Wicket Viewer

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Chapter 1. Wicket Viewer

The Wicket Viewer automatically exposes an Apache Isis domain object model for use by end-users. The viewer is implemented using Apache Wicket.

This user guide discuss end-user features, configuration and customization of the Wicket viewer.

It also discusses how to extend the viewer, and the (non-ASF) Incode Platform wicket components.

1.1. Other Guides

Apache Isis documentation is broken out into a number of user and reference guides.

The user guides available are:

- Fundamentals
- Wicket viewer (this guide)
- Restful Objects viewer
- DataNucleus object store
- Security
- Testing
- Beyond the Basics

The reference guides are:

- Annotations
- Domain Services
- Configuration Properties
- Classes, Methods and Schema
- Apache Isis Maven plugin
- Framework Internal Services

The remaining guides are:

- Developers' Guide (how to set up a development environment for Apache Isis and contribute back to the project)
- Committers' Guide (release procedures and related practices)

Chapter 2. Features/end-user usage

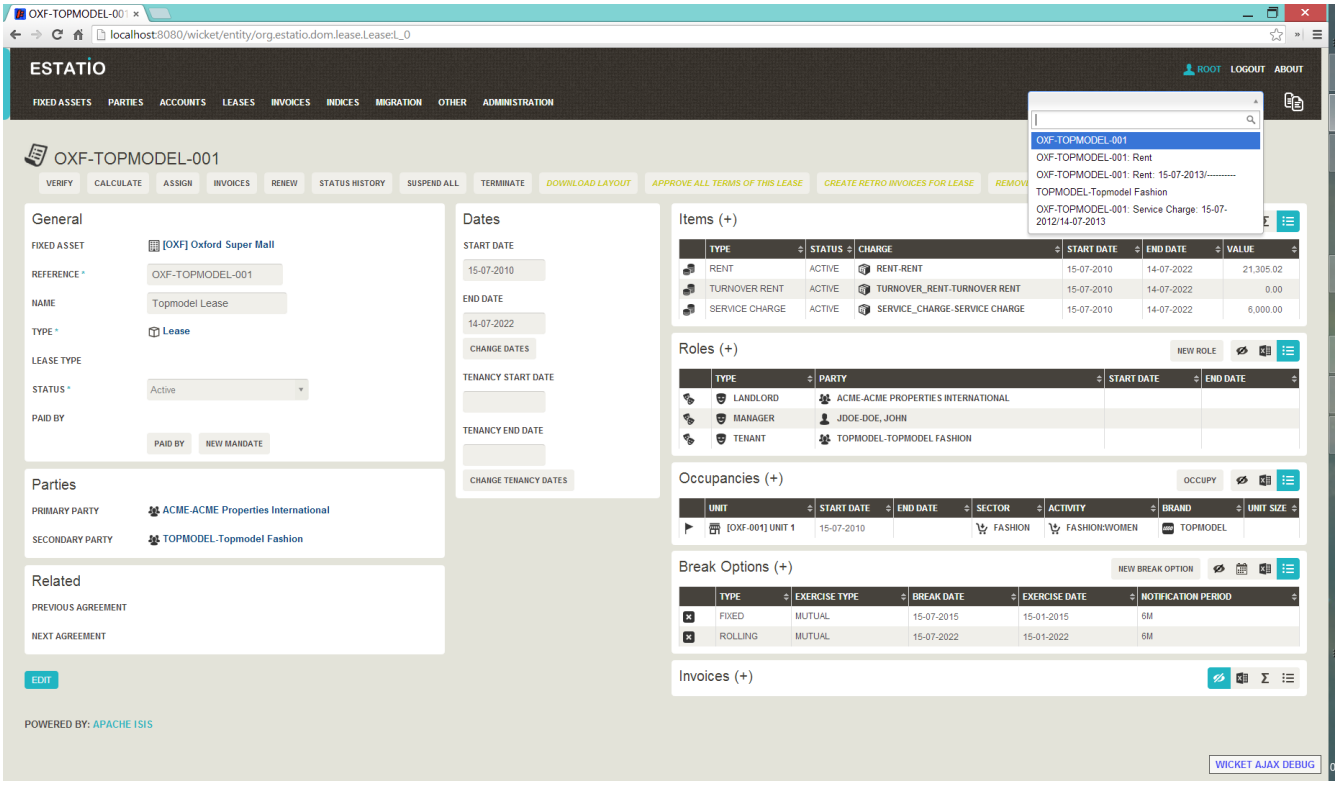
This section discusses features of the wicket viewer from the perspective of an end-user actually using your Apache Isis application.

2.1. Recent pages (drop down)

The Wicket viewer provides a recent pages drop-down that acts as a breadcrumb trail. Using it, the user can quickly open a recently accessed domain object.

2.1.1. Screenshots

The following screenshot, taken from the Estatio application, shows the recent pages drop-down after a number of pages have been accessed.



Note that this screenshot show an earlier version of the Wicket viewer UI (specifically, pre 1.8.0).

2.1.2. Domain Code

The recent pages drop-down is automatically populated; no changes need to be made to the domain classes.

2.1.3. User Experience

Selecting the domain object from the list causes the viewer to automatically navigate to the page for the selected object.

2.1.4. Related functionality

The bookmarked pages (sliding panel) also provides links to recently visited objects, but only those explicitly marked as `@DomainObject(bookmarking=⋯)`. The bookmarks panel also nests related objects together hierarchically (the recent pages drop-down does not).

2.1.5. Configuration

The number of objects is hard-coded as 10; it cannot currently be configured.

2.2. Bookmarked pages

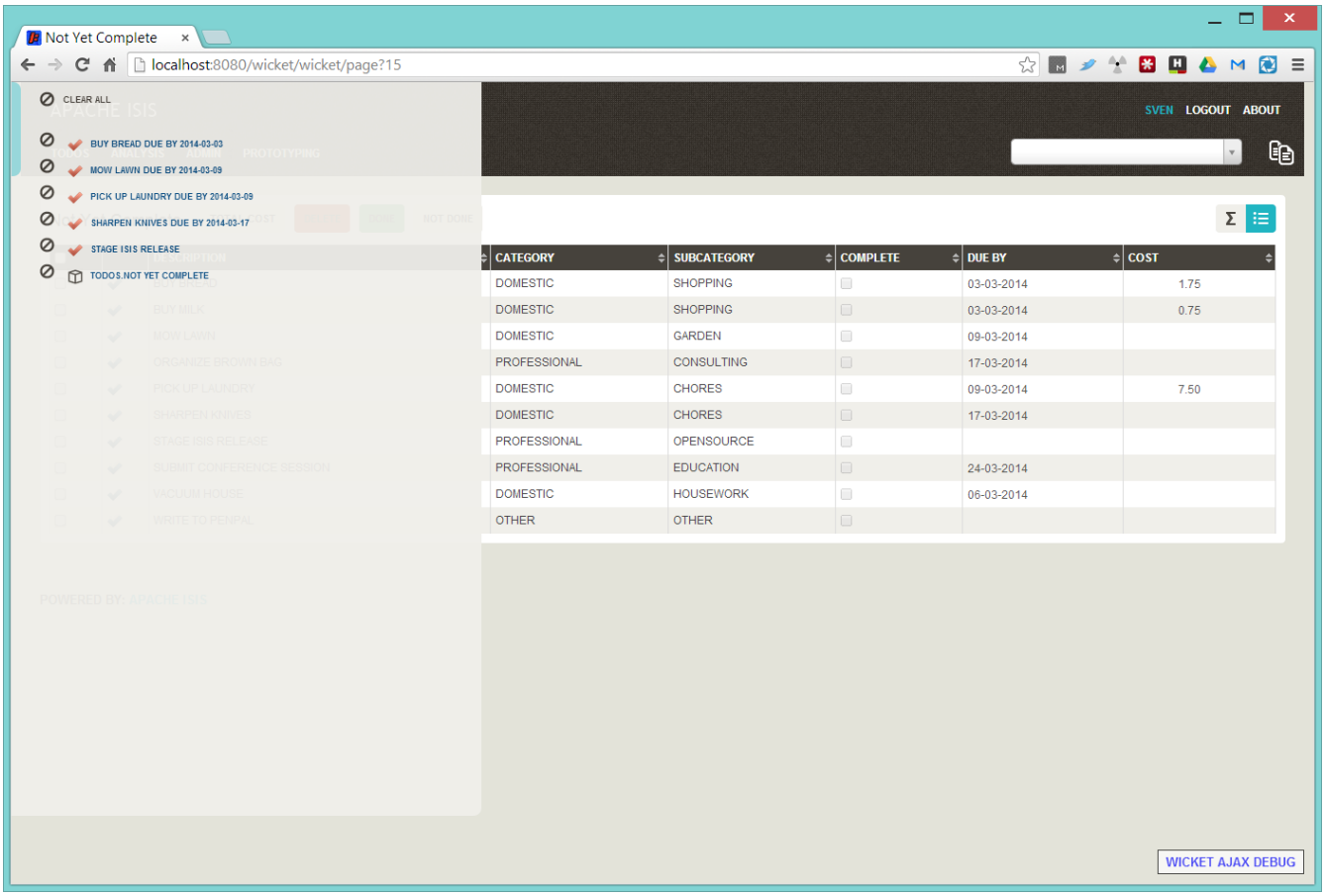
The Wicket viewer supports the bookmarking of both domain objects and query-only (@Action(semantics=...)) actions.

Domain objects, if bookmarkable, can be nested.

Bookmarking is automatic; whenever a bookmarkable object/action is visited, then a bookmark is created. To avoid the number of bookmarks from indefinitely growing, bookmarks that have not been followed after a whle are automatically removed (an MRU/LRU algorithm). The number of bookmarks to preserve can be configured.

