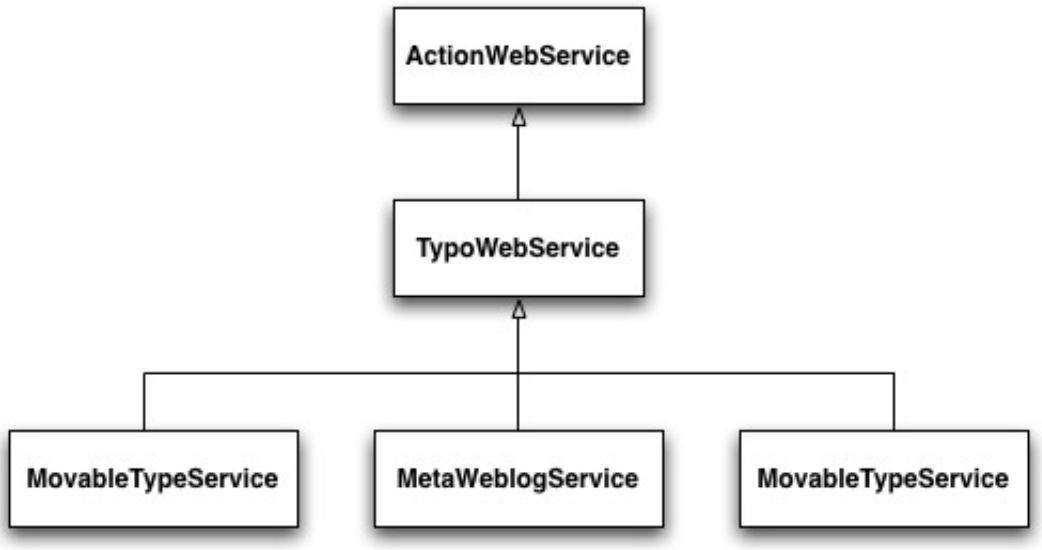
The appropriate `TypoWebService` is constructed and it extracts the information the SOAP or XML-RPC and delegates the calls to the right model. The model then takes care of the request and updates the database as necessary. For more information on how web services work in Rails, refer to ActionWebService: Web services on Rails.

4.6 Other modules

Typo has some extension and customization points that can be added without modifying the main code. These extension points have attracted various contributions from other developers. In fact, the success of Typo is mostly due to its extensibility. These abstractions mean that the developers can easily add new features to Typo without changing the back-end substantially. There are three main points for customization in Typo:

Sidebars Sidebars are extensions that users can write to extend the contents of Typo. They have their own controller and views for displaying tiny bits of information. Some sidebars are updated automatically and display information from other sites. Typo already comes with support for displaying different kinds of information in the sidebars. For instance, there are sidebars to include information from 43things, flickr and del.icio.us. Details on how to create

Figure 4.11 Class diagram for Typo Web Services **app/api**



a sidebar can be found in **components/sidebar/README**. A tutorial on creating your own sidebar can be found here.

Themes Themes are user contributed interfaces for Typo. Themes usually do not need to contain their own logic; they might call basic code to include some other contents though. A minimalist theme has been provided in **themes/scribbish**. A tutorial on creating your own themes can be found here.

Filters Filters are text transformations that are applied to articles. There are three kinds of filters: markup filters (convert text into HTML), macro filters(expand embedded tags into full HTML) and post-processing filters (cleans up HTML). More information on filters can be found here.

Chapter 5

Typo Component-and-Connector Viewtype

5.1 Rails default HTTP request handling

In 4.3 we discussed the default HTTP request handling performed by Rails. We also discussed how we can overwrite the default routing by modifying **app/config/routes.rb**. However, for Typo, the requests are usually not that simple. This is because there are hierarchies between different classes. Therefore, methods in the parent class need to be invoked before a request to view an article on our blog can be handled. The situation gets more complicated because filters declared in the parent classes must run as well.

In the following sections we look at how different requests for a page is handled in Typo. We will see the runtime interactions between different components. Fortunately, we have already seen the part-of relationship between classes in 4. This relationship will come in useful when we determine the filters that need to be run on the controller.

To keep things simple, we will assume that everything runs in one thread and that we do not have to worry about interprocess communications. We will also assume that we are not caching the results from any previous calls[1]. The main point here is to see the objects that are involved with each HTTP request.

