

TinyBlog: Develop your First Web App with Pharo

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About this book

In this book, we will guide you to develop a mini project: a small web application, named TinyBlog, that manages a blog system (see its final state in Figure 1-1). The idea is that a visitor of the web site can read the posts and that the post author can connect to the web site as admin to manage its posts (add, remove and modify existing ones).

TinyBlog is a small pedagogical application that will show you how to define and deploy a web application using Pharo / Seaside / Mongo and frameworks available in Pharo such as NeoJSON.

Our goal is that you will be able to reuse and adapt such an infrastructure to create your own web applications.

1.1 Structure

In the first part called "Core Tutorial", you will develop and deploy, TinyBlog, an application and its administration using Pharo, the Seaside application web server framework as well as some other frameworks such as Voyage and Magritte. Deployment with Mongo DB is optional but it allows you to see that Voyage is an elegant facade to persist your data within Mongo.

In the second part and optional part, we will show you some optional aspects such as data export, use of Mustache or how to expose your application using a REST API.

Presented solutions are sometimes not the best. This is done that way to offer you a room for improvement. Our goal is not to be exhaustive. We present one way to develop TinyBlog nevertheless we invite the reader to read further references such as books or tutorials on Pharo to deepen his expertise and enhance his application.

Finally, to help you to get over possible errors and avoid to get stuck, the last chapter describes how to load the code described in each chapter.

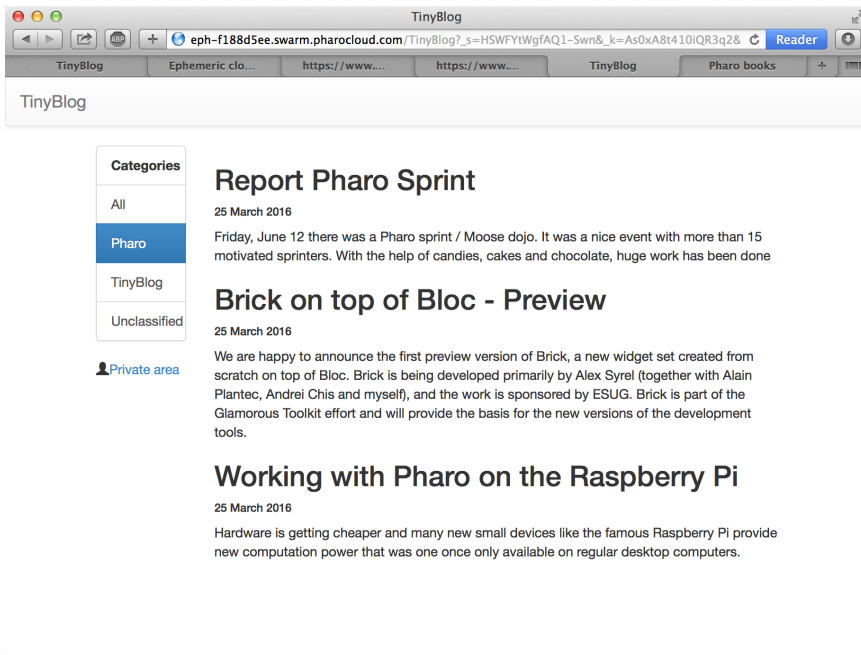


Figure 1-1 The TinyBlog application.

1.2 Pharo Installation

In this tutorial, we suppose that you are using the Pharo MOOC image (it is currently a Pharo 8.0 image) in which many frameworks and web libraries have been loaded: Seaside (component-based web application server), Magritte (an automatic generation report system based on descriptions), Bootstrap (a library to visually tune web applications), Voyage (a framework to save your objects in document databases) and some others.

You can get the Pharo MOOC image using the Pharo Launcher (<http://pharo.org/download>).

1.3 Naming Rules

In the following, we prefix all the class names TB (for TinyBlog). You may:

- either choose another prefix (by example TBM) to be able to load the solution side by side to your own. This way you will be able to compare the two solutions,
- either choose the same prefix to fusion the proposed solutions in your code. The merge tool will help you see the differences and learn from the changes. This solution may be more complex if you implement your own extra functionalities.

1.4 Resources

Pharo has many strong pedagogical resources as well as a super friendly community of users. Here is a list of resources:

- <http://books.pharo.org> proposes books around Pharo. Pharo by Example can help you to discover the language and its libraries. Enterprise Pharo: a Web Perspective presents other aspects useful for web development.
- <http://book.seaside.st> is one of the books on Seaside. It is currently under migration as an open-source book <https://github.com/SquareBracketAssociates/DynamicWebDevelopmentWithSeaside>.
- <http://mooc.pharo.org> proposes an excellent Mooc with more than 90 videos explaining syntactically points as well as object programming key concepts.
- A discord channel where many Pharoers exchange information and help each other is accessible here: <http://www.pharo.org/community>

TinyBlog Application: Core model

In this chapter we will start to develop part of the domain model of TinyBlog. The model is extremely simple: it starts with just a post. In the next chapter we will add a blog containing a list of these posts.

2.1 TBlog Class

Post
visible
date
title
text
category
isVisible
isUnclassified

Figure 2-1 TBlog: a really basic class mostly handling data.

We start with the post representation. It is very simple, as you can see in Figure 2-1. It is defined by the class TBlog:

```
Object subclass: #TBlog
  instanceVariableNames: 'title text date category visible'
  classVariableNames: ''
  package: 'TinyBlog'
```

A blog post is described by 5 instance variables:

Variable	Signification
title	post title
text	post text
date	date of writing
category	name of the category of the post
visible	is the post publicly visible or not?

All of these variables have corresponding accessor methods in the 'accessing' protocol. You can use a refactoring to automatically create all of the following methods:

```
[ TBPoſt >> title
  ^ title
]
[TBPoſt >> title: aString
  title := aString
]
[TBPoſt >> text
  ^ text
]
[TBPoſt >> text: aString
  text := aString
]
[TBPoſt >> date
  ^ date
]
[TBPoſt >> date: aDate
  date := aDate
]
[TBPoſt >> visible
  ^ visible
]
[TBPoſt >> visible: aBoolean
  visible := aBoolean
]
[TBPoſt >> category
  ^ category
]
[TBPoſt >> category: anObject
  category := anObject
]
```

2.2 Post Visibility

We ſhould add methods to make a poſt visible or not and alſo teſt if it is viſible. Thoſe methods are defined in the 'action' protocol.

```
[ TBPoſt >> beVisible
  ſelf visible: true
]
[TBPoſt >> notVisible
  ſelf visible: false
]
```

2.3 Initialization

The `initialize` method (in the 'initialization' protocol) sets the date to the current day and the visibility to false; the user must explicitly make a post visible. This allows them to write a draft post and only publish it when it is finished. By default, a post belongs to the 'Unclassified' category that we define at the class level. This category name is defined on the class-side by the `unclassifiedTag` method.

```
TBPost class >> unclassifiedTag
  ^ 'Unclassified'
```

Pay attention the method `unclassifiedTag` should be defined on the *class-side* of the class `TBPost` (click on the class button to define it). The other methods are defined on the instance-side and will be applied to `TBPost` instances.

```
TBPost >> initialize
  super initialize.
  self category: TBPost unclassifiedTag.
  self date: Date today.
  self notVisible
```

In the solution above, it would be better for the `initialize` method not to hard code the reference to the `TBPost` class. Try to think of a solution. The part 3 in week 6 of the Mooc will help you to understand why it is better to avoid hardcoding class references (See <http://mooc.pharo.org>).

2.4 Posts Creation Methods

On the class-side, we add class methods (i.e. methods that execute on the class object) to make post creation more convenient - usually such methods are grouped under the protocol 'instance creation'.

We define two methods:

```
TBPost class >> title: aTitle text: aText
  ^ self new
    title: aTitle;
    text: aText;
    yourself

TBPost class >> title: aTitle text: aText category: aCategory
  ^ (self title: aTitle text: aText)
    category: aCategory;
    yourself
```

2.5 Creating a Post

Let us create some posts to check the objects that are created. Using the Playground tool, execute the following expression:

```
TBPost
  title: 'Welcome in TinyBlog'
  text: 'TinyBlog is a small blog engine made with Pharo.'
  category: 'TinyBlog'
```

When you inspect the code above (right click and "Inspect it"), you will open an inspector on the newly created object as shown in Figure 2-2.

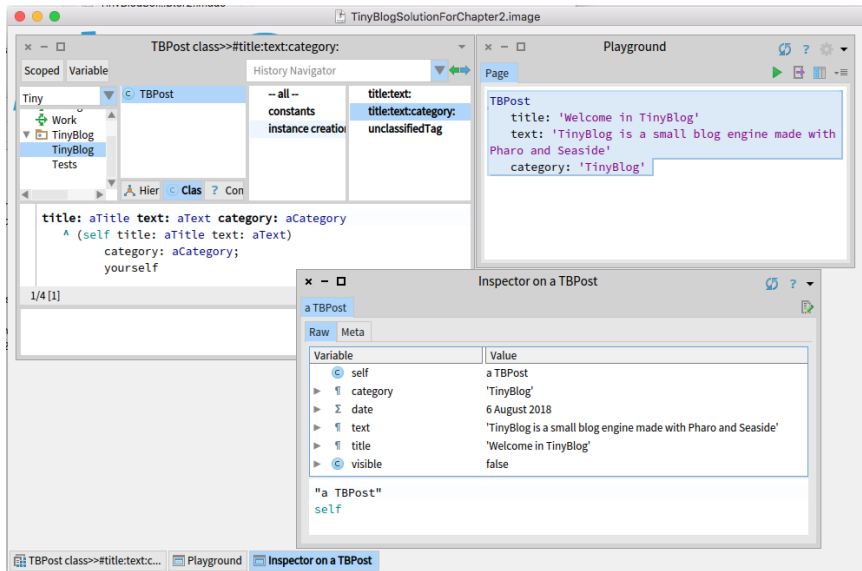


Figure 2-2 Inspector on a TBPost instance.

2.6 Adding Some Unit Tests

Manually looking at objects is not a good way to systematically verify that such objects behave as expected. Even though the model is quite simple we can still define some tests. When doing Test Driven Development we write our tests first, but here we have preferred to define a little class to familiarize ourselves with the IDE first. Let us fix this!

We define the class `TBPostTest` (as subclass of the class `TestCase`):


```
TestCase subclass: #TBPostTest
  instanceVariableNames: ''
  classVariableNames: ''
  package: 'TinyBlog-Tests'
```

Let us define two tests:

```
TBPostTest >> testWithoutCategoryIsUnclassified
```

```
| post |
post := TBPost
  title: 'Welcome to TinyBlog'
  text: 'TinyBlog is a small blog engine made with Pharo.'.
self assert: post title equals: 'Welcome to TinyBlog'.
self assert: post category = TBPost unclassifiedTag
```

```
TBPostTest >> testPostIsCreatedCorrectly
```

```
| post |
post := TBPost
  title: 'Welcome to TinyBlog'
  text: 'TinyBlog is a small blog engine made with Pharo.'.
  category: 'TinyBlog'.
self assert: post title equals: 'Welcome to TinyBlog'.
self assert: post text equals: 'TinyBlog is a small blog engine
made with Pharo.'
```

Your tests should pass.

2.7 Post Queries

In the protocol 'testing', define the following methods that checks whether a post is visible, and whether it is classified or not:

```
TBPost >> isVisible
  ^ self visible
```

```
TBPost >> isUnclassified
  ^ self category = TBPost unclassifiedTag
```

Again, it is not really good practice to hardcode a reference to the class TBPost in a method body. Try to think of a solution.

In addition, let us take the time to update our tests to demonstrate this new behavior:

```
TBPostTest >> testWithoutCategoryIsUnclassified
```

```
| post |
post := TBPost
  title: 'Welcome to TinyBlog'
  text: 'TinyBlog is a small blog engine made with Pharo.'
```

```
self assert: post title equals: 'Welcome to TinyBlog' .  
self assert: post isUnclassified.  
self deny: post isVisible
```

2.8 Conclusion

We have developed the first part of the model (the class `TBPost`) and some tests. We strongly suggest writing some more unit tests to make sure that your model works as expected.

TinyBlog: Extending and Testing the Model

In this chapter we extend the model and add more tests. Note that when you will get fluent in Pharo, you will tend to write first your tests and then execute tests to code in the debugger. We did not do it because coding in the debugger requires more explanation. You can see such a practice in the Mooc video entitled *Coding a Counter in the Debugger* (See <http://mooc.pharo.org>) and read the book *Learning Object-Oriented Programming, Design with TDD in Pharo* (<http://books.pharo.org>).

Before starting, use back the code of the previous chapter or use the information of Chapter ??.

3.1 TBlog class

We develop the class TBlog that contains posts (as shown by Figure 3-1). We define some unit tests.

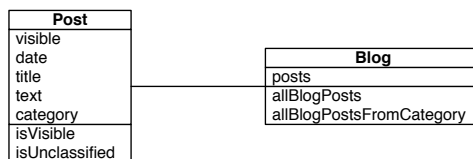


Figure 3-1 TBlog: A simple class containing posts.

Here is its definition:

```
[ Object subclass: #TBBlog
  instanceVariableNames: 'posts'
  classVariableNames: ''
  package: 'TinyBlog'
```

We initialize the `posts` instance variable to an empty collection.

```
[ TBBlog >> initialize
  super initialize.
  posts := OrderedCollection new
```

3.2 Only One Blog Object

In the rest of this project, we assume that we will manage only one blog. Later, you may add the possibility to manage multiple blogs such as one per user of the TinyBlog application. Currently, we use a Singleton design pattern on the `TBBlog` class. However pay attention since this pattern introduces a kind of global variable in your application and brings less modularity to your system. Therefore avoid to make explicit references to the singleton, better use an instance variable whose value first refers to the singleton so that later you can pass another object without being forced to rewrite everything. Do not generalize what we are doing for this class.

Since all the management of a singleton is a class behavior, we define such methods at the class level of `TBBlog`. We define an instance variable at the class level:

```
[ TBBlog class
  instanceVariableNames: 'uniqueInstance'
```

Then we define two methods to manage the singleton.

```
[ TBBlog class >> reset
  uniqueInstance := nil
```

```
[ TBBlog class >> current
  "answer the instance of the TBRepository"
  ^ uniqueInstance ifNil: [ uniqueInstance := self new ]
```

We redefine the class method `initialize` so that when the class is loaded in memory the singleton got reset.

```
[ TBBlog class >> initialize
  self reset
```

3.3 Testing the Model

We now adopt a Test-Driven Development approach i.e., we will write a unit test first and then develop the functionality until the test is green. We will repeat this process for each functionality of the model.

We create unit tests in the `TBBlogTest` class that belongs to the `TinyBlog-Tests` tag. A tag is just a label to sort classes inside a package (See menu item 'Add Tag...'). We use a tag because using two packages will make this project more complex. However, while implementing a real application, it is recommended to have one (or multiple) separate test packages.

```
TestCase subclass: #TBBlogTest
  instanceVariableNames: 'blog post first'
  classVariableNames: ''
  package: 'TinyBlog-Tests'
```

Before each test execution, the `setUp` method initializes the test context (also called test fixture). For example, it erases the blog content, adds one post and creates another temporary post that is not saved.

Pay attention since we will have to modify such behavior in the future else each time we will run the test we will destroy our data. This is an example of the kind of insidious behavior that a singleton introduces.

```
TBBlogTest >> setUp
  blog := TBBlog current.
  blog removeAllPosts.

  first := TBPost title: 'A title' text: 'A text' category: 'First
    Category'.
  blog writeBlogPost: first.

  post := (TBPost title: 'Another title' text: 'Another text'
    category: 'Second Category') beVisible
```

As you may notice, we test different configurations. Posts do not belong to the same category, one is visible and the other is not visible.

At the end of each test, the `tearDown` method is executed and resets the blog.

```
TBBlogTest >> tearDown
  TBBlog reset
```

Here we see one of the limits of using a Singleton. Indeed, if you deploy a blog and then execute the tests, you will lose all posts that have been created because we reset the Blog singleton. We will address this problem in the future.

We will now develop tests first and then implement all functionalities to make them green.

3.4 A First Test

The first test adds a post in the blog and verifies that this post is effectively added.

```
[ TBlogTest >> testAddBlogPost
  blog writeBlogPost: post.
  self assert: blog size equals: 2
```

If you try to execute it, you will notice that this test is not green (does not pass) because we did not define the methods `writeBlogPost:`, `removeAllPosts` and `size`. Let's add them:

```
[ TBlog >> removeAllPosts
  posts := OrderedCollection new

[ TBlog >> writeBlogPost: aPost
  "Add the blog post to the list of posts."
  posts add: aPost

[ TBlog >> size
  ^ posts size
```

The previous test should now pass (i.e. be green).