2.2.1. Screenshots

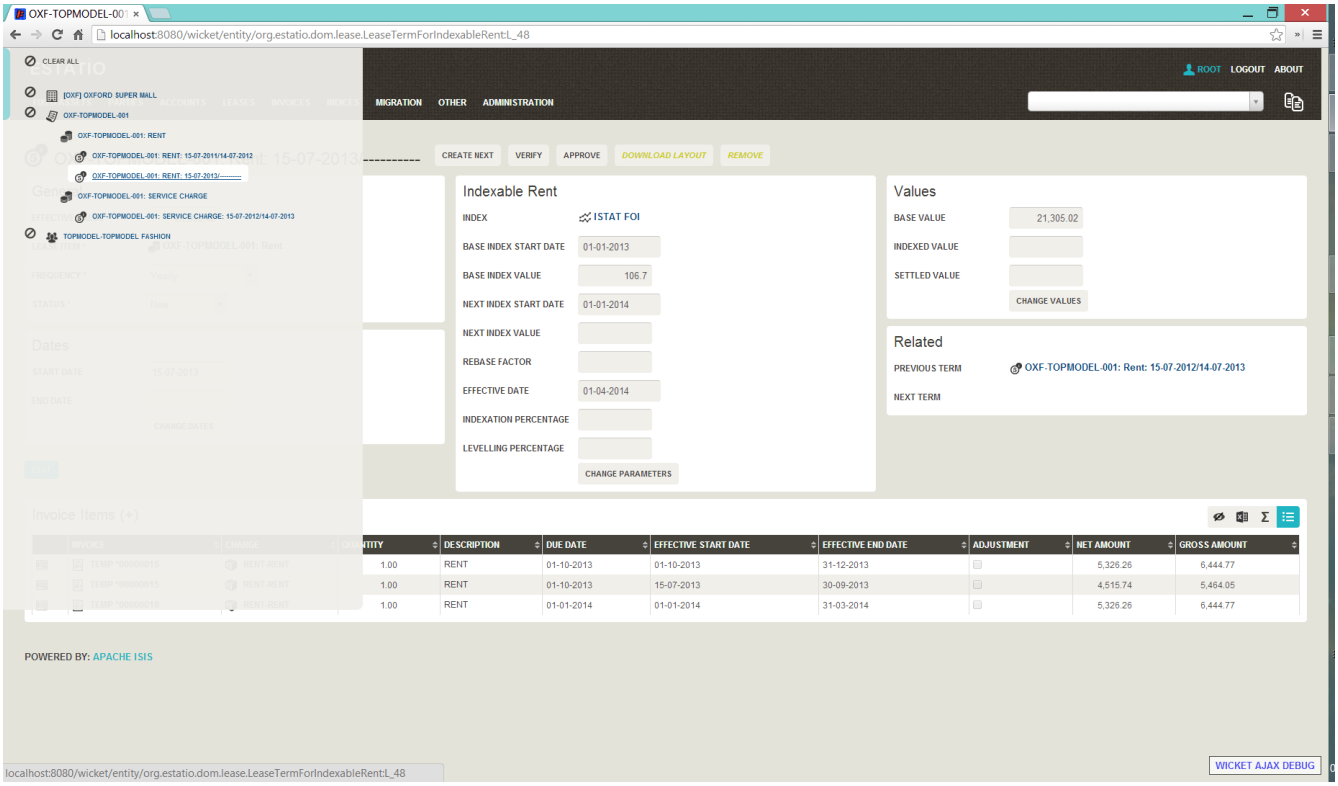
The following screenshot, taken from Isisaddons example todoapp (not ASF) shows how the bookmarks are listed in a sliding panel.



Note that these screenshots show an earlier version of the Wicket viewer UI (specifically, pre 1.8.0).

Note how the list contains both domain objects and an action ("not yet complete").

Bookmarks can also form a hierarchy. The following screenshot, also taken from the Estatio application, shows a variety of different bookmarked objects with a nested structure:



Some - like `Property`, `Lease` and `Party` - are root nodes. However, `LeaseItem` is bookmarkable as a child of `Lease`, and `LeaseTerm` is bookmarkable only as a child of `LeaseItem`. This parent/child relationship is reflected in the layout.

2.2.2. Domain Code

To indicate a class is bookmarkable, use the @DomainObjectLayout annotation:

```
@DomainObjectLayout(
    bookmarking=BookmarkPolicy.AS_ROOT
)
public class Lease { ... }
```

To indicate a class is bookmarkable but only as a child of some parent bookmark, specify the bookmark policy:

```
@DomainObjectLayout(
    bookmarking=BookmarkPolicy.AS_CHILD
)
public class LeaseItem { ... }
```

To indicate that a safe (query only) action is bookmarkable, use the @ActionLayout annotation:

```
public class ToDoItem ... {
    @Action(
        semantics=SemanticsOf.SAFE
    )
    @ActionLayout(
         bookmarking=BookmarkPolicy.AS_ROOT
     )
    public List<ToDoItem> notYetComplete() { ... }
    ...
}
```

The BookmarkPolicy.AS_CHILD does not have a meaning for actions; if the `bookmarking` attribute is set to any other value, it will be ignored.

2.2.3. User Experience

The sliding panel appears whenever the mouse pointer hovers over the thin blue tab (to the left of the top header region).

Alternatively, `alt+[` will toggle open/close the panel; it can also be closed using `Esc` key.

Related functionality

The Recent Pages also lists recently visited pages, selected from a drop-down.

2.2.4. Configuration

By default, the bookmarked pages panel will show a maximum of 15 'root' pages. This can be overridden using a property (in `isis.properties`), for example:

```
isis.viewer.wicket.bookmarkedPages.maxSize=20
```

2.3. Sidebar vs Modal Dialogs

The Wicket viewer supports two different styles of dialog prompts for actions that have parameters:

- the first is a (movable) modal dialog.

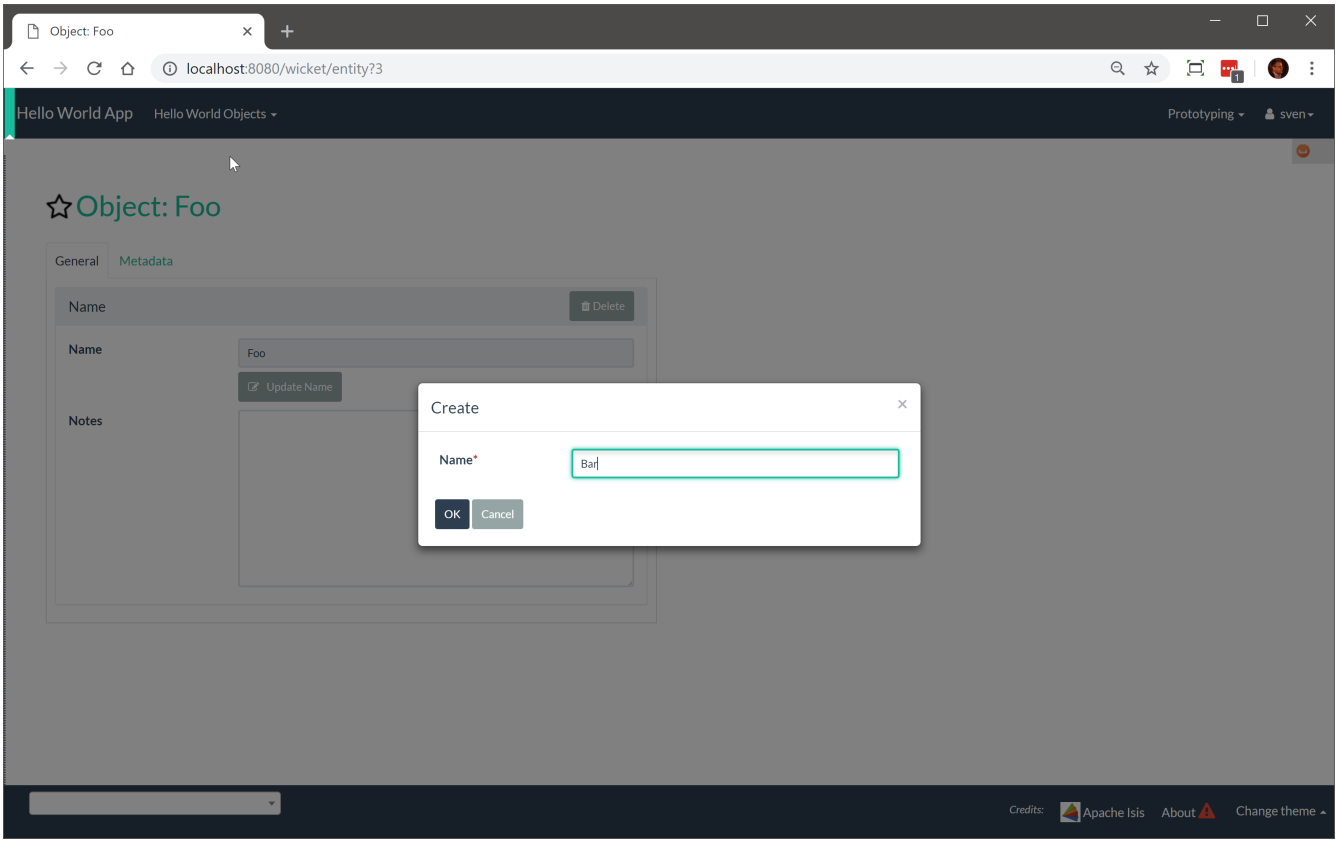
This was the only style available for 1.16.x and earlier versions.