5.2 Request for public pages

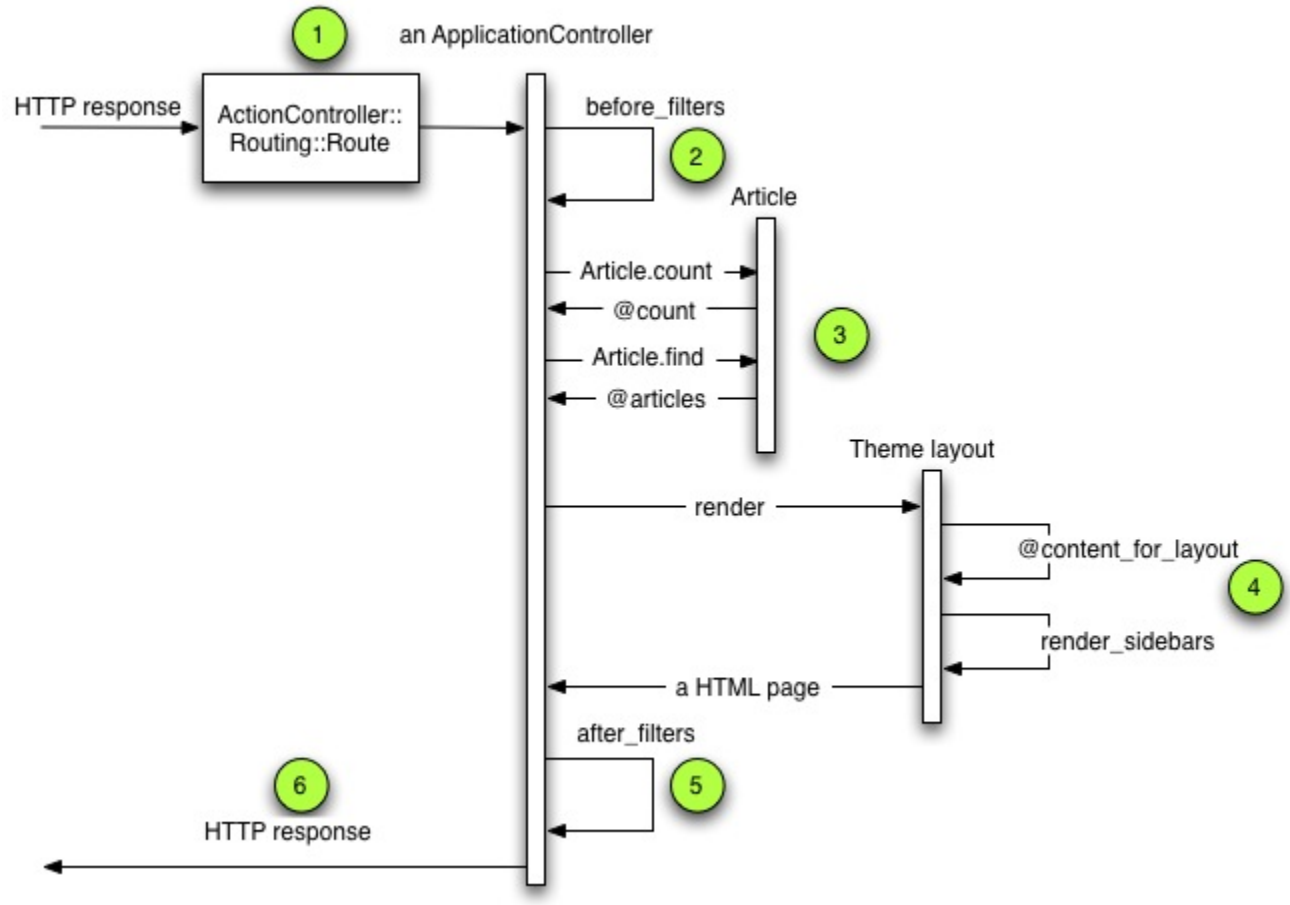
Assume that a request comes for `http://www.yourdomain.com/`. A *pseudo* sequence diagram is shown in Figure 5.1. There are six main parts when handling a request for the index of the site as can be seen in Figure 5.1.

1. The URL is parse following the mapping rules in **app/config/routes.rb**. In our case, a request for `http://www.yourdomain.com/` will invoke the `index` method on a new instance of `ApplicationController` which is found in **app/controllers/articles_controller.rb**.