3.5 Increasing Test Coverage

We should also add tests to cover all functionalities that we introduced.

```
[ TBlogTest >> testSize
  self assert: blog size equals: 1

[ TBlogTest >> testRemoveAllBlogPosts
  blog removeAllPosts.
  self assert: blog size equals: 0
```

3.6 Other Functionalities

We follow the test-driven way of defining methods: First we define a test. Then we verify that this test is failing. Then we define the method under test and finally verify that the test passes.

All Posts

Let's create a test that fails:

```
[ TBlogTest >> testAllBlogPosts
  blog writeBlogPost: post.
  self assert: blog allBlogPosts size equals: 2
```

And the model code that makes it succeed:

```
[ TBlog >> allBlogPosts
  ^ posts
```

Your test should pass.

Visible Posts

We define a new unit test accessing visible blogs:

```
TBBlogTest >> testAllVisibleBlogPosts
  blog writeBlogPost: post.
  self assert: blog allVisibleBlogPosts size equals: 1
```

We add the corresponding method:

```
TBBlog >> allVisibleBlogPosts
  ^ posts select: [ :p | p isVisible ]
```

Verify that the test passes.

All Posts of a Category

The following test verifies that we can access all the posts of a given category. Once defined, we should make sure that the test failed.

```
TBBlogTest >> testAllBlogPostsFromCategory
  self assert: (blog allBlogPostsFromCategory: 'First Category')
  size equals: 1
```

Then we can define the functionality and make sure that our test passes.

```
TBBlog >> allBlogPostsFromCategory: aCategory
  ^ posts select: [ :p | p category = aCategory ]
```

Verify that the test passes.

All visible Posts of a Category

The following test verifies that we can access all the visible posts of a given category. Once defined, we should make sure that the test failed.

```
TBBlogTest >> testAllVisibleBlogPostsFromCategory
  blog writeBlogPost: post.
  self assert: (blog allVisibleBlogPostsFromCategory: 'First
  Category') size equals: 0.
  self assert: (blog allVisibleBlogPostsFromCategory: 'Second
  Category') size equals: 1
```

Then we can define the functionality and make sure that our test passes.

```
TBBlog >> allVisibleBlogPostsFromCategory: aCategory
  ^ posts select: [ :p | p category = aCategory
  and: [ p isVisible ] ]
```

Verify that the test passes.

Check unclassified posts

The following test verifies that we do not have unclassified blogs in our test fixture.

```
TBBlogTest >> testUnclassifiedBlogPosts
  self assert: (blog allBlogPosts select: [ :p | p isUnclassified
    ]) size equals: 0
```

Verify that the test passes.

Retrieve all categories

Again we define a new test and verify that it fails.

```
TBBlogTest >> testAllCategories
  blog writeBlogPost: post.
  self assert: blog allCategories size equals: 2
```

We then add the new behavior.

```
TBBlog >> allCategories
  ^ (self allBlogPosts collect: [ :p | p category ]) asSet
```

Verify that the test passes.

3.7 Testing data

To help you testing the application, you can add the following method that creates multiple posts.

```
TBBlog class >> createDemoPosts
  "TBBlog createDemoPosts"
  self current
    writeBlogPost: ((TBPost title: 'Welcome in TinyBlog' text:
  'TinyBlog is a small blog engine made with Pharo.' category:
  'TinyBlog') visible: true);
    writeBlogPost: ((TBPost title: 'Report Pharo Sprint' text:
  'Friday, June 12 there was a Pharo sprint / Moose dojo. It was a
  nice event with more than 15 motivated sprinters. With the help
  of candies, cakes and chocolate, huge work has been done'
  category: 'Pharo') visible: true);
    writeBlogPost: ((TBPost title: 'Brick on top of Bloc -
  Preview' text: 'We are happy to announce the first preview
  version of Brick, a new widget set created from scratch on top
  of Bloc. Brick is being developed primarily by Alex Syrel
  (together with Alain Plantec, Andrei Chis and myself), and the
  work is sponsored by ESUG.
  Brick is part of the Glamorous Toolkit effort and will provide
  the basis for the new versions of the development tools.'
  category: 'Pharo') visible: true);
```



```
writeBlogPost: ((TBPost title: 'The sad story of unclassified
blog posts' text: 'So sad that I can read this.') visible: true);
writeBlogPost: ((TBPost title: 'Working with Pharo on the
Raspberry Pi' text: 'Hardware is getting cheaper and many new
small devices like the famous Raspberry Pi provide new
computation power that was one once only available on regular
desktop computers.' category: 'Pharo') visible: true)
```

If you inspect the result of the following snippet, you will see that the current blog contains 5 posts:

```
[TBBlog createDemoPosts ; current
```

Be aware that if you execute this `createDemoPosts` method multiple times, your blog singleton object will contain multiple copies of these posts.

3.8 Possible Extensions

Many extensions can be made such as: retrieve the list of categories that contains at least one visible post, delete a category and all posts that it contains, rename a category, move a post from one category to another, make (in)visible one category and all its content, etc. We encourage you to develop some of them.

3.9 Conclusion

You now have the full model of TinyBlog as well as some unit tests. You are now ready to implement more advanced functionality such as the database storage or a first Web front-end. Do not forget to save your code.

Data persistence using Voyage and MongoDB

So far we've used objects stored in memory for our model, which is fine because saving the Pharo image also saves the objects. Nevertheless, it would be better to save these objects (blog posts) into an external database. Pharo supports multiple object serializers such as Fuel (binary format) or STON (text format). These serializers are useful and powerful. Often with a single line of code we can save a full graph of objects, as explained in the Enterprise Pharo book (available at <http://books.pharo.org>).

In this chapter, we will use another option: saving data in a *document database* such as MongoDB (<https://www.mongodb.com>) using the Voyage framework. Voyage provides a unified API to store and retrieve objects in various document-based databases such as MongoDB or UnQLite. But to start with we will use Voyage's ability to simulate an external database in memory. This is really useful during development. You can then install a local MongoDB database and access it through Voyage afterwards if you like. As you will see, this second step will have little impact on our code.

The last chapter explains how to load the code of previous chapters if needed.

4.1 Configure Voyage to save TBBlog objects

By defining the class method `isVoyageRoot`, and having it return `true`, we declare that objects of this class must be saved into the database as *root objects*. It means that the database will contain as many documents as instances of this class:

```
TBBlog class >> isVoyageRoot
  "Indicates that instances of this class are top level documents
  in noSQL databases"
  ^ true
```

We should now establish a connection to real database or work in memory. Let's start off by working in memory by using this expression:

```
[VOMemoryRepository new enableSingleton
```

The `enableSingleton` message indicates to Voyage that we will only use one database. This will free us to specify the database each time. We create and initialize the database in memory in a class-side method on `TBBlog` named `initializeVoyageOnMemoryDB`:

```
TBBlog class >> initializeVoyageOnMemoryDB
  VOMemoryRepository new enableSingleton
```

The `reset` class method re-initializes the database. The `initialize` class method ensures that the database is initialized when we load TinyBlog's code. Do not forget to execute expression `TBBlog initialize` to ensure that the database is initialized.

```
TBBlog class >> reset
  self initializeVoyageOnMemoryDB
TBBlog class >> initialize
  self reset
```

The class-side `current` method is trickier. Before using Voyage, we implemented a simple singleton pattern (`TBBlog current`). However, it does not work anymore. Imagine we save our blog and then the server crashed, or that we reload a new version of the code: it would re-initialize the connection and create a new, fresh instance of the blog. It would then be possible to end up with a different instance than the saved one.

So we must change the implementation of the `current` class method to make a database request and retrieve the saved objects. Since we only save *one* blog object, we just need to get that one blog object out of the collection of objects. Which is a simple case of `self selectOne: [:each | true]` or even just `self selectAll anyOne`. But if the database contains no instance, we create a new one and save it. So we end up with a method that looks something like this:

```
TBBlog class >> current
  ^ self selectAll
    ifNotEmpty: [ :x | x anyOne ]
    ifEmpty: [ self new save ]
```

We can also remove the class instance variable named `uniqueInstance` that we previously used to store our singleton object:

```
TBBlog class
  instanceVariableNames: ''
```

4.2 Saving a blog

Each time we modify a blog object, we must propagate changes into the database. For example, we modify the `writeBlogPost:` method to save the blog when we add a new post|

```
TBBlog >> writeBlogPost: aPost
  "Write the blog post in database"
  posts add: aPost.
  self save
```

We also save the blog when removing posts from a blog:

```
TBBlog >> removeAllPosts
  posts := OrderedCollection new.
  self save
```

4.3 Revising unit tests

We now save blogs in a database, either in memory or in an external MongoDB server, through Voyage. We must be careful with unit tests that modify the database because they may corrupt production data. To circumvent this dangerous situation, a test should not modify the state of the system.

To solve this situation, before running a test we will keep a reference to the current blog and create a new context and restore it after test execution.

Let's add an instance variable `previousRepository` in the `TBBlogTest` class.

```
TestCase subclass: #TBBlogTest
  instanceVariableNames: 'blog post first previousRepository'
  classVariableNames: ''
  package: 'TinyBlog-Tests'
```

Then, we modify the `setUp` method to save the database before each test execution. We create a temporary database object that will be used by the test.

```
TBBlogTest >> setUp
  super setUp.
  previousRepository := VORepository current.
  VORepository setRepository: VOMemoryRepository new.
```

```

blog := TBlog current.
first := TPost title: 'A title' text: 'A text' category: 'First
  Category'.
blog writeBlogPost: first.
post := (TPost title: 'Another title' text: 'Another text'
  category: 'Second Category') beVisible

```

In the `tearDown` method executed after each test, we restore the original database object:

```

TBlogTest >> tearDown

VORepository setRepository: previousRepository.
super tearDown

```

4.4 Querying the database

The database is currently in memory and we can access to the blog object using the current class-side method of the `TBlog` class. It is enough to show the API of Voyage since it will be the same to access a real MongoDB database.

You can create posts:

```
[ TBlog createDemoPosts
```

You can count the number of blog saved. `count` is part of the Voyage API. In this example, we get the result 1 because the blog is implemented as a Singleton.

```
[ TBlog count
>1
```

Similarly, you can retrieve all saved root objects of one kind.

```
[ TBlog selectAll
```

You can also remove a root object using the `remove` message.

You can discover more about the Voyage API by looking at:

- the `Class` class,
- the `VORepository` class which is the root of the hierarchy of all databases either in memory or external.

Those queries will be more relevant with more objects but they would be similar.

4.5 What is we save posts? [Discussion]

This section should not be implemented. It is only described as an example (More information about Voyage can be found in the Enterprise Pharo book <http://books.pharo.org>). We want to illustrate that declaring a class as a Voyage root has an influence on how an instance of this class is saved and reloaded.

So far, a post (an instance of `TBPost`) is not declared as a Voyage root. Post objects are therefore saved as sub-parts into the blog object they belong to. It implies that a post is not guaranteed to be unique after saving and reloading from the database. Indeed, after loading each blog objects will have their own posts objects even if some posts were shared before saving. Shared objects before saving will be duplicated for each root objects after loading.

We can declare posts as root objects meaning that a post can be saved independently from a blog. It implies that saved blogs have a reference to a `TBPost` object. This would preserve posts sharing between blog objects.

However, not all objects should be root objects. If we represent post comments, we would not define them as root objects too because manipulating a comment outside of its context (a post) does not make sense.

Post as Root = Uniqueness

If you want to share posts and make them unique between multiple blogs, therefore, the `TBPost` class must be declared as a root in the database. In this case, posts are saved as autonomous entities and instances of `TBBlog` will reference posts entities instead of embedding them. The consequence is that a post is unique and can be shared via reference from a blog. To achieve this, we **would** define the following methods:

```
TBPost class >> isVoyageRoot
  "Indicates that instances of this class are top level documents
  in noSQL databases"
  ^ true
```

During the addition of a post to a blog, it would be important to save both the blog and the new post.

```
TBBlog >> writeBlogPost: aPost
  "Write the blog post in database"
  posts add: aPost.
  aPost save.
  self save
```

```
TBBlog >> removeAllPosts
  posts do: [ :each | each remove ].
  posts := OrderedCollection new.
  self save.
```

In the `removeAllPosts` method, we first remove all posts, then update the collection and finally save the blog.

4.6 Configure an external MongoDB database [Optional]

By using Voyage, we can easily save our model objects into a MongoDB database. This section explains how to proceed and the few modifications to make to our code. This is not mandatory, and even if you do it, we would encourage you to continue to work with an in-memory database afterwards.

Installing MongoDB

Regardless of your operating system (Linux, MacOS or Windows), you can install a local MongoDB server on your machine (see <https://www.mongodb.com>). This is useful to test your application without requiring an Internet connection. Instead directly installing MongoDB, we suggest installing Docker (<https://www.docker.com>) on your machine and execute a MongoDB container using the following command on your command line:

```
[ docker run --name mongo -p 27017:27017 -d mongo
```

The running MongoDB server must not use authentication (it is not the case with the default installation) because the new SCRAM authentication mechanism used by MongoDB 3.0 is currently not supported by Voyage. Some useful Docker commands:

```
[ # to stop your MongoDB docker container
docker stop mongo

# to re-start your container
docker start mongo

# to delete your container (it must be stopped before)
docker rm mongo
```

Connecting a local MongoDB server

Once installed, you can connect to a MongoDB server directly from Pharo. We define the method named `initializeLocalhostMongoDB` to establish the connection to the local MongoDB server (localhost, default port) and access the database named 'tinyblog'

```
[ TBBlog class >> initializeLocalhostMongoDB
  | repository |
  repository := VOMongoRepository database: 'tinyblog'.
  repository enableSingleton.
```

Reset the class to set a new connection to the database:

4.7 Conclusion

```
[ TBlog class >> reset
  self initializeLocalhostMongoDB
```

Now, if you recreate demo posts, they are automatically saved into your local MongoDB database:

```
[ TBlog reset.
[ TBlog createDemoPosts
```

In case of emergency

If you need to re-initialize completely an external database, you can use the `dropDatabase` method:

```
[ (VOMongoRepository
  host: 'localhost'
  database: 'tinyblog') dropDatabase
```

You can also do it in command line when `mongod` is running with:

```
[ mongo tinyblog --eval "db.dropDatabase()"
```

or by connecting to the docker container it is running in:

```
[ docker exec -it mongo bash -c 'mongo tinyblog --eval
  "db.dropDatabase()"'
```

Warning: changing TBlog definition

When you use an external MongoDB database instead of a memory one, each time you add new root objects or modify the definition of some root objects, it is important to reset the cache maintained by Voyage. It can be done using:

```
[ VORepository current reset
```

4.7 Conclusion

Voyage provides a nice API to transparently manage the storage of objects either into memory or a document database. Application data is now saved into a database, and so we are ready to build a user interface.

CHAPTER 5

First Steps with Seaside

In this chapter, we will setup Seaside and build our first Seaside component. In the next chapters, we will develop the public part of TinyBlog, then the authentication system, followed by the administration part reserved to blog administrators.

All along, we will define Seaside components <http://www.seaside.st>. A reference book is available online <http://book.seaside.st> and the firsts chapters may help you and be a great companion of this tutorial book.

All the following work is independent of Voyage and the Mongo database. As usual, you can download the code of previous chapters as explained in the last chapter.

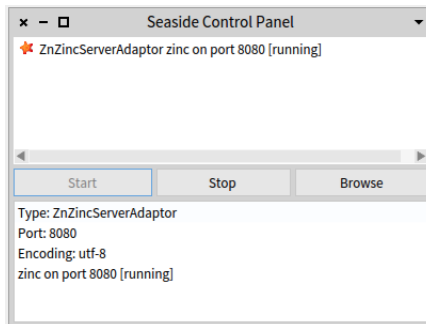


Figure 5-1 Starting the Seaside server.

5.1 Starting Seaside

Seaside should be already loaded in your PharoWeb image. If not, please refer to the loading chapter.

There are two ways to start Seaside. The first one consists in executing the following snippet:

```
[ZnZincServerAdaptor startOn: 8080.
```

The second one uses the graphical tool named "Seaside Control Panel" (Tools Menu>Seaside Control Panel). In the contextual menu (right clic) of this tool, select "add adaptor..." and add a server of type ZnZincServerAdaptor, then define the port number (e.g. 8080) it should run on (cf. Figure 5-1). By opening a web browser on the URL <http://localhost:8080>, you should see the Seaside home page as displayed on Figure 5-2.