- the second is as sidebar

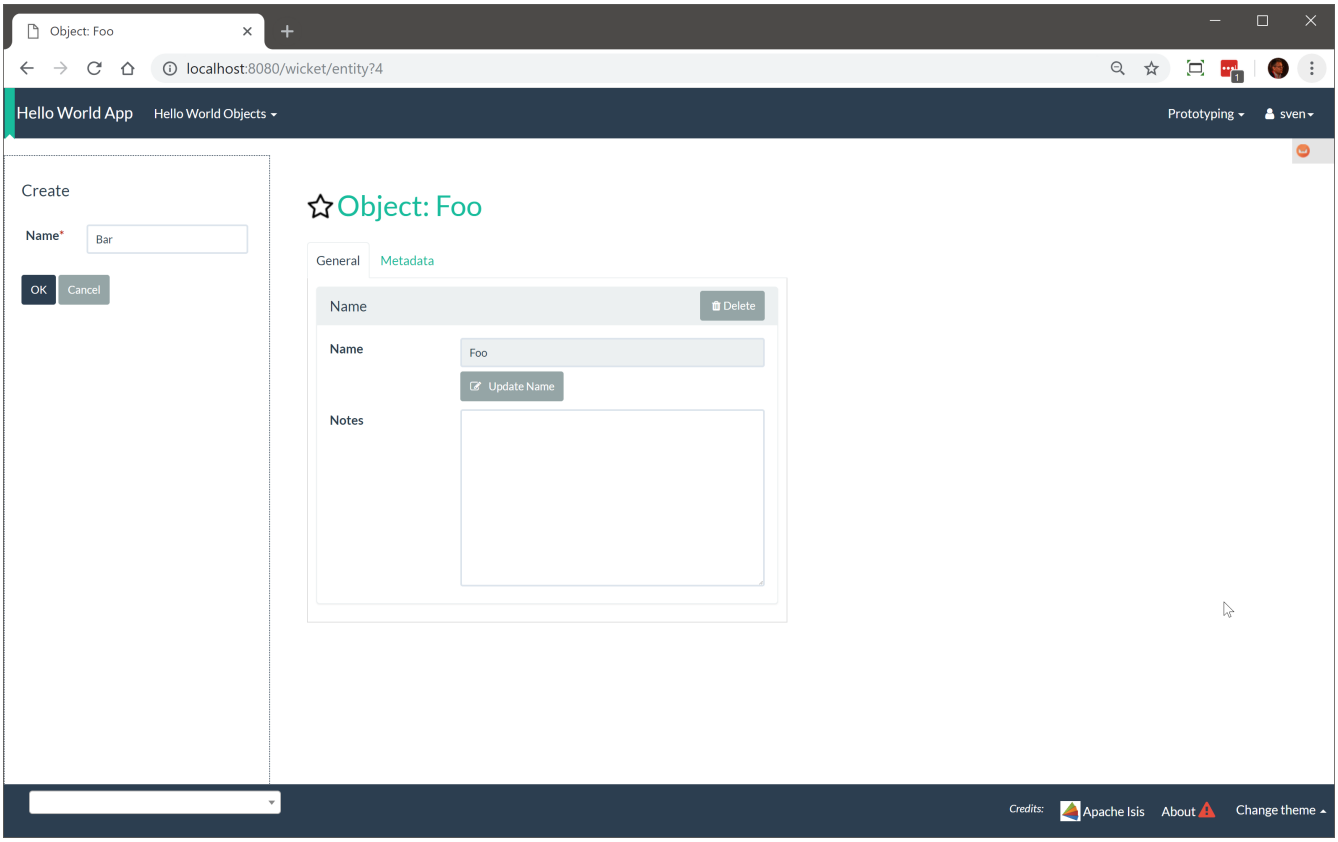
  This is available (and the default) for 1.17+.

The benefit of the sidebar dialog mode compared to the modal dialog is that it doesn't obscure the rest of the information shown on the page; it also doesn't interrupt the end-user's context so much (they are more likely to remember why they invoked the action). For these reasons the sidebar mode is now the default.

For example, here's what invoking an action (to create a new object) looks like using the original modal dialog:



And here's what it looks like with the sidebar dialog:



However, the original modal dialog can still be be used if end-users prefer that style, by setting the `isis.viewer.wicket.dialog` configuration property.

2.4. Hints and copy URL

While the user can often copy the URL of a domain object directly from the browser's address bar, the Wicket viewer also allows the URL of domain objects to be easily copied from a dialog.

More interestingly, this URL can also contain hints capturing any sorting or page numbering, or hiding/viewing of collections. End-users can therefore share these URLs as a form of deep linking into a particular view on a domain object.

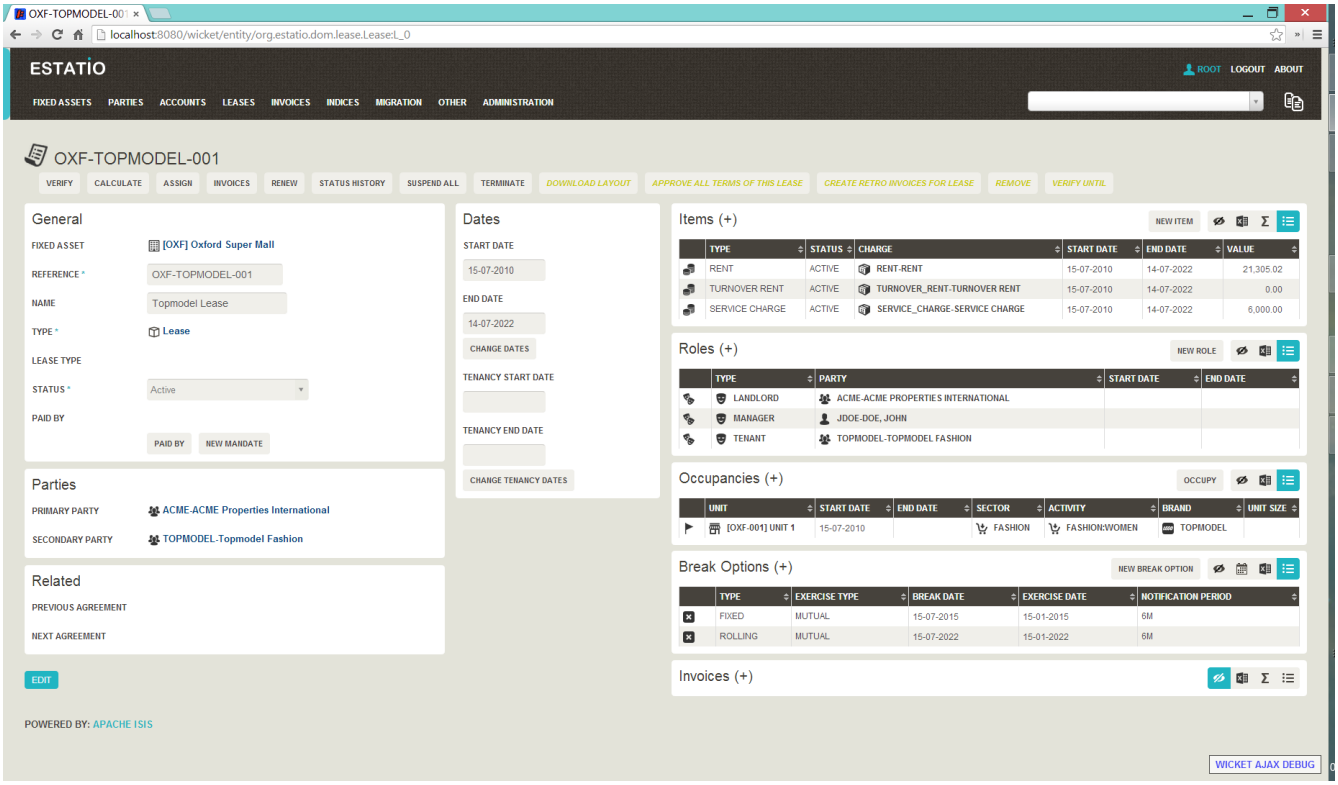
The copy URL and hinting is automatic.

2.4.1. Screenshots

The following screenshots are taken from the [Estatio](https://github.com/estatio/estatio) application.

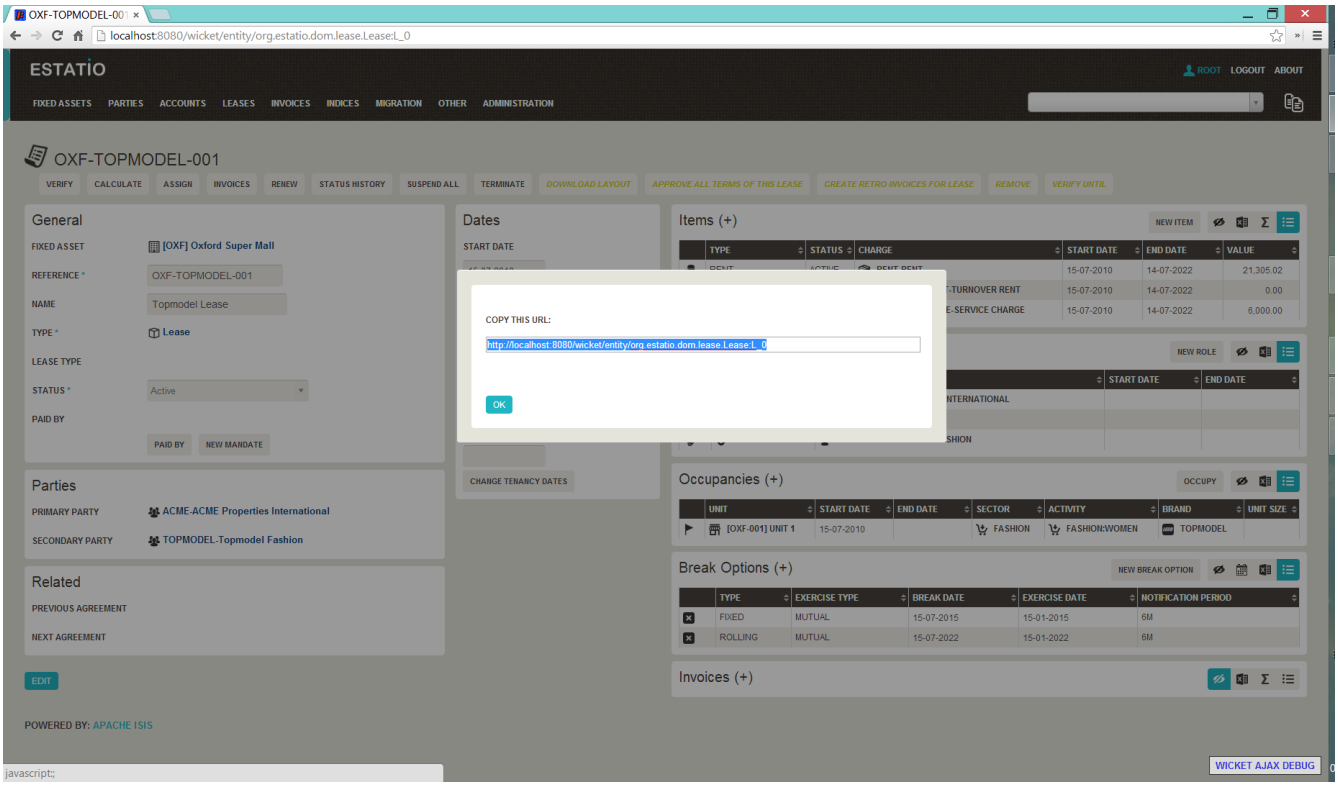
Copy URL

This screenshot shows the copy URL button (top right):



Note that these screenshots show an earlier version of the Wicket viewer UI (specifically, pre 1.8.0).