2. Referring to Figure 4.4 we notice that `ApplicationController` is a subclass of `ContentController` which itself is a subclass of `ApplicaionController`. Both the parent and *grandparent* classes

[1] In fact caching is only turned on by default in production mode and turned off in development mode. So our assumption that we do not need to check the cache is valid

Figure 5.1 A *pseudo* sequence diagram of article request



define filters: there are before_filters, after_filters and around_filters. Filters are inherited by the descendant classes and must be invoked before the the `index` method[2]. The following methods are invoked before the `index` method:

`get_the_blog_post` Returns the current blog and its settings[3].

`fire_triggers` Removes any pending triggers (see section 4.2)that have expired and returns true.

`auto_discovery_defaults` Determines and caches the url for the syndication feeds for the current page[4].

`Blog.filter` Apparently this filter is never called since there is no `filter` class method in Blog.

3. After the filters have been invoked, the `ApplicationController` objects calls the `count` and `find` class methods on `Article`. `Article` is an ActiveRecord class that maps to the database. This `ApplicationController` object finds the all the posts and keeps a count of them. The count is needed for pagination.

4. Our `ApplicationController` object then chooses the layout based on the current theme and sends it to the page template for rendering. The most recent posts are displayed and the sidebars are rendered. All the work for rendering the contents and sidebars is done in **app/views/helpers/articles_helpers.rb**

5. Before the `index` method finally returns, the after_filters and around_filters are applied.

   `flush_the_blog_object` Sets the current blog object to `nil` and returns true.

   `Blog.filter` Apparently this filter is never called since there is no `filter` class method in Blog.

6. The resulting HTML page that has been populated with all the information is finally returned as a HTTP response.

The rest of the requests for public pages follow a similar route. The only parts that differ would be the controller that gets invoked based on the URL scheme.

5.3 Requests for administrative pages

Assume that a request comes for `http://www.yourdomain.com/admin`. Here are the

[2]In addition, `verify` methods may also be invoked before the actual `index` method. `Verify` methods are similar to filters except that they are used mostly for assertions that should not be false

[3]At the moment, there is only **one** blog object since Typo cannot support multiple blogs in the same installation. This might change in the future.

[4]The rationale behind the caching is discussed here. Enabling simple caching speeds up rendering time considerably since the filters get invoked on *all* controllers because they are defined on a parent class.

5.4 Discussion on Typo connection-and-components

As the two examples illustrate, the handling of different requests to our weblog can be pretty complicated. In fact, this is the most complex part of the Typo installation.

Fortunately, there are tests written to verify that the controllers are indeed doing the right thing. These tests help new developers check that they did not break any of the underlying features.

Chapter 6

Typo Allocation Viewtype

6.1 Typo Directory System

Because Typo is built on Rails, it follows the conventions of that framework. These conventions help minimize the configuration files that are needed to get Rails to behave properly. Following these conventions is part of the *convention over configuration* [1] mantra.

Rails uses a standard directory structure for organizing its files. It is important that applications using Rails obey these conventions since Rails uses the directory structure to look for the necessary files; misplaced or missing files will cause the framework to abort its operations.

The directory structure for Typo is shown in Figure 6.1.

What follows is a description of the files and subdirectories that go into each directory.

app Model, View and Controller files go in subdirectories of app.

bin Contains the Typo installer.[1]

components Contains reusable components such as plugins and sidebars. Components allow the sharing of code between different views.

config Contains configuration files. Connection parameters to databases and URL routing information can be found in the directory.

db Contains the schema for various database implementation such as MySQL, PostgreSQL and Sqlite. Migration scripts for upgrading to a different version of Typo also goes in this directory. There are also scripts for switching from a different weblog system to Typo. Currently scripts are available for

doc Documentation directory. Currently only contains an installation guide.