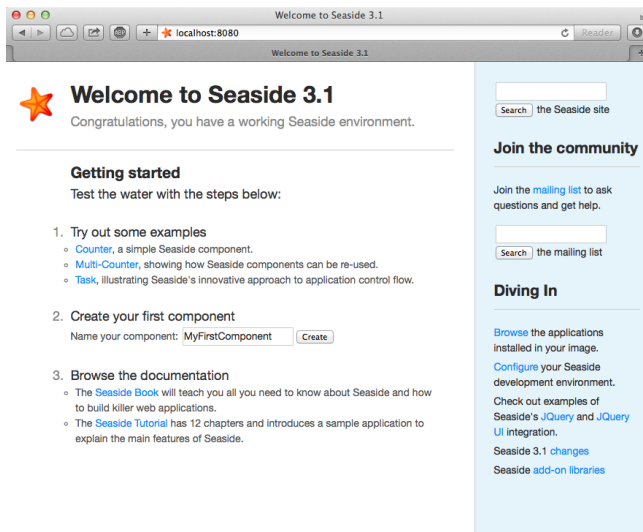


Figure 5-2 Running Seaside.

5.2 Bootstrap for Seaside

The Bootstrap library is directly accessible from Pharo and Seaside. The repository and the documentation of Bootstrap for Pharo is available there: <https://github.com/astares/Seaside-Bootstrap4>. But it is already loaded into the PharoWeb image we are using with this book.

You can browse the examples locally in your browser by clicking on the **bootstrap** link in the list of applications hosted by Seaside or directly enter

5.3 Define our Application Entry Point

this URL `http://localhost:8080/bootstrap`. You should see Bootstrap examples as shown in Figure 5-3.

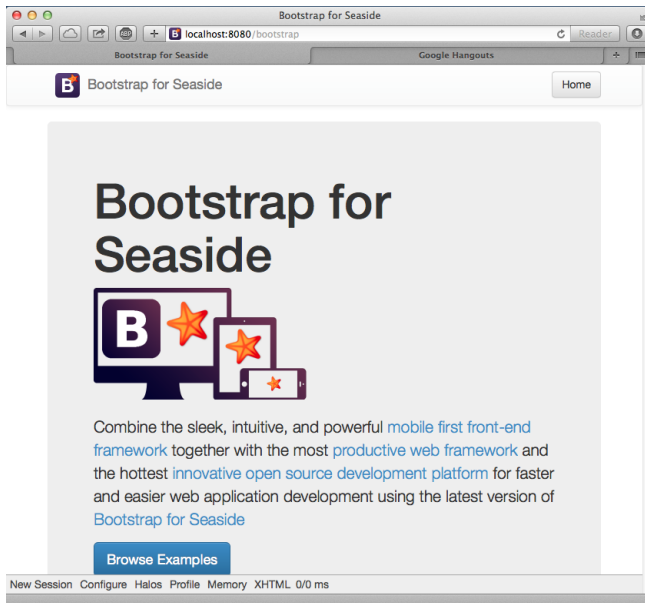


Figure 5-3 Browsing the Seaside Bootstrap Library.

By clicking on the **Examples** link at the bottom of the page, you can see both Bootstrap graphical elements and the Seaside code needed to obtain them (cf. Figure 5-4).

5.3 Define our Application Entry Point

Create a class named `TBApplicationRootComponent` which will be the entry point of the application.

```
WComponent subclass: #TBApplicationRootComponent
  instanceVariableNames: ''
  classVariableNames: ''
  package: 'TinyBlog-Components'
```

We register the `TinyBlog` application into the `Seaside` application server by defining the `initialize` class method into the `'initialization'` protocol. We also integrate dependencies to the `Bootstrap` framework (CSS and JS files will be embedded in the application).

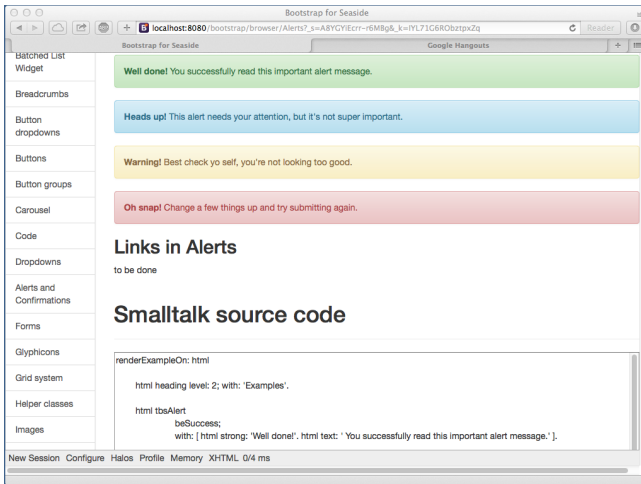


Figure 5-4 A Bootstrap element and its code.

```
TBApplicationRootComponent class >> initialize
  "self initialize"
  | app |
  app := WAAdmin register: self asApplicationAt: 'TinyBlog'.
  app
    addLibrary: JQDeploymentLibrary;
    addLibrary: JQUIDeploymentLibrary;
    addLibrary: TBSDeploymentLibrary
```

Once declared, you should execute this method with `TBApplicationRootComponent initialize`. Indeed, class-side `initialize` methods are executed at loading-time of a class but since the class already exists, we must execute it by hand.

We also add a method named `canBeRoot` to specify that `TBApplicationRootComponent` is not a simple Seaside component but a complete application. This component will be automatically instantiated when a user connects to the application.

```
TBApplicationRootComponent class >> canBeRoot
  ^ true
```

You can verify that your application is correctly registered into Seaside by connecting to the Seaside server through your web browser, click on "Browse the applications installed in your image" and then see that `TinyBlog` appears in the list as illustrated on Figure 5-5. Alternatively, you can visit `http://localhost:8080/TinyBlog`.

5.4 First Simple Rendering

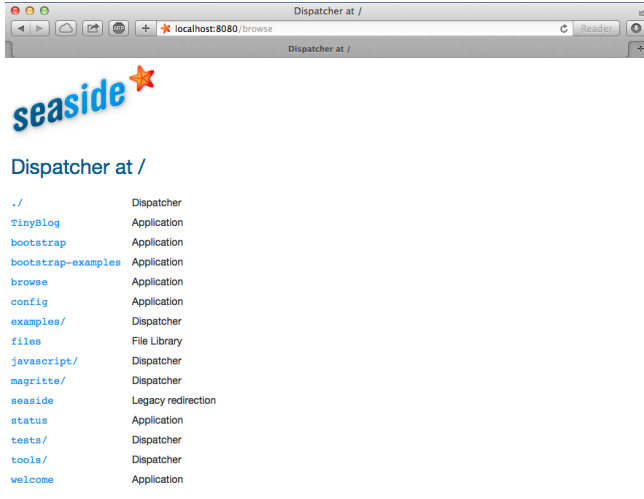


Figure 5-5 TinyBlog is a registered Seaside application.

5.4 First Simple Rendering

Let's add an instance method named `renderContentOn:` in rendering protocol to make our application displaying something.

```
[TBAApplicationRootComponent >> renderContentOn: html  
  html text: 'TinyBlog']
```

If you open `http://localhost:8080/TinyBlog` in your web browser, the page should look like the one on Figure 5-6.

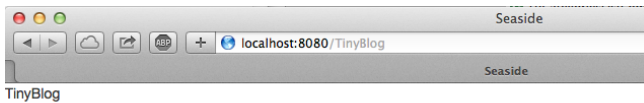


Figure 5-6 A first Seaside web page.

You can customize the web page header and declare it as HTML 5 compliant by redefining the `updateRoot:` method.

```
TBApplicationRootComponent >> updateRoot: anHtmlRoot
  super updateRoot: anHtmlRoot.
  anHtmlRoot beHtml5.
  anHtmlRoot title: 'TinyBlog'
```

The `title:` message is responsible for setting the page title, as can be seen in your web browser's title bar. The `TBApplicationRootComponent` component is the root component of our application. It will not display a lot of things. In the following, it will contain and display other components. For example, a component to display posts to the blog readers, a component to administrate the blog and its posts, ...

5.5 Architecture

We are now ready to define the visual components of our web application.

Overview of TinyBlog

Figure 6-2 shows an overview of them and their responsibilities while Figure 5-8 shows the general architecture of our application and the relations between those components.

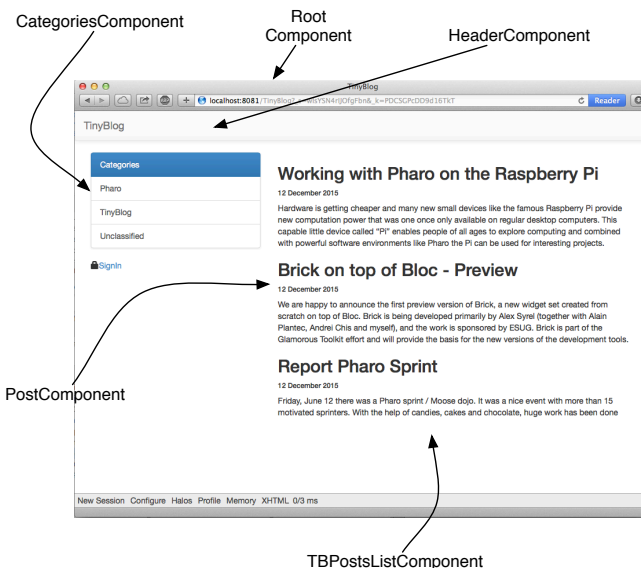


Figure 5-7 Main components of TinyBlog (public view).

Description of the Main Components

To ease your understanding of the incremental development of this application, Figure 5-8 describes the targeted architecture.

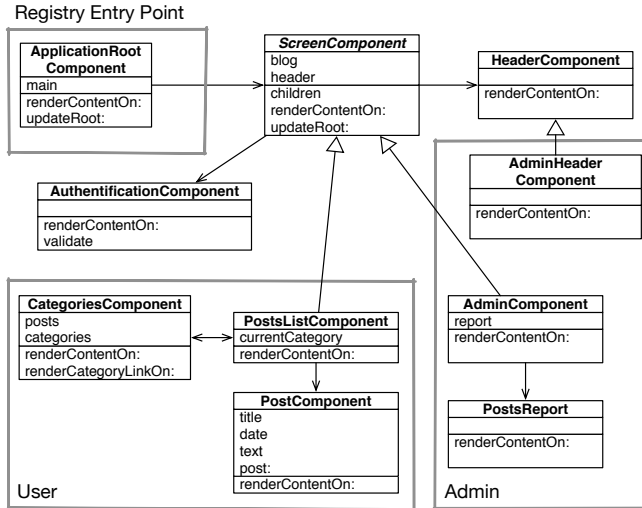


Figure 5-8 Architecture of TinyBlog.

- ApplicationRootComponent is the entry point registered into Seaside. This component contains components inheriting from the abstract class ScreenComponent.
- ScreenComponent is the root of the components used to build the public and administration view of the application. It is composed of a header.
- PostsListComponent is the main component that displays the posts. It is composed of instances of PostComponent) and manages categories.
- AdminComponent is the main component of the administration view. It is composed of a report component (instance of PostsReport) built using Magritte.

5.6 Conclusion

We are now ready to start the development of the described components. In the next chapters, we guide you linearly to develop those components. If you feel lost at some point, we invite you to come back on this architecture overview to better understand what we are developing.

Web Components for TinyBlog

In this chapter, we build the public view of TinyBlog that displays the posts of the blog. Figure 6-1 shows the components we will work on during this chapter. If you feel lost at any moment, please refer to it.

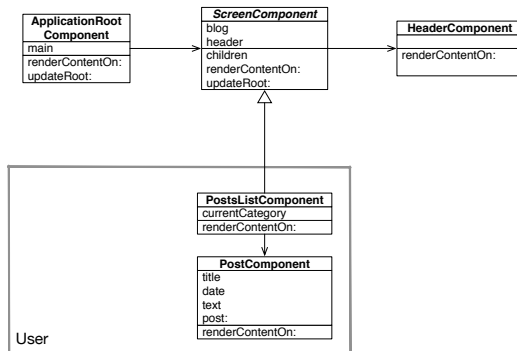


Figure 6-1 Component Architecture of the Public View (opposed to the Administration View).

Before starting, you can load the code of previous chapters as described in the last chapter of this book.

6.1 Visual Components

Figure 6-2 shows the visual components we will define in this chapter and where they will be displayed.

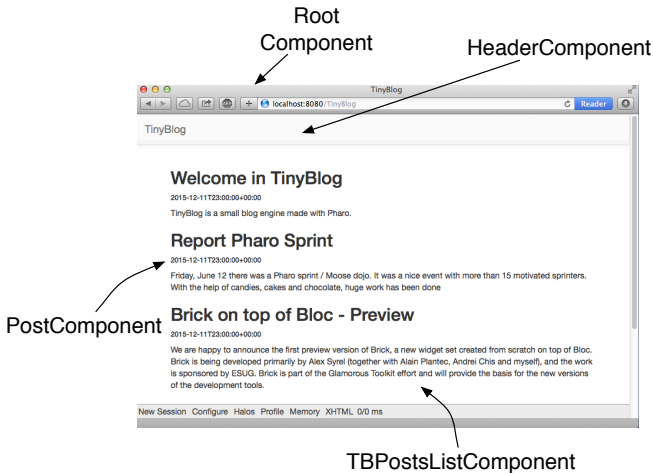


Figure 6-2 Visual Components of TinyBlog.

The TBScreenComponent component

All components contained in `TBApplicationRootComponent` will be subclasses of the abstract class `TBScreenComponent`. This class allows us to factorize shared behavior between all our components.

```
WComponent subclass: #TBScreenComponent
  instanceVariableNames: ''
  classVariableNames: ''
  package: 'TinyBlog-Components'
```

All components need to access the model of our application. Therefore, in the 'accessing' protocol, we add a `blog` method that returns the current instance of `TBBlog` (the singleton). In the future, if you want to manage multiple blogs, you will modify this method and return the blog object it has been configured with.

```
TBScreenComponent >> blog
  "Return the current blog. In the future we will ask the
  session to return the blog of the currently logged in user."
  ^ TBblog current
```

Let's define a method `renderContentOn:` on this new component that temporarily displays a message. If you refresh your browser, nothing appears because this new component is not displayed at all yet.

```
TBScreenComponent >> renderContentOn: html
  html text: 'Hello from TBScreenComponent'
```

6.2 Using the TBScreenComponent component

In the final architecture, TBScreenComponent is an abstract component and should not be used directly. Nevertheless, we will use it temporarily while developing other components.

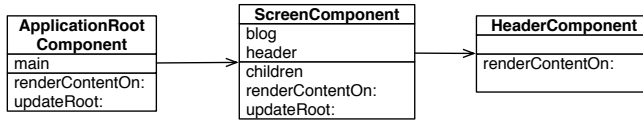


Figure 6-3 ApplicationRootComponent temporarily uses a ScreenComponent that contains a HeaderComponent.

Let's add an instance variable `main` in `TBApplicationRootComponent` class. We obtain the situation described in Figure 6-3.

```

WComponent subclass: #TBApplicationRootComponent
  instanceVariableNames: 'main'
  classVariableNames: ''
  package: 'TinyBlog-Components'
  
```

We initialize this instance variable in the `initialize` method with a new instance of `TBScreenComponent`.

```

TBApplicationRootComponent >> initialize
  super initialize.
  main := TBScreenComponent new
  
```

We make the `TBApplicationRootComponent` to render this sub-component.

```

TBApplicationRootComponent >> renderContentOn: html
  html render: main
  
```

We do not forget to declare that the object contained in `main` instance variable is a sub-component of `TBApplicationRootComponent` by redefining the `children` method.

```

TBApplicationRootComponent >> children
  ^ { main }
  
```

Figure 6-4 shows the result that you should obtain in your browser. Currently, there is only the text: `Hello` from `TBScreenComponent` displayed by the `TBScreenComponent` sub-component. (voir figure 6-4).

6.3 Pattern of Component Definition

We will often use the same following steps:

- first, we define a class and the behavior of a new component;

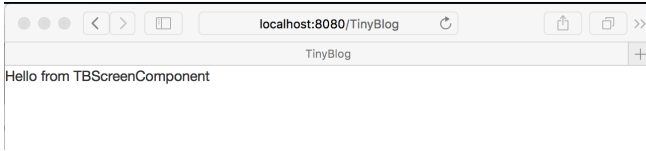


Figure 6-4 First visual rendering of TBScreenComponent.