Clicking on this button brings up a dialog with the URL preselected:



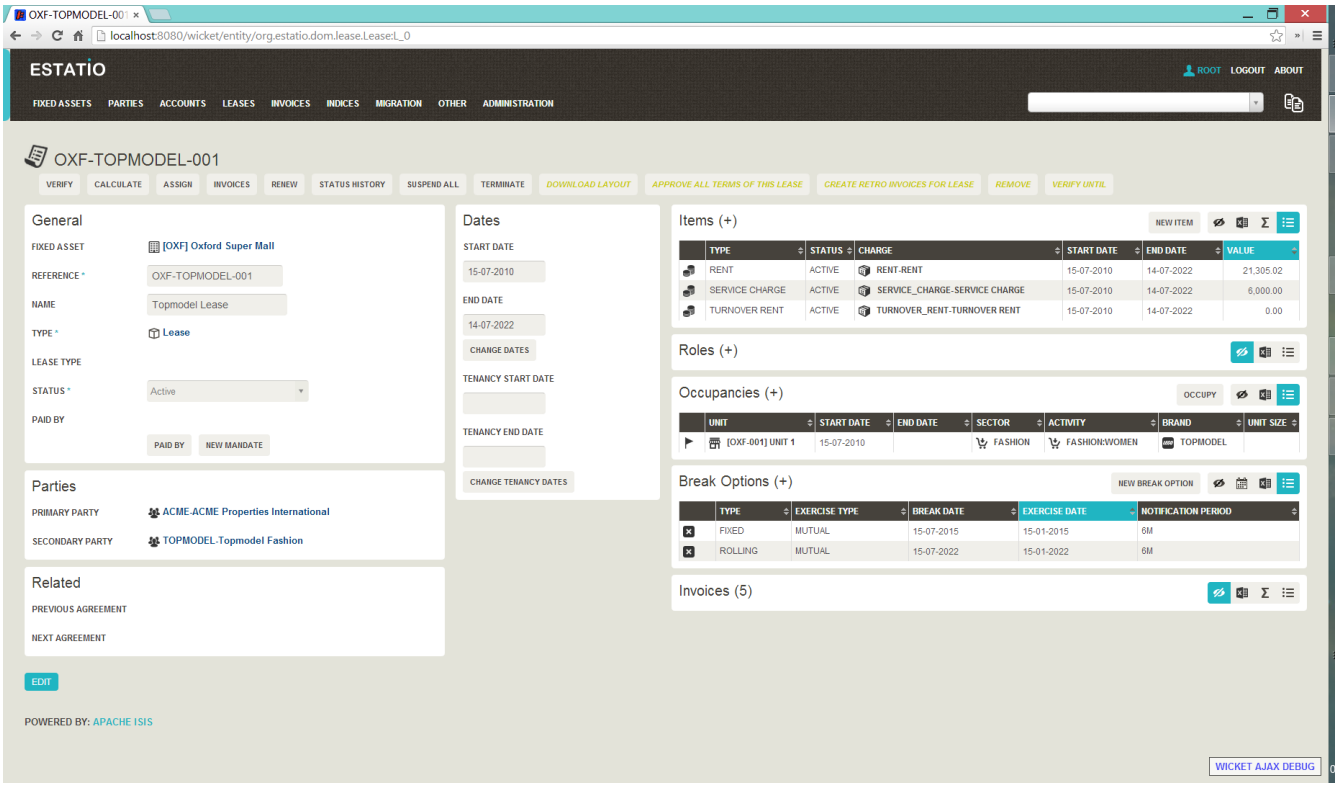
The URL in this case is something like:

```
http://localhost:8080/wicket/entity/org.estatio.dom.lease.Lease:0
```

The user can copy the link (eg `ctrl+C`) into the clipboard, then hit `OK` or `Esc` to dismiss the dialog.

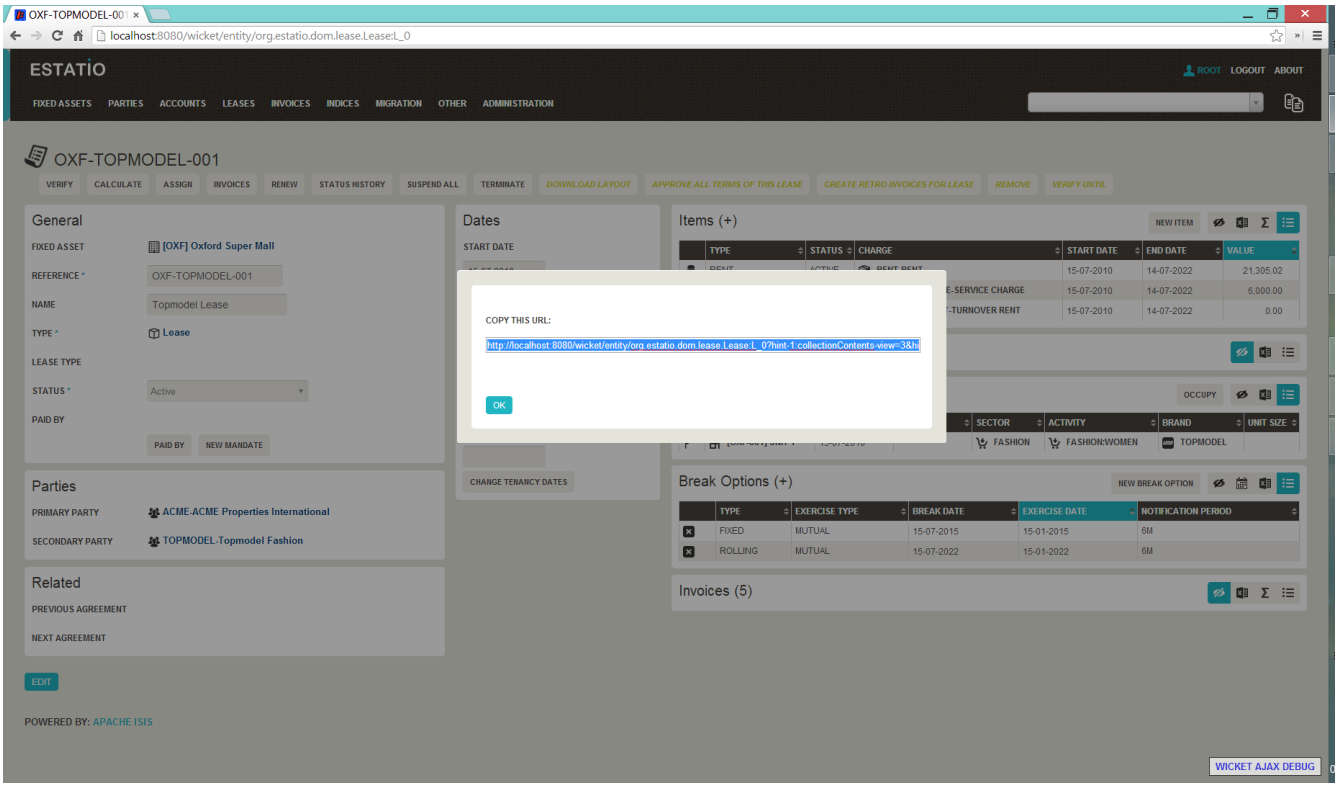
Hints

Using the viewer the user can hide/show collection tables, can sort the tables by header columns:



Also, if the collection spans multiple pages, then the individual page can be selected.

Once the view has been customised, the URL shown in the copy URL dialog is in an extended form:



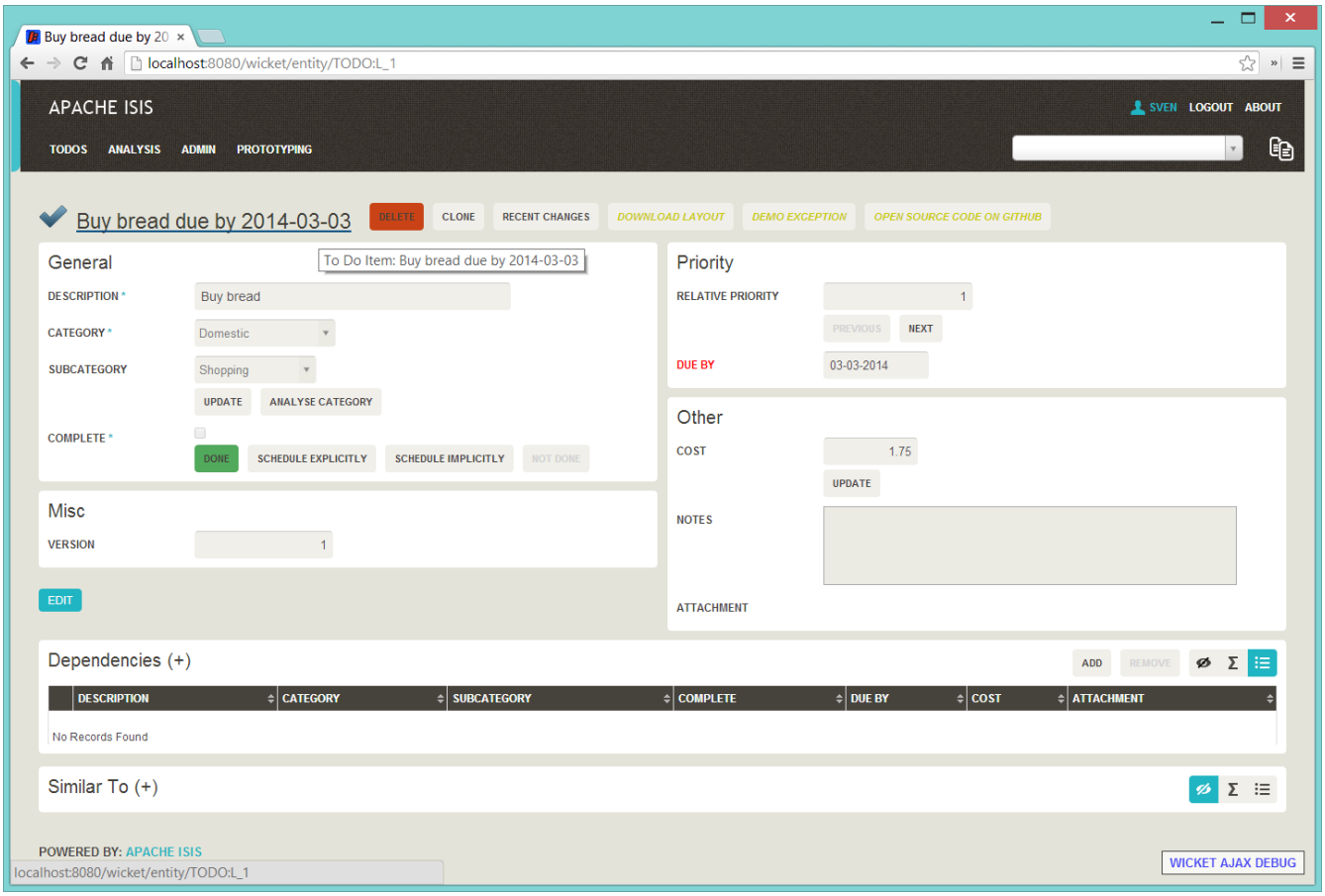
The URL in this case is something like:

```
http://localhost:8080/wicket/entity/org.estatio.dom.lease.Lease:0?hint-
1:collectionContents-view=3&hint-1:collectionContents:collectionContents-3:table-
DESCENDING=value&hint-1:collectionContents:collectionContents-3:table-
pageNumber=0&hint-2:collectionContents-view=0&hint-
2:collectionContents:collectionContents-2:table-pageNumber=0&hint-
3:collectionContents-view=2&hint-3:collectionContents:collectionContents-2:table-
pageNumber=0&hint-4:collectionContents-view=3&hint-
4:collectionContents:collectionContents-3:table-ASCENDING=exerciseDate&hint-
4:collectionContents:collectionContents-3:table-pageNumber=0&hint-
5:collectionContents-view=0&hint-5:collectionContents:collectionContents-3:table-
pageNumber=0
```

Copy URL from title

When the user invokes an action on the object, the URL (necessarily) changes to indicate that the action was invoked. This URL is specific to the user's session and cannot be shared with others.

A quick way for the user to grab a shareable URL is simply by clicking on the object's title:



2.4.2. User Experience

The copy URL dialog is typically obtained by clicking on the icon.

Alternatively, `alt+]` will also open the dialog. It can be closed with either `OK` or the `Esc` key.

2.5. Where am I

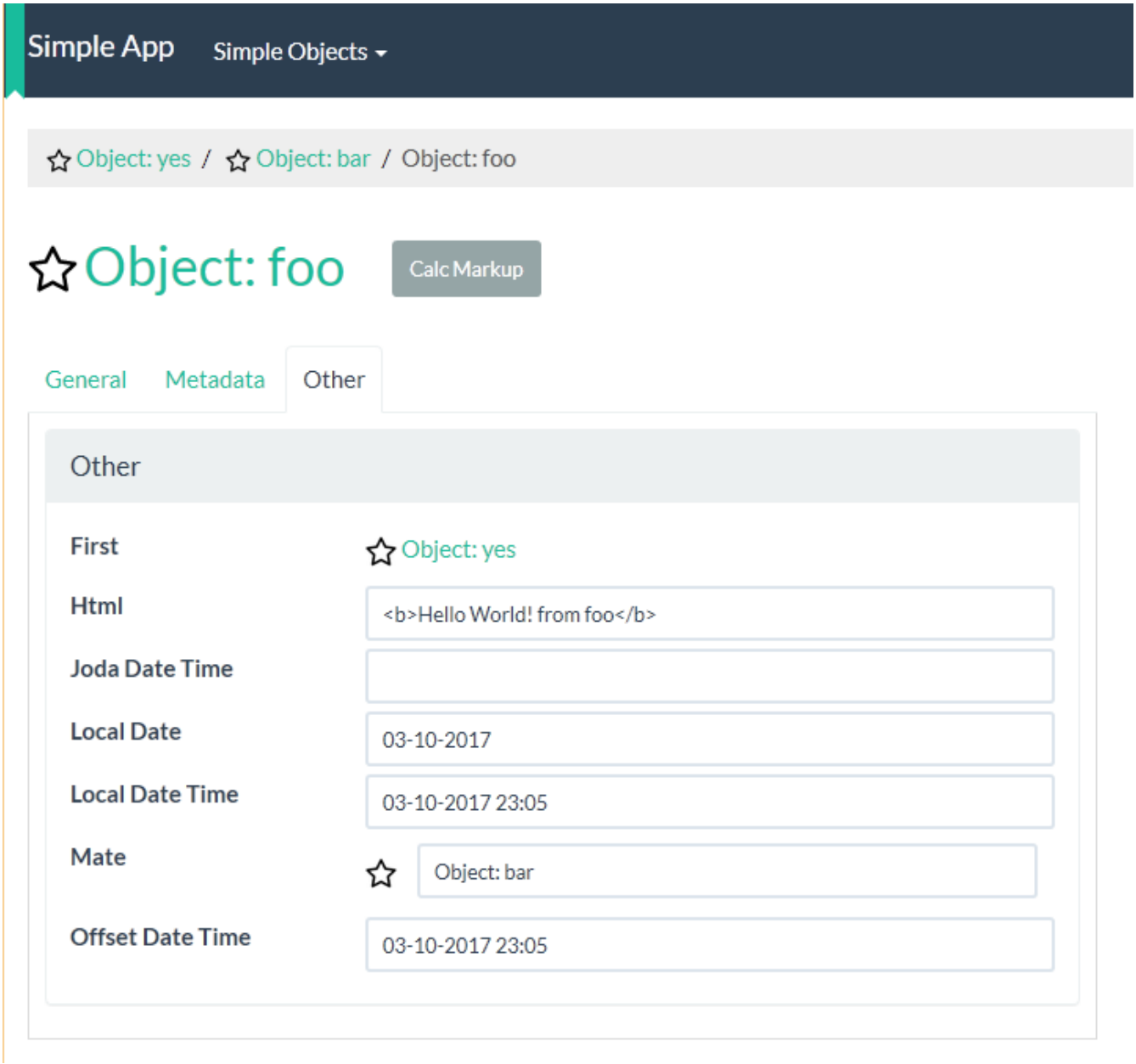
The Wicket viewer provides a secondary navigation scheme that allows users to quickly access domain objects, that are organized in a hierarchical manner.

This hierarchy can be understood as a navigable tree-structure, where the navigable tree-nodes are either domain objects or domain views. Domain objects that take part in such a navigable-tree-structure need to declare their actual navigable parent within this hierarchy. That's all the framework needs, in order to build a navigable-tree. With version 2.0 we introduced the `Navigable` enum to use with the `@PropertyLayout` annotation to allow declarative specification of a domain object's navigable parent.

In other words: a domain object or view may declare its parent (with respect to the navigable tree-structure it is part of) via use of a `@PropertyLayout(navigable=Navigable.PARENT)` annotation.

2.5.1. Screenshots

The following screenshot shows the navigation links below the top menu bar.



2.5.2. Domain Code

To declare a domain object's (or view's) navigable parent, add a `@PropertyLayout(navigable=Navigable.PARENT)` annotation to a field (that has an associated getter) or a no-arg method, that returns the parent object:

```
@DomainObject
public class Company { ... }

@DomainObject
public class Employee {

    @PropertyLayout(navigable=Navigable.PARENT) // annotated field with e.g. lombok
provided getter
    @Getter
    Company myCompany;
}

@DomainObject
public class PhoneNumber {

    @PropertyLayout(navigable=Navigable.PARENT)  // annotated no-arg supplier
    Employee employee(){
        return ...
    }

}
```

This results in a navigable tree-structure …

Company > Employee > PhoneNumber

How to use `Navigable.PARENT`

1. Any use of `@PropertyLayout(navigable=Navigable.PARENT)` with Java interfaces is simply ignored. These do not contribute to the domain meta model.
2. Any class (abstract or concrete) may at most have one `@PropertyLayout` annotation, having `navigable=Navigable.PARENT` 'flag' set (on either a method or a field); otherwise meta-model validation will fail.
3. The annotated member (method or field), when …
    a. … a method: then must be a no-arg method returning a non-primitive type (e.g. a getter)
    b. … a field: then the field must be of non-primitive type and must also have a getter (as specified by the Java Beans Standard, particularly to allow `@PropertyLayout(navigable=Navigable.PARENT)` annotations on fields that use the lombok `@Getter` annotation)
4. Starting from the current domain-object, we search the object's class inheritance hierarchy (super class, super super class, …), until we find the first class that has a `@PropertyLayout(navigable=Navigable.PARENT)` annotation. That's the one we use to resolve the current domain-object's navigable parent.

2.5.3. User Experience

When viewing a domain object that is part of a hierarchical structure, one can easily navigate to any parent of this object. Horizontally arranged text links separated by the 'greater than' symbol (>) are provided below the main menu. (Traditionally called breadcrumbs.)

2.5.4. Related functionality

The navigable tree-structure, as provided by the 'Where am I' feature, is declared at compile-time (predefined by the programmer), whereas related features (Recent Pages and Bookmarked Pages) are populated at runtime only after user interaction.