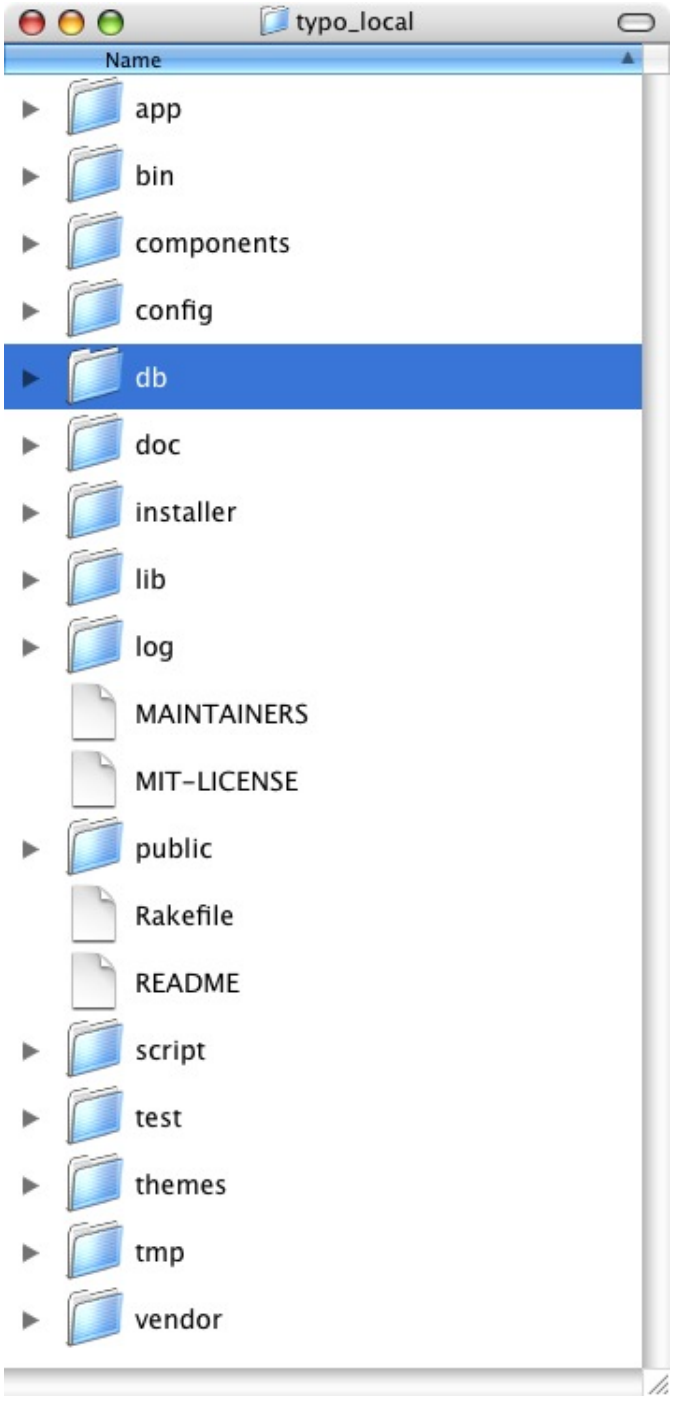
installer Contains information for installing Typo using ruby gem.[2] Templates for setting up various web servers are also included.

lib Contains shared code written by Typo developers.

[1] Uses the rails-installer gem to create an installer for Typo. For more information, refer to Rails Application Installer

[2] For more information on how this works refer to Typo Installer

Figure 6.1 Typo Directory Structure



log Contains log files produced by the running Typo in different modes: development, production and test.

maintainer Contains contact information of active developers for Typo.

public Contains the static contents such as html, css, js and image files. This is the *root* directory of your application.

Rakefile Contains tasks for running tests, upgrading databases, etc.

Script Contains utility scripts for benchmarking, debugging, initializing the web server, etc.

test Contains unit tests, functional tests, mocks and fixtures.

themes Contains the themes for changing the look and feel of a weblog.

cachee Contains the cache, sessions and sockets that Typo uses.

vendor Contains reusable code and utilities written by third-party developers. Currently has utilities for formatting blog posts. A full installation of Rails can be included here to freeze the application with a particular version of Rails.

Figure 6.2 Detailed view of the **app** directory

The **app** directory contains the main files that Typo uses.

apis Contains files that implement `Action Web Services` in Rails. This is the back-end needed to support posting from desktop clients. Please refer to 4.1 for a detailed description that each part plays.

controllers Contains the controller for Typo.

helpers Contains the helpers for the views in Typo.

models Contains the models for Typo.

views Contains the .rhtml files for generating the views.

Chapter 7

Conclusion

We have looked at three different viewtypes for Typo. Hopefully, after reading this document, a developer would be more acquainted with Typo and its architectural design.

This document is not a detailed description of Typo (nor does it attempt to fulfill that role). A lot more information can be gleaned from reading the source code.

Interested readers should sign up for the mailing list to monitor the future development of Typo.

Bibliography

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