- then, we reference it from an existing component that uses it;
- and we express the composite/sub-component relationship by redefining the children method.

6.4 Populating the Blog

You can inspect the blog object returned by `TBBlog current` and verify that it contains some posts. You can also do it simply as:

```
[ TBBlog current allBlogPosts size
```

If it does not, execute:

```
[ TBBlog createDemoPosts
```

6.5 Definition of TBHeaderComponent

Let's define a component named `TBHeaderComponent` that renders the common header of all pages of TinyBlog. This component will be inserted on the top of all components such as `TBPostsListComponent`. We use the pattern described above: define the class of the component, reference it from its enclosing component and redefine the children method.

Here the class definition:

```
[ WAComponent subclass: #TBHeaderComponent
  instanceVariableNames: ''
  classVariableNames: ''
  package: 'TinyBlog-Components'
```

6.6 Usage of TBHeaderComponent

Remember that `TBScreenComponent` is the (abstract) root of all components in our final architecture. Therefore, we will introduce our header into `TBScreenComponent` so that all its subclasses will inherit it. Since, it is not

desirable to instantiate the `TBHeaderComponent` each time a component is called, we store the header in an instance variable named `header`.

```
[ WAComponent subclass: #TBScreenComponent
  instanceVariableNames: 'header'
  classVariableNames: ''
  package: 'TinyBlog-Components'
```

We initialize it in the `initialize` method categorized in the `'initialization'` protocol:

```
[ TBScreenComponent >> initialize
  super initialize.
  header := self createHeaderComponent

[ TBScreenComponent >> createHeaderComponent
  ^ TBHeaderComponent new
```

Note that we use a specific method named `createHeaderComponent` to create the instantiate the header component. Redefining this method makes it possible to completely change the header component that is used. We will use that to display a different header component for the administration view.

6.7 Composite-Component Relationship

In Seaside, sub-components of a component must be returned by the composite when sending it the `children` message. So, we must define that the `TBHeaderComponent` instance is a children of the `TBScreenComponent` component in the Seaside component hierarchy (and not in the Pharo classes hierarchy). We do so by specializing the method `children`. In this example, it returns a collection of one element which is the instance of `TBHeaderComponent` referenced by the `header` instance variable.

```
[ TBScreenComponent >> children
  ^ { header }
```

6.8 Render an header

In the `renderContentOn: method ('rendering' protocol), we can now display the sub-component (the header):`

```
[ TBScreenComponent >> renderContentOn: html
  html render: header
```

If you refresh your browser, nothing appears because the `TBHeaderComponent` has no rendering. Let's add a `renderContentOn: method` on it that displays a Bootstrap navigation header:

```

TBHeaderComponent >> renderContentOn: html
  html tbsNavbar beDefault; with: [
    html tbsContainer: [
      self renderBrandOn: html
    ]
  ]

```

```

TBHeaderComponent >> renderBrandOn: html
  html tbsNavbarHeader: [
    html tbsNavbarBrand
      url: self application url;
      with: 'TinyBlog' ]

```

Your browser should now display what is shown on Figure 6-5. As usual in Bootstrap navigation bar, the link on the title of the application (`tbsNavbarBrand`) enable users to go back to home page of the application.

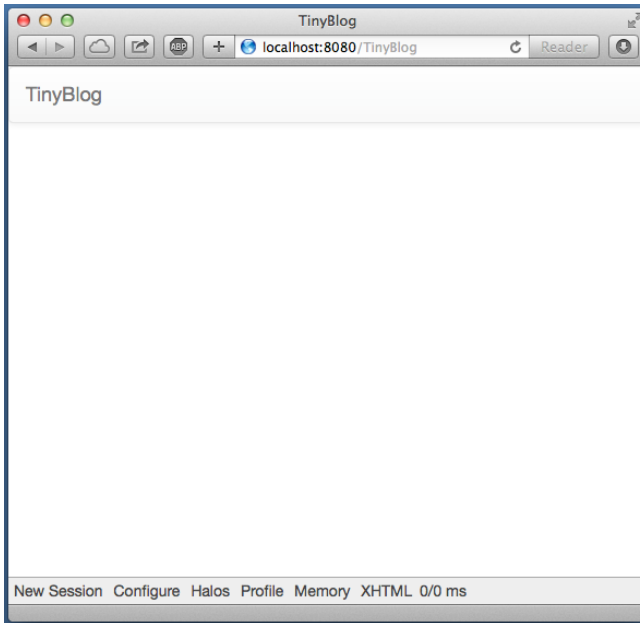


Figure 6-5 TinyBlog with a Bootstrap header.

Possible Enhancements

The blog name should be customizable using an instance variable in the `TinyBlog` class and the application header component should display this title.

6.9 List of Posts

Let's create a `TBPostsListComponent` inheriting from `TBScreenComponent` to display the list of all posts. Remember that we speak about the public access to the blog here and not the administration interface that will be developed later.

```
TBScreenComponent subclass: #TBPostsListComponent
  instanceVariableNames: ''
  classVariableNames: ''
  package: 'TinyBlog-Components'
```

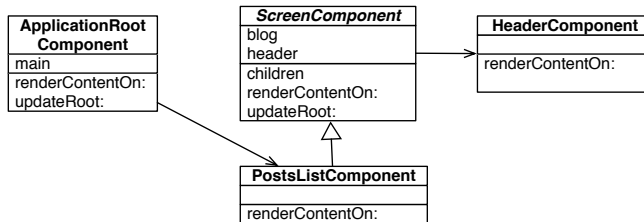


Figure 6-6 The `ApplicationRootComponent` uses `PostsListComponent`.

We can now modify `TBApplicationRootComponent`, the main component of the application, so that it displays this new component as shown in figure 6-6. To achieve this, we modify its `initialize` method:

```
TBApplicationRootComponent >> initialize
  super initialize.
  main := TBPostsListComponent new
```

We add a setter method named `main:` to dynamically change the sub-component to display but by default it is an instance of `TBPostsListComponent`.

```
TBApplicationRootComponent >> main: aComponent
  main := aComponent
```

We now add a temporary `renderContentOn:` method (in the 'rendering' protocol) on `TBPostsListComponent` to test during development (cf. Figure 6-7). In this method, we call the `renderContentOn:` of the super-class which renders the header component.

```
TBPostsListComponent >> renderContentOn: html
  super renderContentOn: html.
  html text: 'Blog Posts here !!!'
```

If you refresh `TinyBlog` in your browser, you should now see what is shown in figure 6-7.

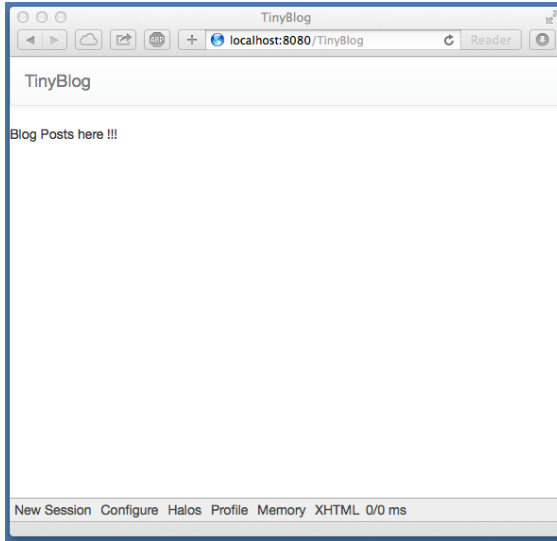


Figure 6-7 TinyBlog displaying a basic posts list.

6.10 The PostComponent

Now we will define TPostComponent to display the details of a post. Each post will be graphically displayed by an instance of TPostComponent which will show the post title, its date and its content as shown in figure 6-8.

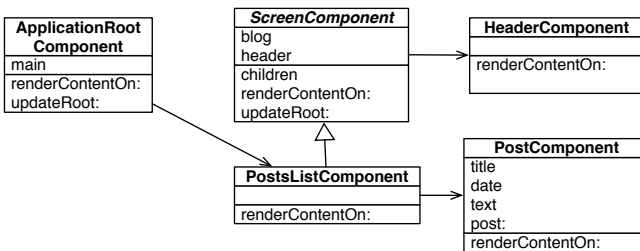


Figure 6-8 Using PostComponents to displays each Posts.

```

WComponent subclass: #TPostComponent
  instanceVariableNames: 'post'
  classVariableNames: ''
  package: 'TinyBlog-Components'

TPostComponent >> initialize
  super initialize.
  post := TPost new
  
```

```
[ TBlogComponent >> title
  ^ post title
[ TBlogComponent >> text
  ^ post text
[ TBlogComponent >> date
  ^ post date
```

The `renderContentOn:` method defines the HTML rendering of a post.

```
[ TBlogComponent >> renderContentOn: html
  html heading level: 2; with: self title.
  html heading level: 6; with: self date.
  html text: self text
```

About HTML Forms

In a future chapter on the administration view, we will show how to use Magritte to add descriptions to model objects and then use them to automatically generate Seaside components. This is powerful and free developers to manually describe forms in Seaside.

To give you a taste of that, here the equivalent code as above using Magritte:

```
[ TBlogComponent >> renderContentOn: html
  "DON'T WRITE THIS YET"
  html render: post asComponent
```

6.11 Display Posts

Before displaying available posts in the database, you should check that your blog contains some posts:

```
[ TBlog current allBlogPosts size
```

If it contains no posts, you can recreate some:

```
[ TBlog createDemoPosts
```

Now, we just need to modify the `TBlogPostsListComponent >> renderContentOn:` method to display all visible posts in the database:

```
[ TBlogPostsListComponent >> renderContentOn: html
  super renderContentOn: html.
  self blog allVisibleBlogPosts do: [ :p |
    html render: (TBlogPostComponent new post: p) ]
```

Refresh your web browser and you should get an error.

6.12 Debugging Errors

By default, when an error occurs in a web application, Seaside returns an HTML page with the error message. You can change this message or during development, you can configure Seaside to open a debugger directly in Pharo IDE. To configure Seaside, just execute the following snippet:

```
(WAAdmin defaultDispatcher handlerAt: 'TinyBlog')
  exceptionHandler: WADebugErrorHandler
```

Now, if you refresh the web page in your browser, a debugger should open on Pharo side. If you analyze the stack, you should see that we forgot to define the following method:

```
TBPostComponent >> post: aPost
  post := aPost
```

You can define this method in the debugger using the Create button. After that, press the Proceed button. The web application should now correctly renders what is shown in Figure 6-9.

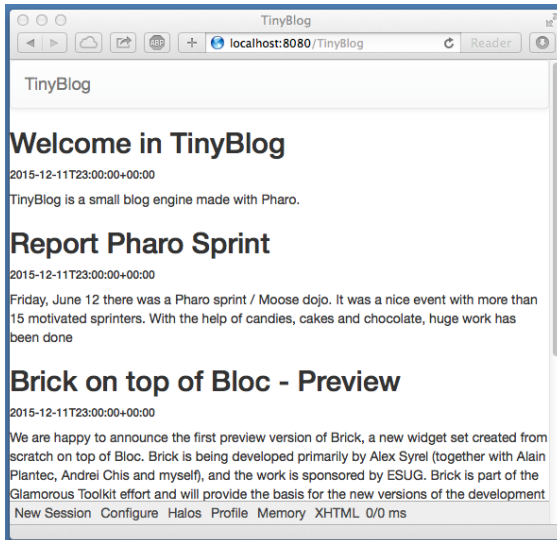


Figure 6-9 TinyBlog with a List of Posts.

6.13 Displaying the List of Posts with Bootstrap

Let's use Bootstrap to make the list of posts more beautiful using a Bootstrap container thanks to the message `tbsContainer::`

6.14 Instantiating Components in `renderContentOn:`

```
TBPostsListComponent >> renderContentOn: html
  super renderContentOn: html.
  html tbsContainer: [
    self blog allVisibleBlogPosts do: [ :p |
      html render: (TBPostComponent new post: p) ] ]
```

Your web application should look like Figure 6-2.

6.14 Instantiating Components in `renderContentOn:`

We explained that the `children` method of a component should return its sub-components. Indeed, before executing the `renderContentOn:` method of a composite, `Seaside` needs to retrieve all its sub-components and their state. However, if sub-components are instantiated in the `renderContentOn:` method of the composite (such as in `TBPostsListComponent>>renderContentOn:`), it is not needed that `children` returns those sub-components.

Note that, instantiating sub-components in the rendering method is not a good practice since it increases the loading time of the web page.

If we would store all sub-components that display posts, we should add an instance variable `postComponents`.

```
TBPostsListComponent >> initialize
  super initialize.
  postComponents := OrderedCollection new
```

Initialize it with posts.

```
TBPostsListComponent >> postComponents
  postComponents := self readSelectedPosts
    collect: [ :each | TBPostComponent new post: each ].
  ^ postComponents
```

Redefine the `children` method and of course `render` these sub-components in `renderContentOn:`:

```
TBPostsListComponent >> children
  ^ self postComponents, super children

TBPostsListComponent >> renderContentOn: html
  super renderContentOn: html.
  html tbsContainer: [
    self postComponents do: [ :p |
      html render: p ] ]
```

We do not do this in `TinyBlog` because it makes the code more complex.

6.15 Conclusion

In this chapter, we developed a Seaside component that renders a list of posts. In the next chapter, we will improve this by displaying posts' categories.

Notice that we did not care about web requests or the application state. A Seaside programmer only define components and compose them as we would do in desktop applications.

A Seaside component is responsible of rendering itself by redefining its `renderContentOn:` method. It should also returns its sub-components (if no instantiated during each rendering) by redefining the `children` method.

Managing Categories

In this chapter, we add the possibility to sort posts in a category. Figure 7-1 shows you on which components we will work in this chapter.

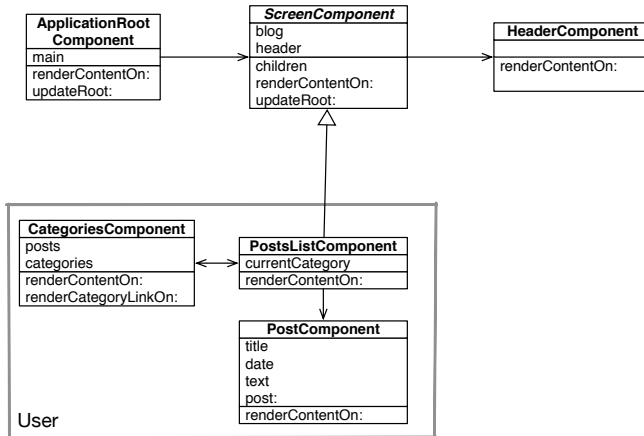


Figure 7-1 L'architecture des composants de la partie publique with categories.

You can find instructions to load the code of previous chapter in Chapter 10.

7.1 Displaying Posts by Category

Posts are sorted by a category. If no category is specified, posts are sorted in a special category called "Unclassified". To manage a list of categories, we will define a component named `TBCategoriesComponent`.

Displaying Categories

We need a component to display a list of categories defined in the blog. This component should support the selection of one category. This component should be able to communicate with the component `TBPostsListComponent` to give it the currently selected category. Figure 7-1 described the situation.