2.5.5. Configuration

By default, the 'Where am I' feature will show a maximum of 64 links. This can be overridden using a property (in `isis.properties`), for example:

```
isis.viewer.wicket.whereAmI.maxParentChainLength=20
```

To disable the 'Where am I' feature, override the default (=enabled) by using a property (in `isis.properties`):

```
isis.viewer.wicket.whereAmI.enabled=false
```

2.6. Titles in Tables

Object titles can often be quite long if the intention is to uniquely identify the object. While this is appropriate for the object view, it can be cumbersome within tables.

If an object's title is specified with from `@Title` annotation then the Wicket viewer will (for parented collections) automatically "contextualize" a title by excluding the part of the title corresponding to a reference to the owning (parent) object.

In other words, suppose we have:

so that `Customer` has a collection of `Order`s:

```
public class Customer {
    public Set<Order> getOrders() { ... }
    ...
}
```

and `Product` also has a collection of `Order`s (please forgive the suspect domain modelling in this example (!)):

```
public class Product {
    public Set<Order> getOrders() { ... }
    ...
}
```

and where the `Order` class references both `Customer` and `Product`.

The `Order's might involve each of these:

```
public class Order {
    @Title(sequence="1")
    public Customer getCustomer() { ... }
    @Title(sequence="2")
    public Product getProduct() { ... }
    @Title(sequence="3")
    public String getOtherInfo() { ... }
    ...
}
```

In this case, if we view a `Customer` with its collection of `Order`s, then in that parented collection's table the customer's property will be automatically excluded from the title of the `Order` (but it would show the product). Conversely, if a `Product` is viewed then its collection of `Order`s would suppress product (but would show the customer).

This feature is a close cousin of the `@PropertyLayout(hidden=Where.REFERENCES_PARENT)` annotation, which will cause the property itself to be hidden as a column in the table. An Isis idiom is therefore:

```
public class Order {
    @Title(sequence="1")
    @PropertyLayout(hidden=Where.REFERENCES_PARENT)
    public Customer getCustomer() { ... }
    ...
}
```

The above annotations mean that titles usually "just work", altering according to the context in which they are viewed.

It is also possible to configure the Wicket viewer to abbreviate titles or suppress them completely.

2.7. File upload/download

The Apache Isis application library provides the Blob value type (binary large objects) and also the Clob value type (character large object), each of which also includes metadata about the data (specifically the filename and mime type).

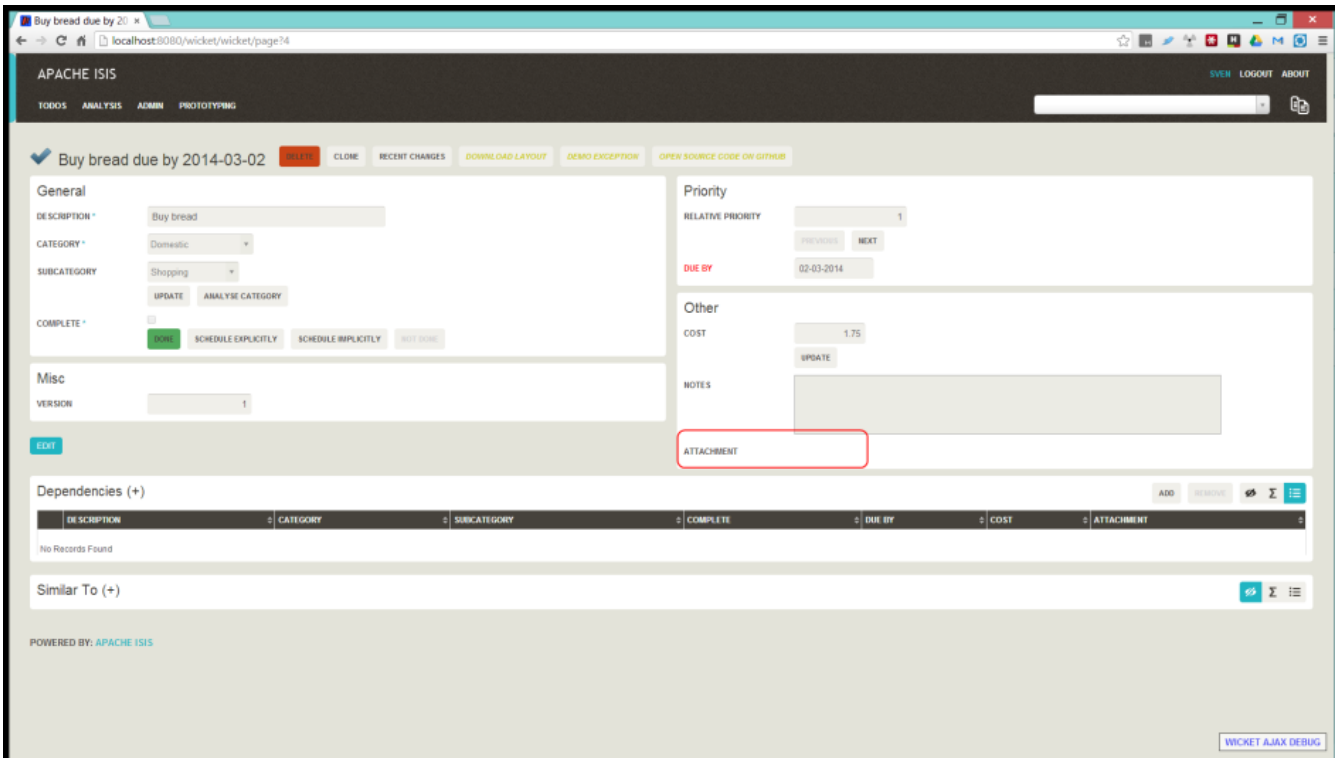
A class can define a property using either of these types, for example:

2.7.1. Screenshots

The following screenshots are taken from the Isis addons example todoapp (not ASF):

View mode, empty

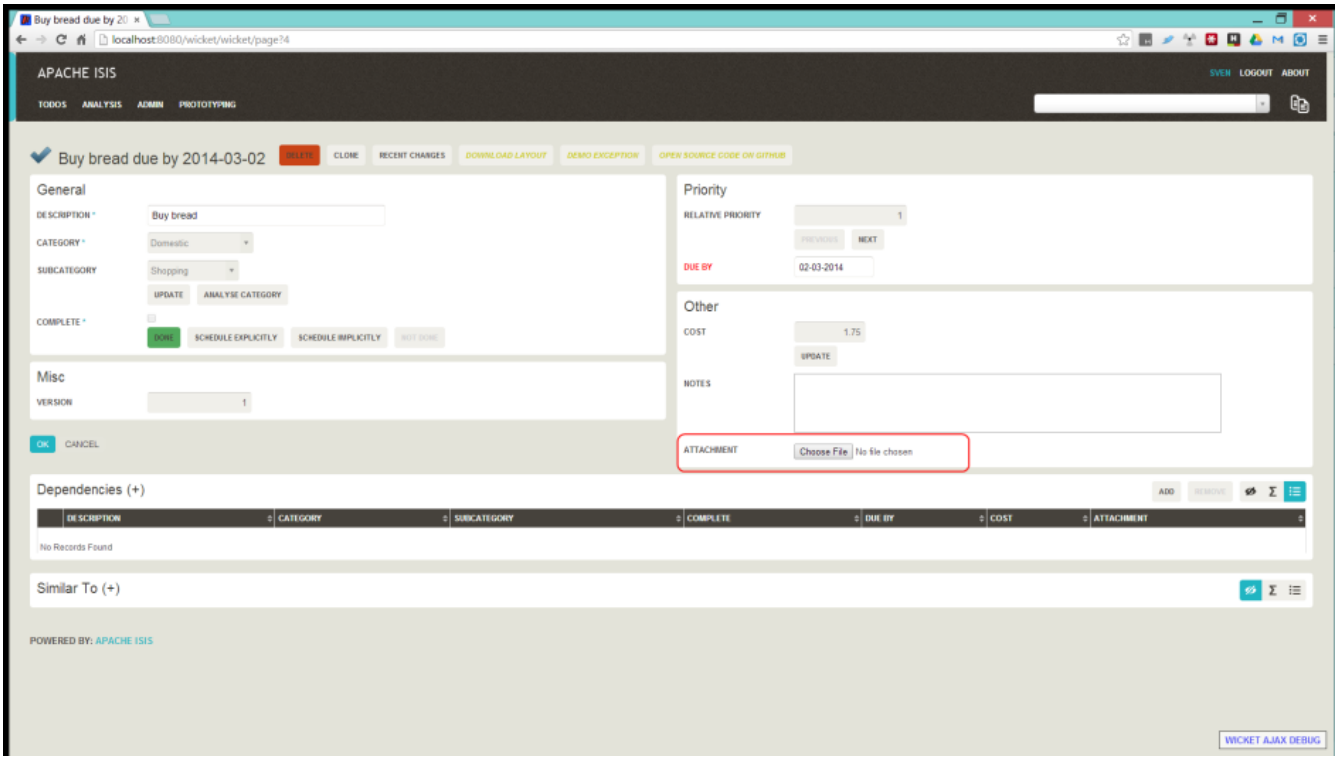
`Blob` field rendered as attachment (with no data):



Note that these screenshots show an earlier version of the Wicket viewer UI (specifically, pre 1.8.0).