Remember that a category is simply expressed as a string in the model we defined in Chapter 2 and how the following test illustrates it:

```
[ testAllBlogPostsFromCategory
  self assert: (blog allBlogPostsFromCategory: 'First Category')
    size equals: 1
```

Component Definition

Let us define a new component named `TBCategoriesComponent`. It keeps a sorted collection of string representing each category as well as a reference to the component managing the post list.

```
[ WAComponent subclass: #TBCategoriesComponent
  instanceVariableNames: 'categories postsList'
  classVariableNames: ''
  package: 'TinyBlog-Components'
```

We define the associated accessors.

```
[ TBCategoriesComponent >> categories
  ^ categories

[ TBCategoriesComponent >> categories: aCollection
  categories := aCollection asSortedCollection

[ TBCategoriesComponent >> postsList: aComponent
  postsList := aComponent

[ TBCategoriesComponent >> postsList
  ^ postsList
```

We define a creation method as a class method.

```
[ TBCategoriesComponent class >> categories: categories postsList:
  aTBScreen
  ^ self new categories: categories; postsList: aTBScreen
```

From the Post List

In the class `TBPostsListComponent`, we need to add an instance variable to store the current category.


```

TBScreenComponent subclass: #TBPostsListComponent
  instanceVariableNames: 'currentCategory'
  classVariableNames: ''
  package: 'TinyBlog-Components'

```

We define its associated accessors.

```

TBPostsListComponent >> currentCategory
  ^ currentCategory

TBPostsListComponent >> currentCategory: anObject
  currentCategory := anObject

```

The method selectCategory:

We define the method selectCategory: (protocol 'actions') to communicate the current category to the TBPostsListComponent component.

```

TBCategoriesComponent >> selectCategory: aCategory
  postsList currentCategory: aCategory

```

7.2 Category Rendering

We can now define method for the rendering of the category component on the page. Let us call it renderCategoryLinkOn:with:, we define in particular that clicking on a category will select it as the current one. We use a callback (message callback:). The argument of this message is a block that can contains any Pharo expression. This illustrates how simple is to call function to react to event.

```

TBCategoriesComponent >> renderCategoryLinkOn: html with: aCategory
  html tbsLinkifyListGroupItem
    callback: [ self selectCategory: aCategory ];
    with: aCategory

```

The method renderContentOn: of TBCategoriesComponent is simple: we iterate on all categories and we display them using Bootstrap.

```

TBCategoriesComponent >> renderContentOn: html
  html tbsListGroup: [
    html tbsListGroupItem
      with: [ html strong: 'Categories' ].
    categories do: [ :cat |
      self renderCategoryLinkOn: html with: cat ] ]

```

We are nearly there. We need to display the list of categories and update the posts based on the current category.

7.3 Updating Post List

Now we should update the list of posts. We modify the rendering method of the component `TBPostsListComponent`.

The method `readSelectedPosts` collects the posts to be displayed. It filters them based on the current category. When the current category is nil, it means that the user did not select yet a category. Therefore we display all the posts. When the current category is something else than nil, the user selected a category and the application display the corresponding posts.

```
TBPostsListComponent >> readSelectedPosts
  ^ self currentCategory
    ifNil: [ self blog allVisibleBlogPosts ]
    ifNotNil: [ self blog allVisibleBlogPostsFromCategory: self
currentCategory ]
```

We modify now the method responsible of the post list rendering:

```
TBPostsListComponent >> renderContentOn: html
  super renderContentOn: html.
  html render: (TBCategoriesComponent
    categories: (self blog allCategories)
    postsList: self).
  html tbsContainer: [
    self readSelectedPosts do: [ :p |
      html render: (TBPostComponent new post: p) ] ]
```

An instance of the component `TBCategoriesComponent` is added to the page and allows one to select the current category (see Figure 7-2).

As previously explained, a new instance of `TBCategoriesComponent` is created each time the component `TBPostsListComponent` is rendered, therefore it is not mandatory to add it to the children sublist of the component.

Possible Enhancements

Hardcoding class name and the creation logic of categories and posts is not really optimal. Propose some solution.

7.4 Look and Layout

We will not place better the component `TBPostsListComponent` using a more 'responsive' design (as shown in Figure 7-3). It means that the CSS style should adapt the component to the available space.

Components are placed in a Bootstrap container then positioned on a line with two columns. Column dimension is determined based on the view-port and resolution of the device used. The 12 columns of Bootstrap are distributed over the category and post lists.

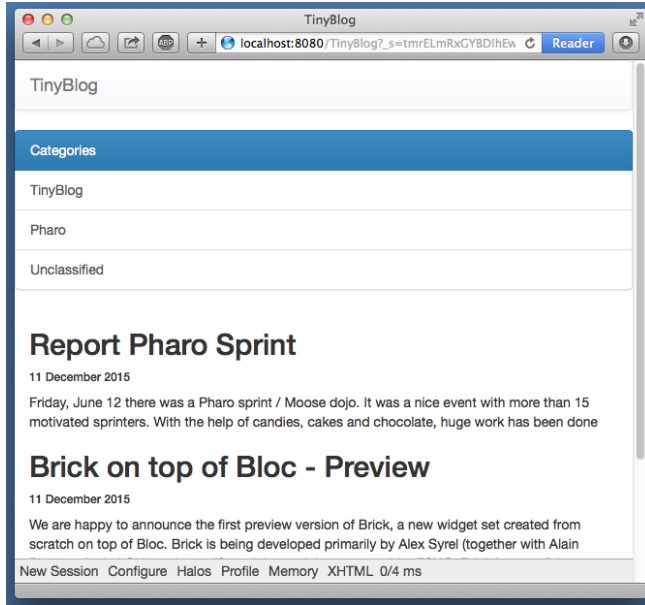


Figure 7-2 Categories and Posts.

In the case of a low resolution, the list of categories is placed above the post list (each element using 100% of the container width).

```
TBPostsListComponent >> renderContentOn: html
super renderContentOn: html.
html tbsContainer: [
  html tbsRow showGrid;
  with: [
    html tbsColumn
      extraSmallSize: 12;
      smallSize: 2;
      mediumSize: 4;
      with: [
        html render: (TBCategoriesComponent
          categories: (self blog allCategories)
          postsList: self) ].
    html tbsColumn
      extraSmallSize: 12;
      smallSize: 10;
      mediumSize: 8;
      with: [
        self readSelectedPosts do: [ :p |
          html render: (TBPostComponent new post: p) ] ] ] ] ]
```

You should obtain a situation close to the one presented in Figure 7-3.

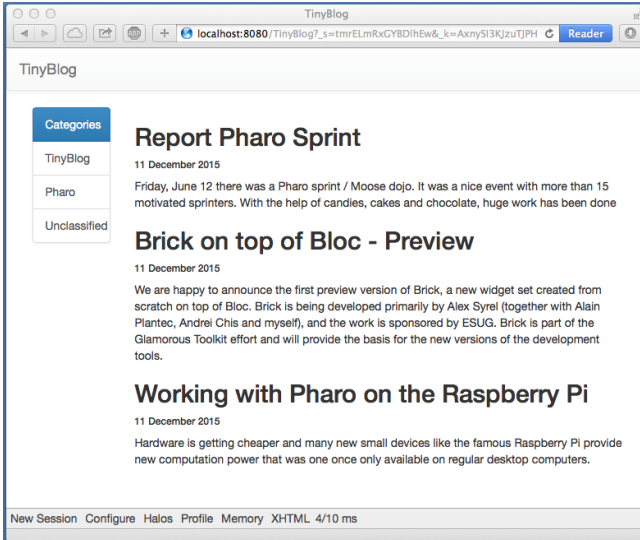


Figure 7-3 Post list with a better layout.

When one selects a category, the post list is updated. However, the selected category is not selected. We modify the following method to address this point.

```
TBCategoriesComponent >> renderCategoryLinkOn: html with: aCategory
    html tbsLinkifyListGroupItem
        class: 'active' if: aCategory = self postsList currentCategory;
        callback: [ self selectCategory: aCategory ];
        with: aCategory
```

Even if the code works, we cannot keep the method `renderContentOn:` in such state. It is far too long and not reusable. Propose a solution.

7.5 Modular Code with Small Methods

Here is our solution to the previous problem. To ease reading and future reuse, we start to define component creation methods.

```
TBPostsListComponent >> categoriesComponent
    ^ TBCategoriesComponent
        categories: self blog allCategories
        postsList: self

TBPostsListComponent >> postComponentFor: aPost
    ^ TBPPostComponent new post: aPost
```

```

TBPostsListComponent >> renderContentOn: html
  super renderContentOn: html.
  html
    tbsContainer: [ html tbsRow
      showGrid;
      with: [
        html tbsColumn
          extraSmallSize: 12;
          smallSize: 2;
          mediumSize: 4;
          with: [ html render: self categoriesComponent ].
        html tbsColumn
          extraSmallSize: 12;
          smallSize: 10;
          mediumSize: 8;
          with: [ self readSelectedPosts
            do: [ :p | html render: (self postComponentFor: p) ]
          ] ] ]

```

Another Pass

We continue to cut this method in other smaller methods. We create one method for each of the elementary tasks.

```

TBPostsListComponent >> basicRenderCategoriesOn: html
  html render: self categoriesComponent

```

```

TBPostsListComponent >> basicRenderPostsOn: html
  self readSelectedPosts do: [ :p |
    html render: (self postComponentFor: p) ]

```

Then we use such tasks to simplify the method `renderContentOn:`.

```

TBPostsListComponent >> renderContentOn: html
  super renderContentOn: html.
  html
    tbsContainer: [
      html tbsRow
        showGrid;
        with: [ self renderCategoryColumnOn: html.
          self renderPostColumnOn: html ] ]

```

```

TBPostsListComponent >> renderCategoryColumnOn: html
  html tbsColumn
    extraSmallSize: 12;
    smallSize: 2;
    mediumSize: 4;
    with: [ self basicRenderCategoriesOn: html ]

```

```
TBPostsListComponent >> renderPostColumnOn: html
html tbsColumn
    extraSmallSize: 12;
    smallSize: 10;
    mediumSize: 8;
    with: [ self basicRenderPostsOn: html ]
```

The final application is showing in Figure 7-4.

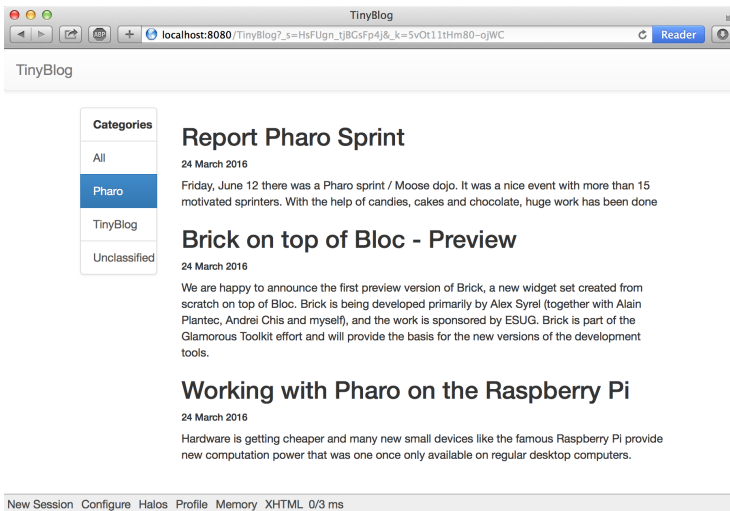


Figure 7-4 Final TinyBlog Public UI.

7.6 Conclusion

We defined an interface for our blog using a set of components each specifying its own state and responsibility. Many web applications are built the same way reusing components. You have the foundation to build more advanced web application.

In the next chapter, we show how to manage authentication to access the post admin part of our application.

Possible Enhancements

As exercise you can:

- sort category alphabetically, or
- add a link named 'All' in the category list to display all the posts.

Authentication and Session

In this chapter we will develop a traditional scenario: the user should login to access to the administration part of the application. He does it using a login and password.

Figure 8-1 shows the architecture that we will reach in this chapter.

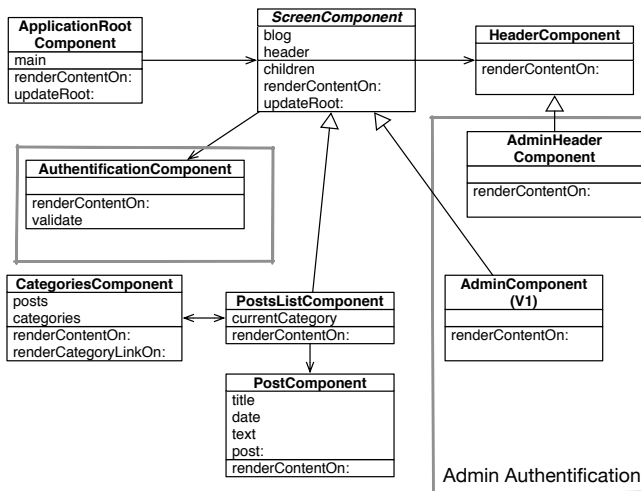


Figure 8-1 Authentication flow.

Let us start to put in place a first version that allows one to navigate between the part of TinyBlog rendered by the component `TBPostsListComponent` and a first draft of the administration component as shown in Figure 8-2. This illustrates how to invoke a component.

In the following we will build and integrate a component managing the login based on modal interaction. This will illustrate how we can elegantly map filed inputs to instance variables of a component.

Finally we will show how the user information is stored into the current session.

8.1 A Simple Admin Component (v1)

Let us define a really super simple administration component. This component inherits from the class `TBScreenComponent` as mentioned in previous chapters and illustrated in Figure 8-1.

```
TBScreenComponent subclass: #TBAdminComponent
  instanceVariableNames: ''
  classVariableNames: ''
  package: 'TinyBlog-Components'
```

We define a first version of the rendering method to be able to test our approach.

```
TBAdminComponent >> renderContentOn: html
  super renderContentOn: html.
  html tbsContainer: [
    html heading: 'Blog Admin'.
    html horizontalRule ]
```

8.2 Adding 'admin' Button

We add now a button in the header of the site (component `TBHeaderComponent`) so that the user can access to the admin as shown in Figure 8-2. To do so, we modify the existing components: `TBHeaderComponent` (header) et `TBPostsListComponent` (public part).

Let us add a button in the header:

```
TBHeaderComponent >> renderContentOn: html
  html tbsNavbar beDefault; with: [
    html tbsContainer: [
      self renderBrandOn: html.
      self renderButtonsOn: html
    ]
  ]

TBHeaderComponent >> renderButtonsOn: html
  self renderSimpleAdminButtonOn: html

TBHeaderComponent >> renderSimpleAdminButtonOn: html
  html form: [
    html tbsNavbarButton
    tbsPullRight;
```


8.2 Adding 'admin' Button

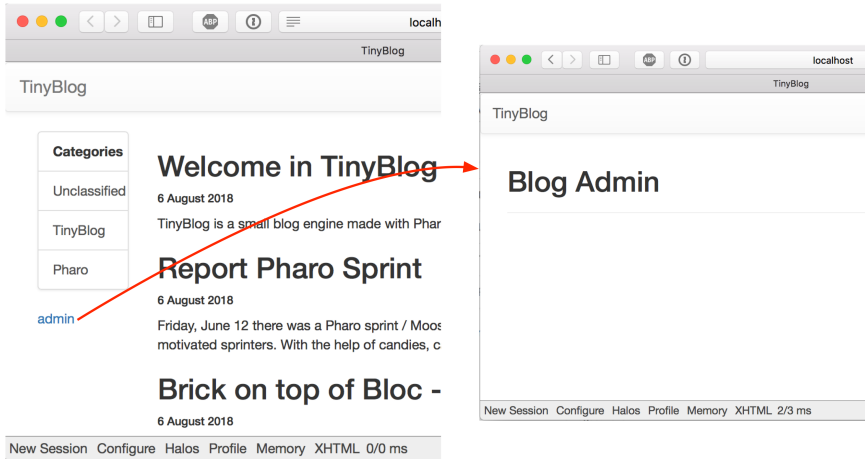


Figure 8-2 Simple link to the admin part.

```
with: [  
    html tbsGlyphIcon iconListAlt.  
    html text: ' Admin View' ]]
```

When you refresh the web browser, the admin button is present but it does not have any effect (See Figure 8-3).

We should define a callback on this button (message callback:) to replace the current component (TBPostsListComponent) by the administration component (TBAdminComponent).

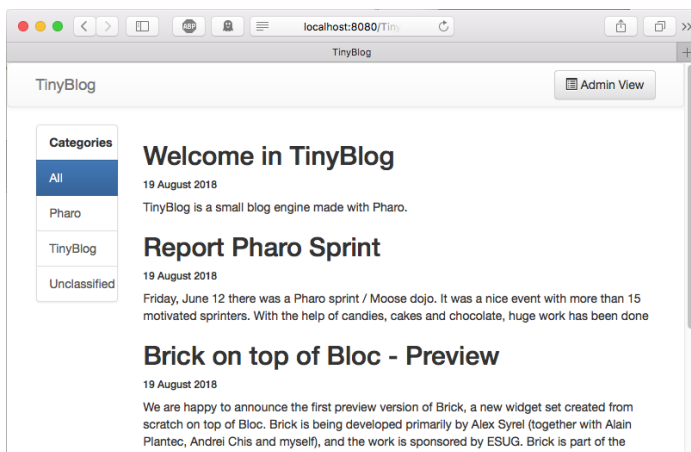


Figure 8-3 Header with an admin button.

8.3 Header Revision

Let us revise the definition of `TBHeaderComponent` by adding a new instance variable named `component` to store and access to the current component (either post list or admin component). This will allow us to access to the component from the header.

```
[WComponent subclass: #TBHeaderComponent
 instanceVariableNames: 'component'
 classVariableNames: ''
 package: 'TinyBlog-Components'

TBHeaderComponent >> component: anObject
 component := anObject

TBHeaderComponent >> component
 ^ component
```

We add a new class method.

```
[TBHeaderComponent class >> from: aComponent
 ^ self new
 component: aComponent;
 yourself
```

8.4 Admin Button Activation

We modify the component instantiation in `TBScreenComponent` method to pass the component which will be under the header.

```
[TBScreenComponent >> createHeaderComponent
 ^ TBHeaderComponent from: self
```

Note that the method `createHeaderComponent` is defined in the superclass `TBScreenComponent` and it is applicable to all the subclasses.

We can add now the callback on the button:

```
[TBHeaderComponent >> renderSimpleAdminButtonOn: html
 html form: [
 html tbsNavbarButton
 tbsPullRight;
 callback: [ component goToAdministrationView ];
 with: [
 html tbsGlyphIcon iconListAlt.
 html text: ' Admin View' ]]
```

We just need to define the method `goToAdministrationView` on the component `TBPostsListComponent`:

```
[TBPostsListComponent >> goToAdministrationView
 self call: TBAdminComponent new
```

Before clicking on the admin button, you should renew the current session by clicking on 'New Session': it will recreate the component `TBHeaderComponent`.

You should get the situation presented in Figure 8-4. The 'Admin' button allows one to access the admin part v1.

Pay attention not to click twice on the admin button because we do not manage it yet for the admin part. We will replace it by a Disconnect button.

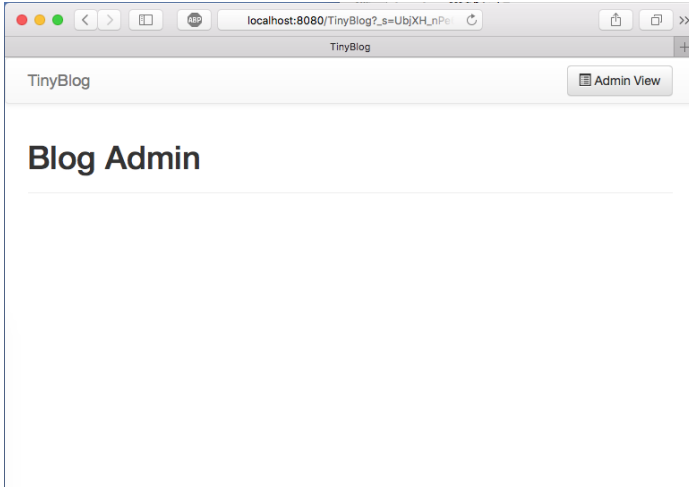


Figure 8-4 Admin component under definition.

8.5 'disconnect' Button Addition

When we display the admin part, we will replace the header component by a new one. This new header will display a disconnect button.

Let us define this new header component:

```
[ TBHeaderComponent subclass: #TBAdminHeaderComponent
  instanceVariableNames: ''
  classVariableNames: ''
  package: 'TinyBlog-Components'

[ TBAdminHeaderComponent >> renderButtonsOn: html
  html form: [ self renderDisconnectButtonOn: html ]
```

The `TBAdminComponent` component must use this header:

```
[ TBAdminComponent >> createHeaderComponent
  ^ TBAdminHeaderComponent from: self
```

Now we can specialize our new admin header to display a disconnect button.

```
TBAdminHeaderComponent >> renderDisconnectButtonOn: html
  html tbsNavbarButton
    tbsPullRight;
    callback: [ component goToPostListView ];
    with: [
      html text: 'Disconnect '.
      html tbsGlyphIcon iconLogout ]
TBAdminComponent >> goToPostListView
  self answer
```

What is seen is that the message `answer` gives back the control to the component that calls it. So we go back the post list.

Reset the current session by clicking on 'New Session'. Then you can click on the 'Admin' button, you should see now the admin v1 display itself with a 'Disconnect' button. This button allows on to go back the public part as shown in Figure 8-2.

call:/answer: Notion

When you study the previous code, you see that we use the `call:/answer:` mechanism of Seaside to navigate between the components `TBPostsListComponent` and `TBAdminComponent`.

The message `call:` replaces the current component with the one passed in argument and gives it the flow of control. The message `answer:` returns a value to this call and gives back the flow of control to the calling argument. This mechanism is really powerful and elegant. It is explained in the vidéo 1 of week 5 of the Pharo Mooc (http://rmod-pharo-mooc.lille.inria.fr/MOOC/WebPortal/co/content_5.html).

8.6 Modal Window for Authentication

Let us develop now a authentication component that when invoked will open a dialog box to request the login and password. The result we want to obtain is shown in Figure 8-5.

There are some libraries of components ready to be used. For example, the Heimdal project available at <http://www.github.com/DuneSt/> offers an authentication component or the Steam project <https://github.com/guillem/steam> offers ways to interrogate google ou twitter accounts.

Authentication Component Definition

We define a new subclass of `WComponent` and its accessors. This component contains a login, a password and a component which invoked it to access to

8.6 Modal Window for Authentication

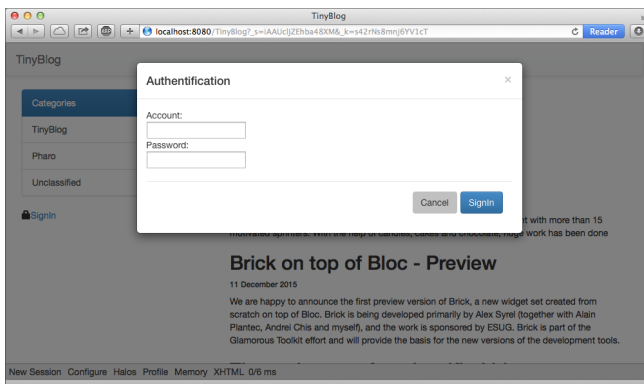


Figure 8-5 Authentication component.

the admin part.

```
WComponent subclass: #TBAAuthenticationComponent
  instanceVariableNames: 'password account component'
  classVariableNames: ''
  package: 'TinyBlog-Components'
```

```
TBAAuthenticationComponent >> account
  ^ account
```

```
TBAAuthenticationComponent >> account: anObject
  account := anObject
```

```
TBAAuthenticationComponent >> password
  ^ password
```

```
TBAAuthenticationComponent >> password: anObject
  password := anObject
```

```
TBAAuthenticationComponent >> component
  ^ component
```

```
TBAAuthenticationComponent >> component: anObject
  component := anObject
```

The instance variable component will be initialized by the following class method: classe suivante :

```
TBAAuthenticationComponent class >> from: aComponent
  ^ self new
    component: aComponent;
    yourself
```

8.7 Authentication Component Rendering

The following method `renderContentOn:` defines the contents of a dialog box with the ID `myAuthDialog`. This ID will be used to select the component that should be made visible when in modal mode.

This dialog box has a header and a body. Note the use of the messages `tbsModal`, `tbsModalBody:`, and `tbsModalContent:` which supports a modal interaction with the component.

```
TBAuthenticationComponent >> renderContentOn: html
  html tbsModal
    id: 'myAuthDialog';
    with: [
      html tbsModalDialog: [
        html tbsModalContent: [
          self renderHeaderOn: html.
          self renderBodyOn: html ] ] ]
```

The header displays a button to close the dialog box and a title with large fonts. Note that you can also use the ESC key to close the modal window box.

```
TBAuthenticationComponent >> renderHeaderOn: html
  html
    tbsModalHeader: [
      html tbsModalCloseIcon.
      html tbsModalTitle
        level: 4;
      with: 'Authentication' ]
```

The body of the component displays the input field for the login identifier, password and some buttons.

```
TBAuthenticationComponent >> renderBodyOn: html
  html
    tbsModalBody: [
      html tbsForm: [
        self renderAccountFieldOn: html.
        self renderPasswordFieldOn: html.
        html tbsModalFooter: [ self renderButtonsOn: html ]
      ] ]
```

The method `renderAccountFieldOn:` shows how the value of an input field is passed and stored in an instance variable of a component when the user finishes its input.

The parameter of the callback: `message` is a bloc which takes as argument the value of the input field.

```
TBAuthenticationComponent >> renderAccountFieldOn: html
  html
    tbsFormGroup: [ html label with: 'Account'.
      html textInput
        tbsFormControl;
        attributeAt: 'autofocus' put: 'true';
        callback: [ :value | account := value ];
        value: account ]
```

The same process is used for the password.

```
TBAuthenticationComponent >> renderPasswordFieldOn: html
  html tbsFormGroup: [
    html label with: 'Password'.
    html passwordInput
      tbsFormControl;
      callback: [ :value | password := value ];
      value: password ]
```

Finally in the following `renderContentOn:` method, two buttons are added at the bottom of the modal window. The 'Cancel' button which allows one to close the window using the attribute 'data-dismiss' and the 'SignIn' button which sends the `validate` using a callback.

The enter key is bound to the 'SignIn' button activation when using the method `tbsSubmitButton`. This method sets the 'type' attribute to 'submit'.

```
TBAuthenticationComponent >> renderButtonsOn: html
  html tbsButton
    attributeAt: 'type' put: 'button';
    attributeAt: 'data-dismiss' put: 'modal';
    beDefault;
    value: 'Cancel'.
  html tbsSubmitButton
    bePrimary;
    callback: [ self validate ];
    value: 'SignIn'
```

In the `validate` method, we simply send a message to the main component giving it the information entered by the user.

```
TBAuthenticationComponent >> validate
  ^ component tryConnectionWithLogin: self account andPassword: self
  password
```

8.8 Authentication Component Integration

To integrate our authentication component, we modify the Admin button of the header component (`TBHeaderComponent`) as follows:

```

[ TBHeaderComponent >> renderButtonsOn: html
  self renderModalLoginButtonOn: html
[ TBHeaderComponent >> renderModalLoginButtonOn: html
  html render: (TBAuthenticationComponent from: component).
  html tbsNavbarButton
    tbsPullRight;
    attributeAt: 'data-target' put: '#myAuthDialog';
    attributeAt: 'data-toggle' put: 'modal';
    with: [
      html tbsGlyphIcon iconLock.
      html text: ' Login' ]

```

The method `renderModalLoginButtonOn:` starts by rendering the component `TBAuthenticationComponent` within this web page. This component is created during each display and it does not have to be returned by the `children` method. In addition, we add 'Login' button with a icon lock. When the user clicks on this button, the modal dialog identified with the ID `myAuthDialog` will be displayed.

Reloading the TinyBlog page, you should see now a 'Login' button in the header (button that will pop up the authentication we just developed) as illustrated by Figure 8-5.

8.9 Naively Managing Logins

When you click on the 'SignIn' button you get an error. Using the Pharo debugger, you can see that we should define the method `tryConnectionWithLogin:andPassword:` on the component `TBPostsListComponent` since it is the one sent by the callback of the button.

```

[ TBPostsListComponent >> tryConnectionWithLogin: login andPassword:
  password
  (login = 'admin' and: [ password = 'topsecret' ])
    ifTrue: [ self goToAdministrationView ]
    ifFalse: [ self loginErrorOccurred ]

```

For the moment we store directly the login and password in the method and this is not really a good practice.

8.10 Managing Errors

We defined the method `goToAdministrationView`. Let us add the method `loginErrorOccured` and a mechanism to display an error message when the user does not use the correct identifiers as shown in Figure 8-6.

For this we will add a new instance variable `showLoginError` that represents the fact that we should display an error.


```

TBScreenComponent subclass: #TBPostsListComponent
  instanceVariableNames: 'currentCategory showLoginError'
  classVariableNames: ''
  package: 'TinyBlog-Components'

```

The method `loginErrorOccurred` specifies that an error should be displayed.

```

TBPostsListComponent >> loginErrorOccurred
  showLoginError := true

```

We add a method to test this state.

```

TBPostsListComponent >> hasLoginError
  ^ showLoginError ifNil: [ false ]

```

We define also an error message.

```

TBPostsListComponent >> loginErrorMessage
  ^ 'Incorrect login and/or password'

```

We modify the method `renderPostColumnOn:` to perform a specific task to handle the errors.

```

TBPostsListComponent >> renderPostColumnOn: html
  html tbsColumn
    extraSmallSize: 12;
    smallSize: 10;
    mediumSize: 8;
    with: [
      self renderLoginErrorMessageIfAnyOn: html.
      self basicRenderPostsOn: html ]

```

The method `renderLoginErrorMessageIfAnyOn:` displays if necessary an error message. It sets the instance variable `showLoginError` so that we do not display the error indefinitely.

```

TBPostsListComponent >> renderLoginErrorMessageIfAnyOn: html
  self hasLoginError ifTrue: [
    showLoginError := false.
    html tbsAlert
      beDanger ;
      with: self loginErrorMessage
  ]

```

8.11 Modeling the Admin

We do not want to store the administrator identifiers in the code as we did previously. We revise this now and will store the identifiers in a model: a class `Admin`.

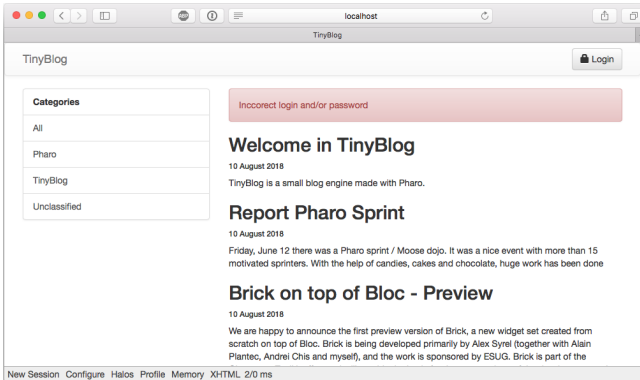


Figure 8-6 Error message in case wrong identifiers.

Let us start to enrich our TinyBlog model with the notion of administrator. We define a class named `TBAdministrator` characterized by its pseudo, login and password.

```
[ Object subclass: #TBAdministrator
  instanceVariableNames: 'login password'
  classVariableNames: ''
  package: 'TinyBlog'
```

```
[ TBAdministrator >> login
  ^ login
```

```
[ TBAdministrator >> login: anObject
  login := anObject
```

```
[ TBAdministrator >> password
  ^ password
```

Note that we do not store the admin password in the instance variable `password` but its hash encoded in SHA256.

```
[ TBAdministrator >> password: anObject
  password := SHA256 hashMessage: anObject
```

We define also a new instance creation method.

```
[ TBAdministrator class >> login: login password: password
  ^ self new
    login: login;
    password: password;
    yourself
```

You can verify that the model works by executing the following expression:

```
[ luc := TBAdministrator login: 'luc' password: 'topsecret'.
```

8.12 Blog admin

We decide for simplicity that a blog has one admin. We add the instance variable `adminUser` and an accessor in the class `TBBlog` to store the blog admin.

```
[Object subclass: #TBBlog
  instanceVariableNames: 'adminUser posts'
  classVariableNames: ''
  package: 'TinyBlog'

TBBlog >> administrator
  ^ adminUser
```

We define a default login and password that we use as default. As we will see later, we will modify such attributes and these modified attributes will be saved at the same time that the blog in a database.

```
[TBBlog class >> defaultAdminPassword
  ^ 'topsecret'

TBBlog class >> defaultAdminLogin
  ^ 'admin'
```

Now we create a default admin.

```
[TBBlog >> createAdministrator
  ^ TBAdministrator
    login: self class defaultAdminLogin
    password: self class defaultAdminPassword
```

And we initialize the blog to set a default administrateur.

```
[TBBlog >> initialize
  super initialize.
  posts := OrderedCollection new.
  adminUser := self createAdministrator
```

8.13 Setting a New Admin

We should not recreate the blog:

```
[TBBlog reset; createDemoPosts
```

We can now modify the admin information as follows:

```
[|admin|
  admin := TBBlog current administrator.
  admin login: 'luke'.
  admin password: 'thebrightside'.
TBBlog current save
```

Note that without doing anything, the blog admin information has been saved by Voyage in the database. Indeed the class `TBBlog` is a Voyage root,

all its attributes are automatically stored in the database when it received the message save.

Possible Enhancements

Define some tests for the extensions by writing new unit tests.