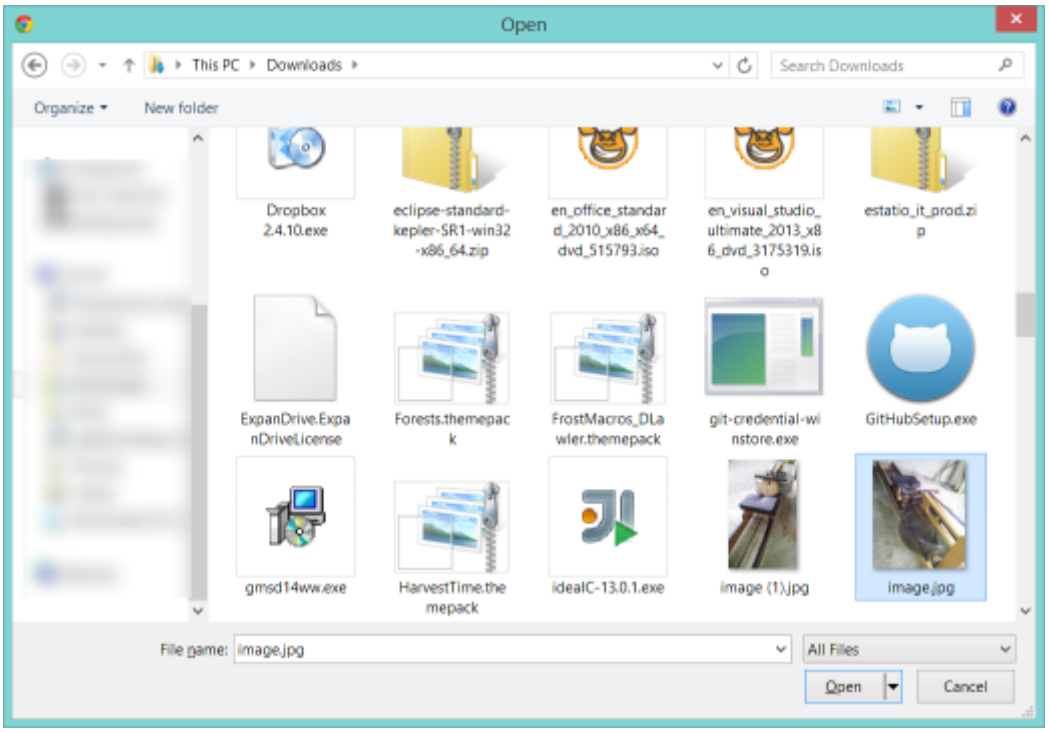
Edit mode

Hit edit; 'choose file' button appears:



Choose file

Choose file using the regular browser window:



Chosen file is indicated:

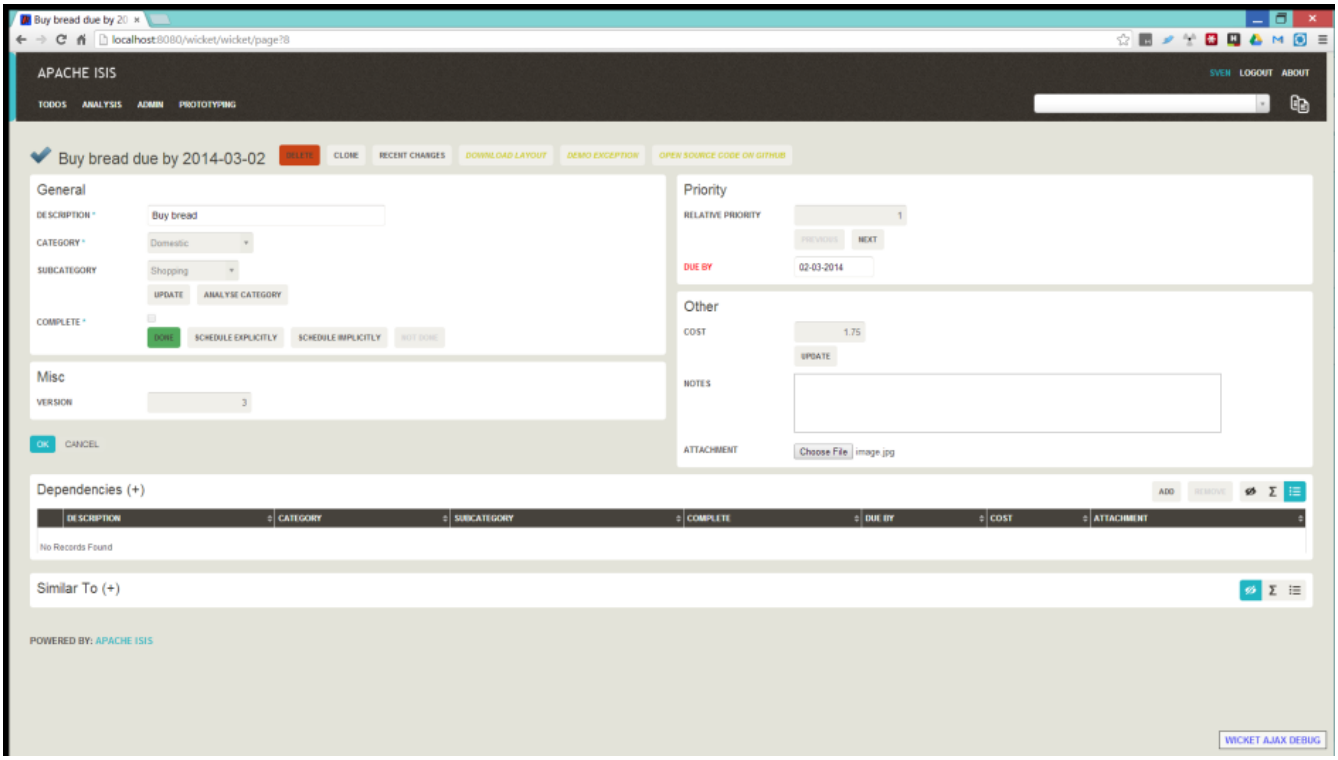
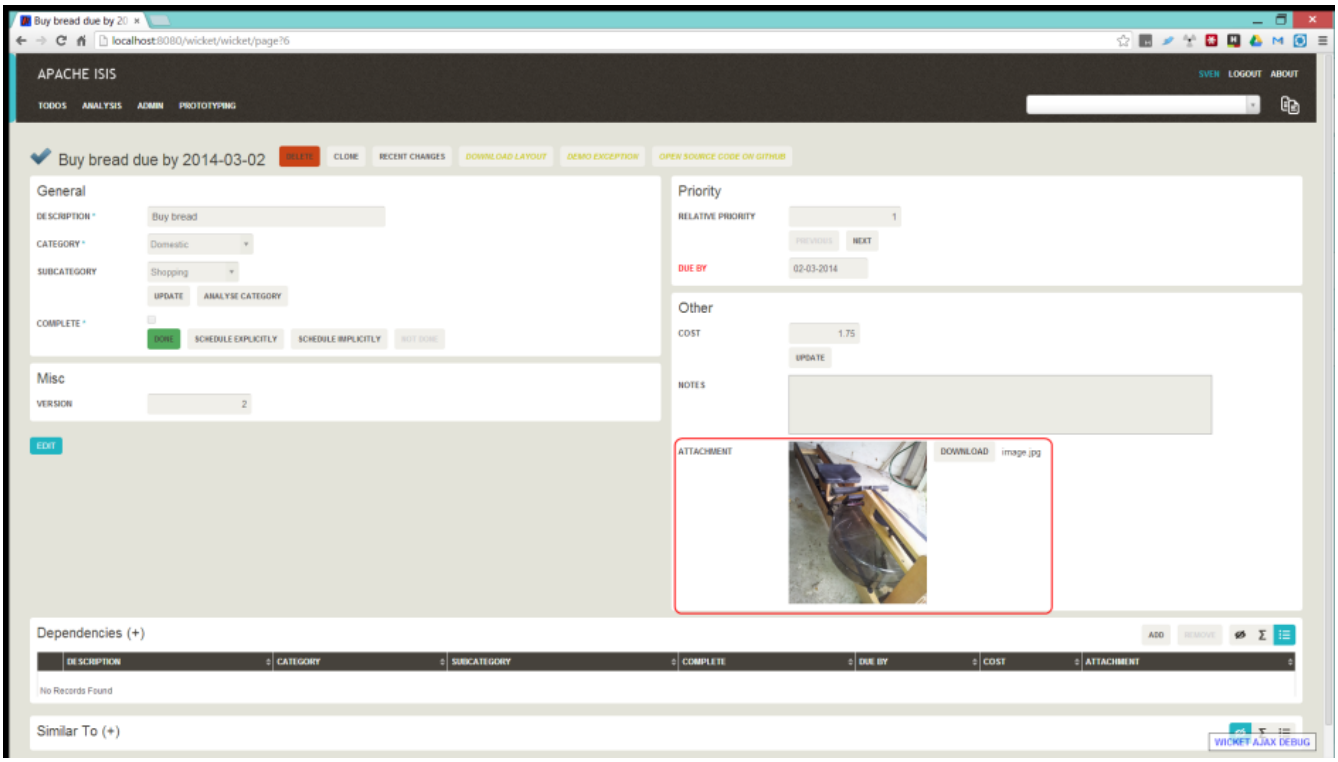