8.14 Integrating the Admin Information

Let us modify the method `tryConnectionWithLogin:andPassword:` so that it uses the current blog admin identifiers. Note that we are comparing the hash SHA256 of the password since we do not store the password.

```
TBPostsListComponent >> tryConnectionWithLogin: login andPassword:
    password
    (login = self blog administrator login and: [
        (SHA256 hashMessage: password) = self blog administrator
        password ])
        ifTrue: [ self goToAdministrationView ]
        ifFalse: [ self loginErrorOccurred ]
```

8.15 Storing the Admin in the Current Session

With the current setup, when the blog admin wants to navigate between the private and public part, he must reconnects each time. We will simplify this situation but storing the current admin information in the session when the connection is succesful.

A session object is given to the each instance of the application. Such session allows on to keep information which are shared and accessible between components.

We will then store the current admin in a session and modify the components to display buttons that support a simplified navigation when the admin is logged.

When he explicetely disconnect or when the session expires, we delete the current session.

Figure 8-7 shows the navigation between the pages of TinyBlog.

8.16 Definition and use of specific session

Let us start to define a subclass of `WASession` and name it `TBSession`. We add in this new class an instance variable that stores the current admin.

8.16 Definition and use of specific session

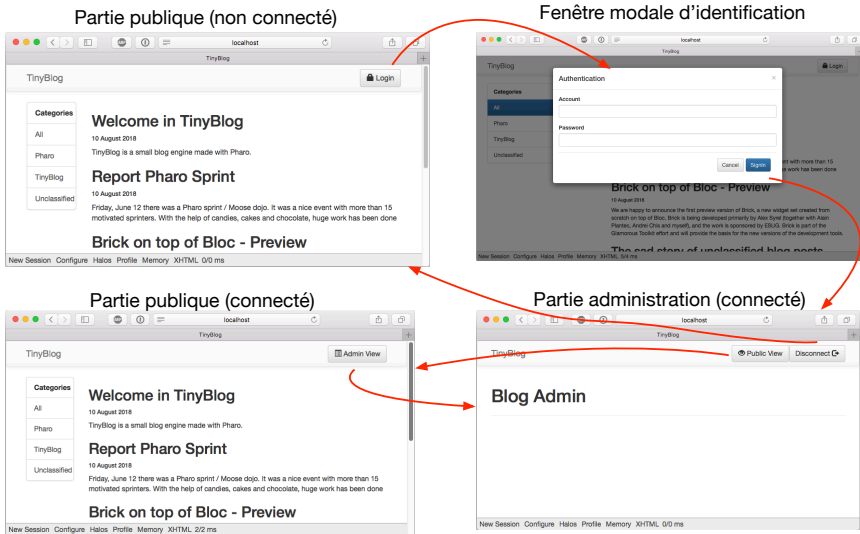


Figure 8-7 Navigation and identification in TinyBlog.

```
WASession subclass: #TBSession
  instanceVariableNames: 'currentAdmin'
  classVariableNames: ''
  package: 'TinyBlog-Components'
```

```
TBSession >> currentAdmin
^ currentAdmin
```

```
TBSession >> currentAdmin: anObject
currentAdmin := anObject
```

We define a method `isLogged` allows one to know if the administration is logged.

```
TBSession >> isLogged
^ self currentAdmin notNil
```

Now we should indicate to Seaside to use `TBSession` as the class of the current session for our application. This initialization is done in the class method `initialize` in the class `TBApplicationRootComponent` as follows:

```
TBApplicationRootComponent class >> initialize
  "self initialize"
  | app |
  app := WAAdmin register: self asApplicationAt: 'TinyBlog'.
  app
    preferenceAt: #sessionClass put: TBSession.
  app
```

```

    addLibrary: JQDeploymentLibrary;
    addLibrary: JQueryDeploymentLibrary;
    addLibrary: TBSDeploymentLibrary

```

Do not forget to execute this expression `TBApplicationRootComponent initialize` before testing the application.

8.17 Storing the Current Admin

When a connection is successful, we add the admin object to the current session using the message `currentAdmin:`. Note that the current session is available to every Seaside component via `self session`.

```

TBPostsListComponent >> tryConnectionWithLogin: login andPassword:
    password
    (login = self blog administrator login and: [
        (SHA256 hashMessage: password) = self blog administrator
        password ])
        ifTrue: [
            self session currentAdmin: self blog administrator.
            self goToAdministrationView ]
        ifFalse: [ self loginErrorOccurred ]

```

8.18 Simplified navigation

To put in place the simplified navigation we discussed above, we modify the header to display either a login button or a simple navigation button to the admin part without forcing any reconnection. For this we use the session and the fact that we can know if a user is logged.

```

TBHeaderComponent >> renderButtonsOn: html
    self session isLoggedIn
        ifTrue: [ self renderSimpleAdminButtonOn: html ]
        ifFalse: [ self renderModalLoginButtonOn: html ]

```

You can test this new navigation but first create a new session ('New Session' button). Once reconnected the admin is added in session. Note that the disconnection button does not work correctly since it does not invalidate the session.

8.19 Managing Disconnection

We add a method `reset` on our session object to delete the current admin, invalidate the current session and redirect to the application entry point.

```
TBSession >> reset
  currentAdmin := nil.
  self requestContext redirectTo: self application url.
  self unregister.
```

Now we modify the header disconnection button to send the message reset to the correct session.

```
TBAdminHeaderComponent >> renderDisconnectButtonOn: html
  html tbsNavbarButton
    tbsPullRight;
    callback: [ self session reset ];
    with: [
      html text: 'Disconnect ' .
      html tbsGlyphIcon iconLogout ]
```

Now we 'Disconnect' button works the way it should.

8.20 Simplified Navigation to the Public Part

We can add now a button in the header of the admin part to go back to the public part without being forced to get disconnected.

```
TBAdminHeaderComponent >> renderButtonsOn: html
  html form: [
    self renderDisconnectButtonOn: html.
    self renderPublicViewButtonOn: html ]

TBAdminHeaderComponent >> renderPublicViewButtonOn: html
  self session isLoggedIn ifTrue: [
    html tbsNavbarButton
      tbsPullRight;
      callback: [ component goToPostListView ];
      with: [
        html tbsGlyphIcon iconEyeOpen.
        html text: ' Public View' ]]
```

Now you can test the navigation. It should correspond to the situation depicted by Figure 8-7.

8.21 Conclusion

We put in place an authentication for TinyBlog. We create a reusable modal component. We made the distinction between component displayed when a user is connected or not and ease the navigation of a connected user using session.

We are now ready for the administration part of the application and we will work on this in the next chapter. We will take advantage of it to show and advanced aspect: the automatic form generation.

Possible Enhancements

You can:

- Add the admin logging in the header
- Manage multipel admin accounts.

Administration Web Interface and Automatic Form Generation

We will now develop the administration part of TinyBlog. In previous chapter, we define Seaside components that interact together and where each component is responsible for its internal state, behavior and its graphical rendering.

In this chapter, we want to show that we can go a step further and generate Seaside components from object descriptions using the Magritte framework.

Figure 9-1 shows a part of the result we will obtain, the other part being post edition.

Figure 9-2 shows a survey of the architecture that we will develop in this chapter.

9.1 Describing Domain Data

Magritte is a library that allows one to generate various representations once the objects are described. Coupled with Seaside, Magritte generates forms and reports. The Quuve of the Debris Publishing company is a brilliant example of Magritte power: all tables and reports are automatically generated (see <http://www.pharo.org/success>).

Data validation is also done at the Magritte level instead of being dispersed in the user interface code. This chapter will not cover such aspects. Resources on Magritte are a chapter in the Seaside book (<http://book.seaside.st>) as well as a tutorial under writing available at <https://github.com/SquareBracketAssociates/Magritte>.

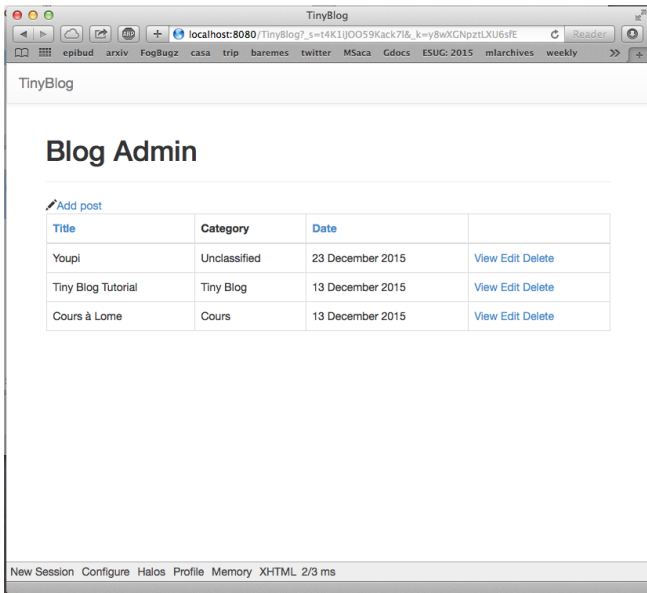


Figure 9-1 Post management.

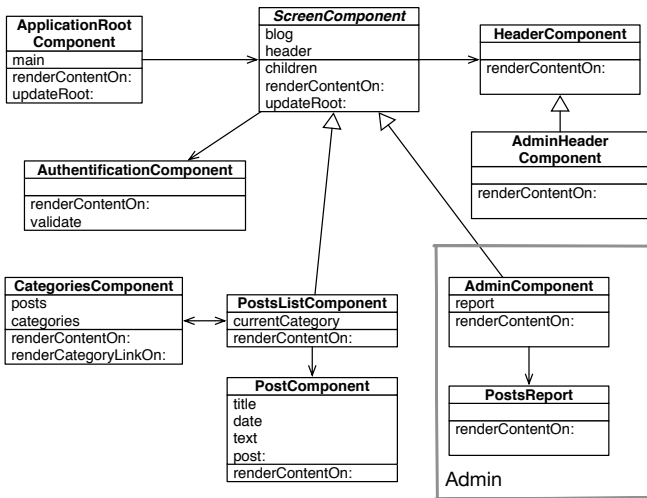


Figure 9-2 Administration components.

A description is an object that specifies information on the data of our model as well as its type, whether the information is mandatory, if it should be sorted and what is the default value.

9.2 Post Description

Let us start to describe the five instance variable of `TBPost` with Magritte. Then we will show how we can get a form generated for us.

We will define the five following methods in the protocol 'magritte-descriptions' of the class `TBPost`. Note that the method names are not important but we follow a convention. This is the pragma `<magritteDescription>` (method annotation) that allows Magritte to identify descriptions.

The post title is a string of characters that is mandatory.

```
TBPost >> descriptionTitle
  <magritteDescription>
  ^ MAStringDescription new
    accessor: #title;
    beRequired;
    yourself
```

A post text is a multi-line that is mandatory.

```
TBPost >> descriptionText
  <magritteDescription>
  ^ MAMemoDescription new
    accessor: #text;
    beRequired;
    yourself
```

The category is represented as a string and it does not have to be given. In such case the post will be sorted in the 'Unclassified' category.

```
TBPost >> descriptionCategory
  <magritteDescription>
  ^ MAStringDescription new
    accessor: #category;
    yourself
```

The post creation time is important since it is used to sort posts. It is then required.

```
TBPost >> descriptionDate
  <magritteDescription>
  ^ MAMemoDescription new
    accessor: #date;
    beRequired;
    yourself
```

The visible instance variable should be a Boolean and it is required.

```
TBPost >> descriptionVisible
<magritteDescription>
 ^ MABooleanDescription new
   accessor: #visible;
   beRequired;
   yourself
```

We could enrich the descriptions so that it is not possible to publish a post with a date before the current day. We could change the description of a category to make sure that a category is part of a predefined list of categories. We do not do it to keep it to the main point.

9.3 Automatic Component Creation

Once a post described we can generate a Seaside component by sending a message `asComponent` to an post instance.

```
[ aTBPost asComponent
```

Let us see how we can use this in the following.

9.4 Building a post report

We will develop a new component that will be used by the component `TBAdminComponent`. The `TBPostReport` component is a report that will contain all the posts. As we will see below the report Seaside component will be generated automatically from Magritte. We could have develop only one component but we prefer to distinguish it from the admin component for future evolution.

The PostsReport Component

Post list is displayed using a report dynamically generated by Magritte. We will use Magritte to implement the different behaviors of the admin activity (post list, post creation, edition, delete of a post).

The component `TBPostsReport` is a subclass of `TBSMagritteReport` that manages reports with Bootstrap.

```
[ TBSMagritteReport subclass: #TBPostsReport
  instanceVariableNames: ''
  classVariableNames: ''
  package: 'TinyBlog-Components'
```

We add a creation method that takes a blog as argument.

```
TBPostsReport class >> from: aBlog
  | allBlogs |
  allBlogs := aBlog allBlogPosts.
  ^ self rows: allBlogs description: allBlogs anyOne
    magritteDescription
```

9.5 AdminComponent Integration with PostsReport

Let us now revise our TBAdminComponent to display this report.

We add an instance variable report and its accessors in the class TBAdminComponent.

```
TBScreenComponent subclass: #TBAdminComponent
  instanceVariableNames: 'report'
  classVariableNames: ''
  package: 'TinyBlog-Components'
```

```
TBAdminComponent >> report
  ^ report
```

```
TBAdminComponent >> report: aReport
  report := aReport
```

Since the report is a son component of the admin component we should not forget to redefine the method children. Note that the collection contains the subcomponents defined in the superclass (header component) and those in current class (report component).

```
TBAdminComponent >> children
  ^ super children copyWith: self report
```

In initialize method we instantiate a report by giving it a blog instance.

```
TBAdminComponent >> initialize
  super initialize.
  self report: (TBPostsReport from: self blog)
```

Let us modify the admin part rendering to display the report.

```
TBAdminComponent >> renderContentOn: html
  super renderContentOn: html.
  html tbsContainer: [
    html heading: 'Blog Admin'.
    html horizontalRule.
    html render: self report ]
```

You can test this change by refreshing your web browser.

9.6 Filter Columns

By default, a report displays the full data of each post. However, some columns are not useful. We should filter the columns. Here we only keep the title, category and publication date.

We add a class method for the column selection and modify the method from: to use this.

```
TBPostsReport class >> filteredDescriptionsFrom: aBlogPost
  "Filter only some descriptions for the report columns."

  ^ aBlogPost magritteDescription
    select: [ :each | #(title category date) includes: each accessor
              selector ]

TBPostsReport class >> from: aBlog
  | allBlogs |
  allBlogs := aBlog allBlogPosts.
  ^ self rows: allBlogs description: (self
    filteredDescriptionsFrom: allBlogs anyOne)
```

Figure 9-3 shows the situation that you should get.

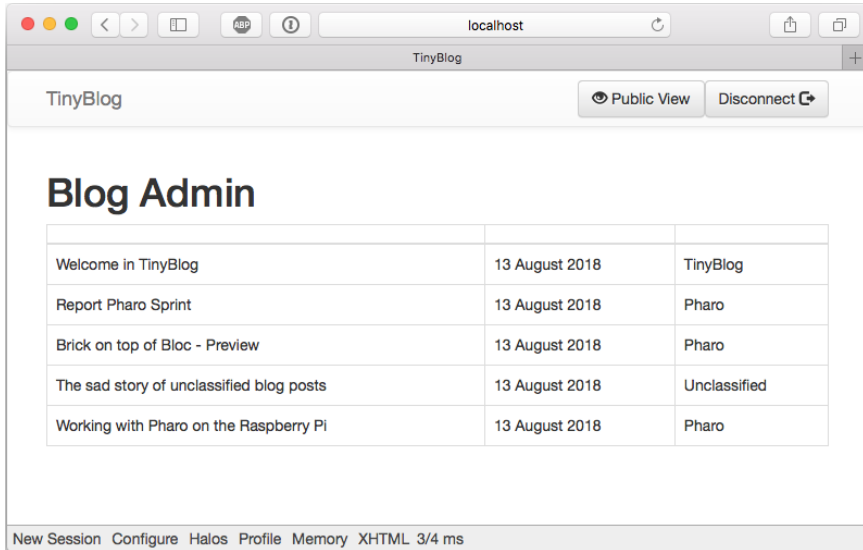


Figure 9-3 Magritte report with posts.

9.7 Report Enhancements

The previous report is pretty raw. There is no title on columns and the display column order is not fixed. This can change from one instance to the other. To handle this, we modify the description for each instance variable. We specify a priority and a title (message label:) as follows:

```
TBPost >> descriptionTitle
<magritteDescription>
^ MStringDescription new
  label: 'Title';
  priority: 100;
  accessor: #title;
  beRequired;
  yourself
```

```
TBPost >> descriptionText
<magritteDescription>
^ MAMemoDescription new
  label: 'Text';
  priority: 200;
  accessor: #text;
  beRequired;
  yourself
```

```
TBPost >> descriptionCategory
<magritteDescription>
^ MStringDescription new
  label: 'Category';
  priority: 300;
  accessor: #category;
  yourself
```

```
TBPost >> descriptionDate
<magritteDescription>
^ MDateDescription new
  label: 'Date';
  priority: 400;
  accessor: #date;
  beRequired;
  yourself
```

```
TBPost >> descriptionVisible
<magritteDescription>
^ MBooleanDescription new
  label: 'Visible';
  priority: 500;
  accessor: #visible;
  beRequired;
  yourself
```

You should obtain the situation such as represented by Figure 9-4.

Title	Category	Date
Welcome in TinyBlog	TinyBlog	13 August 2018
Report Pharo Sprint	Pharo	13 August 2018
Brick on top of Bloc - Preview	Pharo	13 August 2018
The sad story of unclassified blog posts	Unclassified	13 August 2018
Working with Pharo on the Raspberry PI	Pharo	13 August 2018

Figure 9-4 Administration Report.

9.8 Post Administration

We can now put in place a CRUD (Create Read Update Delete) allowing to generate posts. For this, we will add a new column (instance of `MACCommandColumn`) to the report. This column will group the different operations using the `addCommandOn: message`. This method allows one to define a link that will execute a method of the current object. We give access to the blog the report is build for.

```
TBSMagritteReport subclass: #TBPostsReport
  instanceVariableNames: 'blog'
  classVariableNames: ''
  package: 'TinyBlog-Components'
```

```
TBPostsReport >> blog
  ^ blog
```

```
TBPostsReport >> blog: aTBBlog
  blog := aTBBlog
```

The method `from:` adds a new column to the report. It groups the different operations.

```
TBPostsReport class >> from: aBlog
  | report blogPosts |
  blogPosts := aBlog allBlogPosts.
  report := self rows: blogPosts description: (self
  filteredDescriptionsFrom: blogPosts anyOne).
  report blog: aBlog.
  report addColumn: (MACCommandColumn new
```



```

        addCommandOn: report selector: #viewPost: text: 'View';
    yourself;
        addCommandOn: report selector: #editPost: text: 'Edit';
    yourself;
        addCommandOn: report selector: #deletePost: text: 'Delete';
    yourself).
    ^ report

```

We will have to define the methods linked to each operation in the following section.

In addition this method is a bit lengthy and it does not separate the report definition from the operation definition. A possible solution is to create an instance method named `addCommands` and to call it explicitly. Try to do it to practice.

9.9 Post Addition

Addition a post is not associated with a post and we place just before the main report. Since this behavior is then part of the component `TBPostsReport`, we should redefine the method `renderContentOn:` of the component `TBPostsReport` to insert a link add.

```

TBPostsReport >> renderContentOn: html
    html tbsGlyphIcon iconPencil.
    html anchor
        callback: [ self addPost ];
        with: 'Add post'.
    super renderContentOn: html

```

Login another time and you should get the situation as it is represented in Figure 9-5.

9.10 CRUD Action Implementation

Each action (Create/Read/Update/Delete) should invoke methods of the instance of `TBPostsReport`. We implement them now. A personalized form is built based on the requested operation (it is not necessary to have a save button when the user is just viewing a post).

9.11 Post Addition

Let us begin with post addition. The following method `renderAddPostForm:` illustrates the power of Magritte to generate forms:

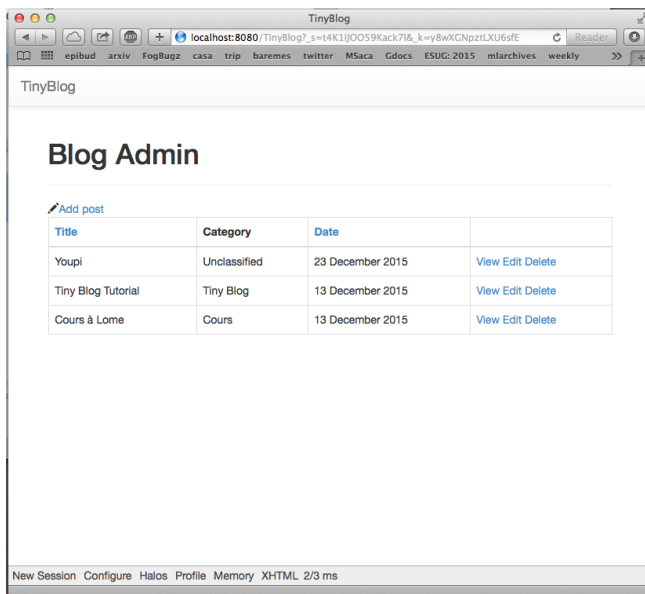


Figure 9-5 Post report with links.

```
TBPostsReport >> renderAddPostForm: aPost
  ^ aPost asComponent
    addDecoration: (TBSMagritteFormDecoration buttons: { #save
-> 'Add post' . #cancel -> 'Cancel'});
  yourself
```

Here the message `asComponent`, sent to the object of class `TBPost`, creates directly a component. We add a decoration to this component to manage ok/cancel.

The method `addPost` displays the component returned by the method `renderAddPostForm:` and when a new post is created, it is added for the blog. The method `writeBlogPost:` saves the changes the user may do.

```
TBPostsReport >> addPost
  | post |
  post := self call: (self renderAddPostForm: TBPost new).
  post ifNotNil: [ blog writeBlogPost: post ]
```

In this method we see another use of the message `call:` to give the control to a component. The link to add a post allows one to display a creation form that we will make better looking later (See Figure 9-6).

TinyBlog Public View Disconnect

Blog Admin

Title:

Text:

Category:

Date:

Visible: Visible

Figure 9-6 Basic rendering of a post.

Post Display

To display a post in read-only mode, we define two methods similar to the previous. Note that we use the `readonly: true` to indicate that the form is not editable.

```
TBPostsReport >> renderViewPostForm: aPost
  ^ aPost asComponent
    addDecoration: (TBSMagritteFormDecoration buttons: { #cancel
-> 'Back' });
    readonly: true;
    yourself
```

Looking at a post does not require any extra action other than rendering it.

```
TBPostsReport >> viewPost: aPost
  self call: (self renderViewPostForm: aPost)
```

Post Edition

To edit a post, we use the same approach.

```
TBPostsReport >> renderEditPostForm: aPost
  ^ aPost asComponent addDecoration: (
    TBSMagritteFormDecoration buttons: {
      #save -> 'Save post'.
      #cancel -> 'Cancel'});
    yourself
```

Now the method `editPost:` gets the value of the `call: message` and saves the changes made.

```

TBPostsReport >> editPost: aPost
  | post |
  post := self call: (self renderEditPostForm: aPost).
  post ifNotNil: [ blog save ]

```

Removing a post

We must now adding the method `removeBlogPost:` to the class `TBBlog`:

```

TBBlog >> removeBlogPost: aPost
  posts remove: aPost ifAbsent: [ ].
  self save.

```

Let us add a unit test:

```

TBBlogTest >> testRemoveBlogPost
  self assert: blog size equals: 1.
  blog removeBlogPost: blog allBlogPosts anyOne.
  self assert: blog size equals: 0

```

To avoid an unwanted operation, we use a modal dialog so that the user confirms the deletion of the post. One the post is displayed, the list of managed posts by `TBPostsReport` is changed and should be refresh.

```

TBPostsReport >> deletePost: aPost
  (self confirm: 'Do you want remove this post ?')
  ifTrue: [ blog removeBlogPost: aPost ]

```

9.12 Refreshing Posts

The methods `addPost:` and `deletePost:` are working well but the display is not refreshed. We need to refresh the post lists using the expression `self refresh`.

```

TBPostsReport >> refreshReport
  self rows: blog allBlogPosts.
  self refresh.

TBPostsReport >> addPost
  | post |
  post := self call: (self renderAddPostForm: TBPost new).
  post
    ifNotNil: [ blog writeBlogPost: post.
               self refreshReport ]

TBPostsReport >> deletePost: aPost
  (self confirm: 'Do you want remove this post ?')
  ifTrue: [ blog removeBlogPost: aPost.
           self refreshReport ]

```

The report is not working and it even manage input constraints: for example, mandatory fields should be filled up.

9.13 Better Form Look

To take advantage of Bootstrap, we will modify Magritte definitions. First we specify that the report rendering based on Bootstrap.

A container in Magritte is the element that will contain the other components created from descriptions.

```
TBPost >> descriptionContainer
  <magritteContainer>
    ^ super descriptionContainer
      componentRenderer: TBSMagritteFormRenderer;
      yourself
```

We want can now pay attention of the different input fields and improve their appearance.

```
TBPost >> descriptionTitle
  <magritteDescription>
    ^ MAStringDescription new
      label: 'Title';
      priority: 100;
      accessor: #title;
      requiredErrorMessage: 'A blog post must have a title.';
      comment: 'Please enter a title';
      componentClass: TBSMagritteTextInputComponent;
      beRequired;
      yourself
```

```
TBPost >> descriptionText
  <magritteDescription>
    ^ MAMemoDescription new
      label: 'Text';
      priority: 200;
      accessor: #text;
      beRequired;
      requiredErrorMessage: 'A blog post must contain a text.';
      comment: 'Please enter a text';
      componentClass: TBSMagritteTextAreaComponent;
      yourself
```

```
TBPost >> descriptionCategory
  <magritteDescription>
    ^ MAStringDescription new
      label: 'Category';
      priority: 300;
      accessor: #category;
      comment: 'Unclassified if empty';
```

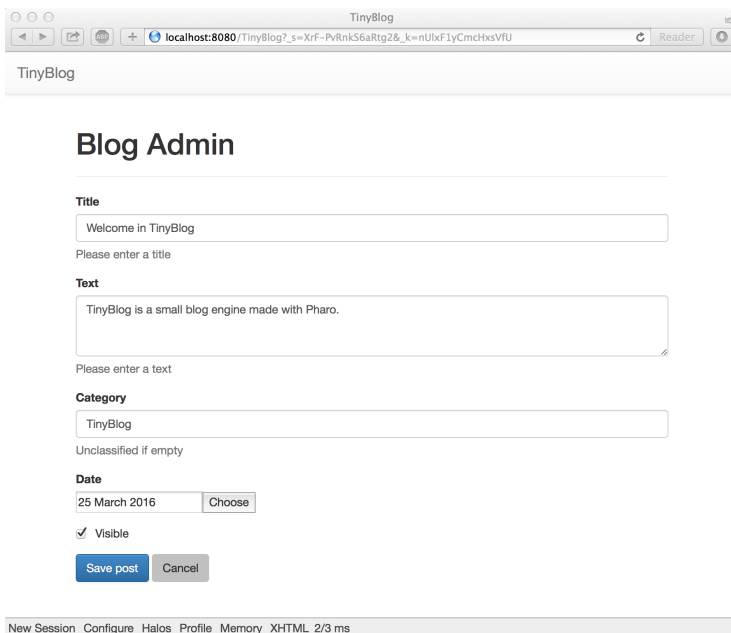


Figure 9-7 Post form addition with Bootstrap.

```

componentClass: TBSMagritteTextInputComponent;
yourself

TBPost >> descriptionVisible
<magritteDescription>
^ MABooleanDescription new
  checkboxLabel: 'Visible';
  priority: 500;
  accessor: #visible;
  componentClass: TBSMagritteCheckboxComponent;
  beRequired;
yourself

```

Based on new Magritte descriptions, forms generated now use Bootstrap. For example, the post form edition should not look like Figure 9-7.

9.14 Conclusion

In this chapter we defined the administration of TinyBlog based on reports built out of the posts contained in the current blog. We added links to manage CRUD for each post. What we show is that adding descriptions on posts lets us generate Seaside components automatically.

Loading Chapter Code

This chapter contains the expressions to load the code described in each of the chapters. Such expressions can be executed in any Pharo 8.0 (or above) image. Nevertheless, using the Pharo MOOC image (cf. Pharo Launcher) is usually faster because it already includes several libraries such as: Seaside, Voyage, ...

When you start for example the chapter 4, you can load all the code of the previous chapters (1, 2, and 3) by following the process described in the following section 'Chapter 4'.

Obviously, we believe that this is better that you use you own code but having our code at hand can help you in case you would be stuck.

10.1 Chapter 3: Extending and Testing the Model

You can load the correction of the previous chapter as follow:

```
Metacello new
  baseline: 'TinyBlog';
  repository: 'github://LucFabresse/TinyBlog:chapter2/src';
  onConflict: [ :ex | ex useLoaded ];
  load
```

Run the tests! To do so, you can use the TestRunner (Tools menu > Test Runner), look for the package TinyBlog-Tests and click on "Run Selected". All tests should be green.

10.2 Chapter 4: Data Persistency using Voyage and Mongo

You can load the correction of the previous chapter as follow:

```
Metacello new
  baseline:'TinyBlog';
  repository: 'github://LucFabresse/TinyBlog:chapter3/src';
  onConflict: [ :ex | ex useLoaded ];
  load
```

Once loaded execute the tests.

10.3 Chapter 5: First Steps with Seaside

You can load the correction of the previous chapter as follow:

```
Metacello new
  baseline:'TinyBlog';
  repository: 'github://LucFabresse/TinyBlog:chapter4/src';
  onConflict: [ :ex | ex useLoaded ];
  load
```

Execute the tests.

To test the application, start the HTTP server:

```
[ZnZincServerAdaptor startOn: 8080.
```

Open your web browser at <http://localhost:8080/TinyBlog>

You may need to recreate some posts as follows:

```
[TBBlog reset ; createDemoPosts
```

10.4 Chapitre 6: Web Components for TinyBlog

You can load the correction of the previous chapter as follow:

```
Metacello new
  baseline:'TinyBlog';
  repository: 'github://LucFabresse/TinyBlog:chapter5/src';
  onConflict: [ :ex | ex useLoaded ];
  load
```

Same process as above.

10.5 Chapitre 7: Managing Categories

You can load the correction of the previous chapter as follow:


```
Metacello new
  baseline: 'TinyBlog';
  repository: 'github://LucFabresse/TinyBlog:chapter6/src';
  onConflict: [ :ex | ex useLoaded ];
  load
```

To test the application, start the HTTP server:

```
ZnZincServerAdaptor startOn: 8080.
```

Open your web browser at <http://localhost:8080/TinyBlog>

You may need to recreate some posts as follows:

```
TBBlog reset ; createDemoPosts
```

10.6 Chapitre 8: Authentication and Session

You can load the correction of the previous chapter as follow:

```
Metacello new
  baseline: 'TinyBlog';
  repository: 'github://LucFabresse/TinyBlog:chapter7/src';
  onConflict: [ :ex | ex useLoaded ];
  load
```

To test the application, start the HTTP server:

```
ZnZincServerAdaptor startOn: 8080.
```

10.7 Chapitre 9: Administration Web Interface and Automatic Form Generation

You can load the correction of the previous chapter as follow:

```
Metacello new
  baseline: 'TinyBlog';
  repository: 'github://LucFabresse/TinyBlog:chapter8/src';
  onConflict: [ :ex | ex useLoaded ];
  load
```

10.8 Latest Version of TinyBlog

The most up-to-date version of TinyBlog can be loaded as follow:

```
Metacello new
  baseline: 'TinyBlog';
  repository: 'github://LucFabresse/TinyBlog/src';
  onConflict: [ :ex | ex useLoaded ];
  load
```

i Load.



Save your code

When you save the Pharo image (Pharo Menu > Save menuentry), it contains all objects of the system as well as all classes. This solution is useful but fragile. We will show you how Pharoers save their code directly using Iceberg. Iceberg is the Pharo code versioning tools (introduced in Pharo 7.0) that directly send code to well-known Web sites such as: github, bitbucket, or gitlab.

We suggest you read the chapter in the book "Managing Your Code with Iceberg" (available at <http://books.pharo.org>).

We list the key points here:

- Create an account on <http://www.github.com> or similar.
- Create a project on <http://www.github.com> or similar.
- Add a new project into Iceberg by choosing the option: clone from github.
- Create a folder 'src' with the filelist or using the command line in the folder that you just cloned.
- Open your project and add your packages (Define a baseline to be able to reload your code – check <https://github.com/pharo-open-documentation/pharo-wiki/blob/master/General/Baselines.md>)
- Commit your code.
- Push your code on github.