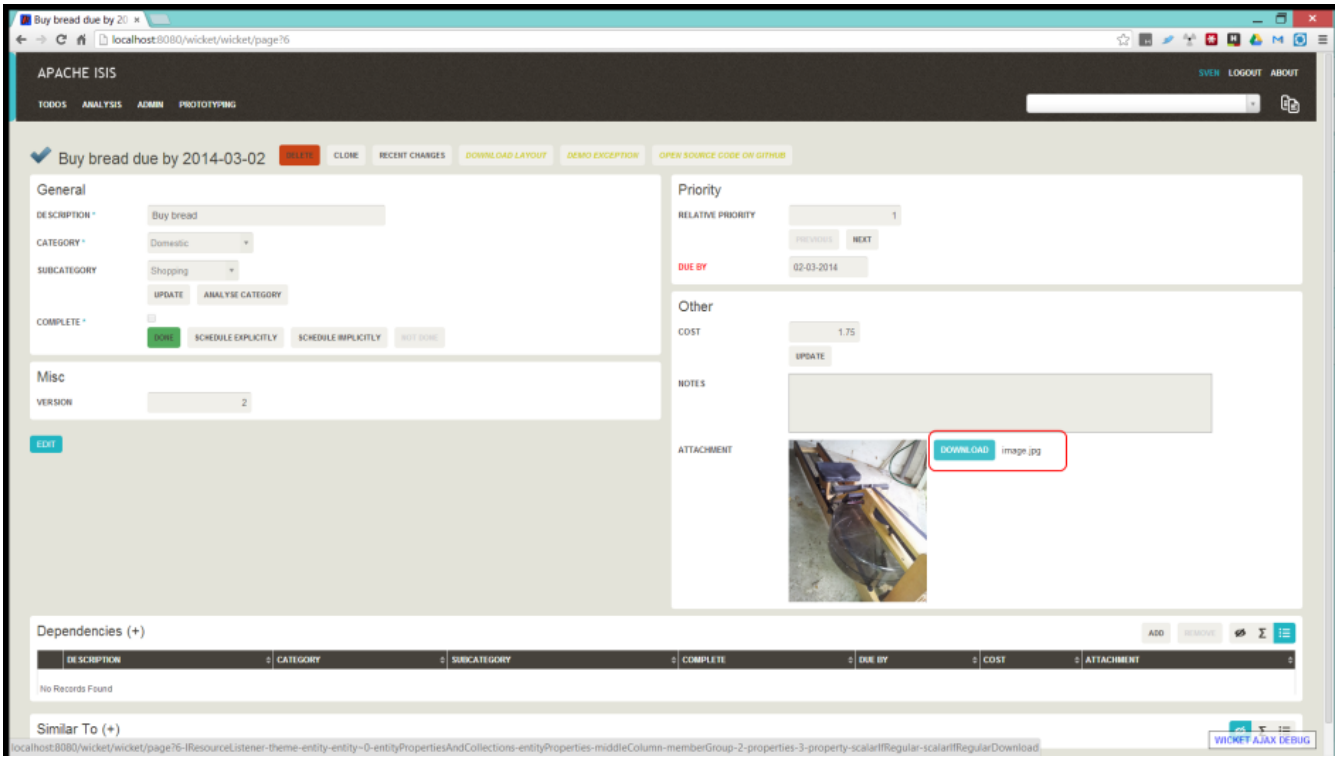
Image rendered

Back in view mode (ie once hit OK) if the `Blob` is an image, then it is shown:



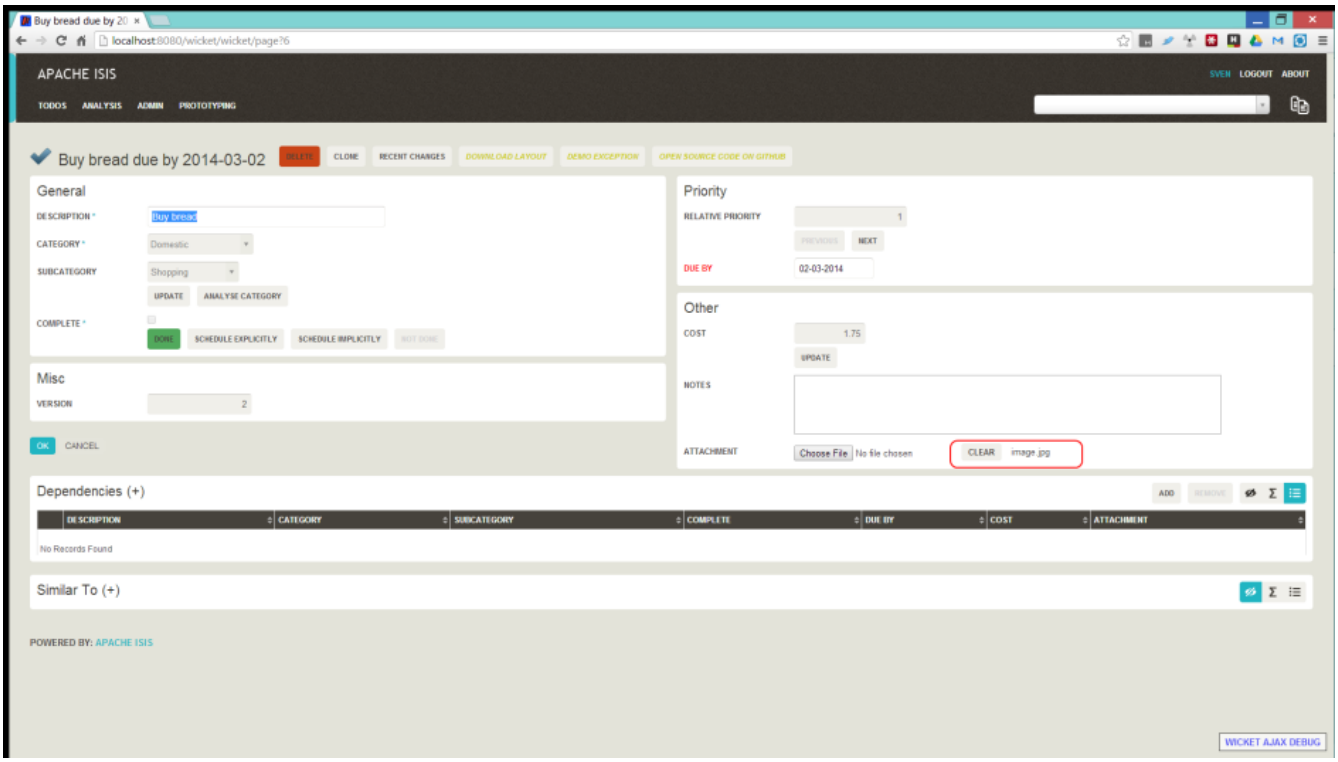
Download

`Blob` can be downloaded:



Clear

Back in edit mode, can choose a different file or clear (assuming property is not mandatory):



2.7.2. Domain Code

To define a `Blob`, use:

```
private Blob attachment;
@javax.jdo.annotations.Persistent(defaultFetchGroup="false")
    @javax.jdo.annotations.Persistent(defaultFetchGroup="false", columns = {
            @javax.jdo.annotations.Column(name = "attachment_name"),
            @javax.jdo.annotations.Column(name = "attachment_mimetype"),
            @javax.jdo.annotations.Column(name = "attachment_bytes", jdbcType = "BLOB
", sqlType = "BLOB")
    })
@Property(
        domainEvent = AttachmentDomainEvent.class,
        optionality = Optionality.OPTIONAL
)
public Blob getAttachment() { return attachment; }
public void setAttachment(final Blob attachment) { this.attachment = attachment; }
```

To define a `Clob`, use:

```
private Clob doc;
@javax.jdo.annotations.Persistent(defaultFetchGroup="false", columns = {
        @javax.jdo.annotations.Column(name = "doc_name"),
        @javax.jdo.annotations.Column(name = "doc_mimetype"),
        @javax.jdo.annotations.Column(name = "doc_chars", jdbcType = "CLOB", sqlType =
"CLOB")
})
@Property(
        optionality = Optionality.OPTIONAL
)
public Clob getDoc() { return doc; }
public void setDoc(final Clob doc) { this.doc = doc; }
```

The `Blob` and `Clob` types can also be used as parameters to actions.

2.8. User Registration

The Wicket viewer provides the ability for users to sign-up by providing a valid email address:

- from the login page the user can instead follow a link to take them to a sign-up page, where they enter their email address.
- a verification email is sent using this service; the email includes a link back to the running application.
- the user then completes the registration process by choosing a user name and password.
- the Wicket viewer then creates an account for them and logs them in.

In a similar way, if the user has forgotten their password then they can request a reset link to be sent to their email, again by providing their email address.

To support this the framework requires three services to be registered and configured:

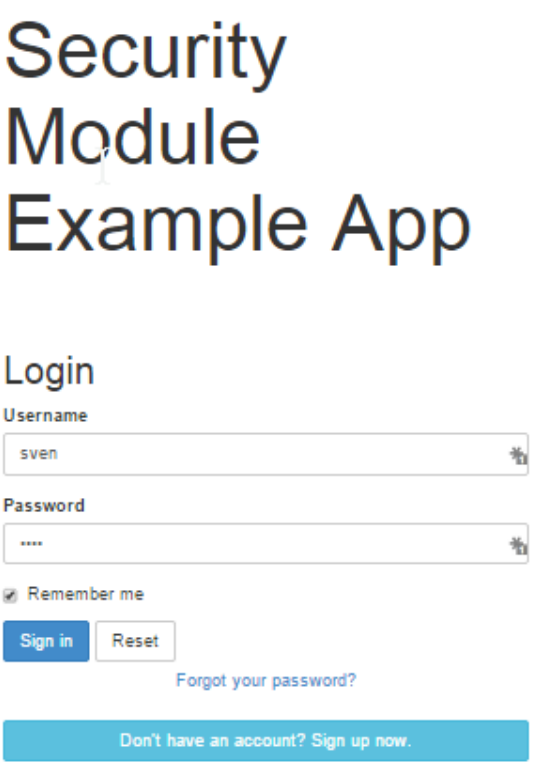
- the user registration service, which provides an API to create the user account
- the email notification service, which provides an API for to send the verification emails
- the email service, that is used by the email notification service to actually send the email.

The Apache Isis core framework provides a default implementation of both the email notification service and the email service. If your application uses the (non-ASF) Incode Platform's security module then an implementation is provided by that module; just add to the classpath. Otherwise you will need to provide your own implementation.

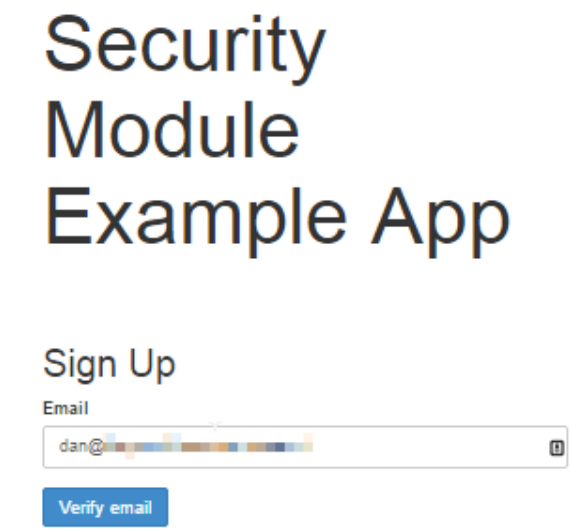
There is *no* default implementation of the user registration service in the core framework.

2.8.1. Screenshots

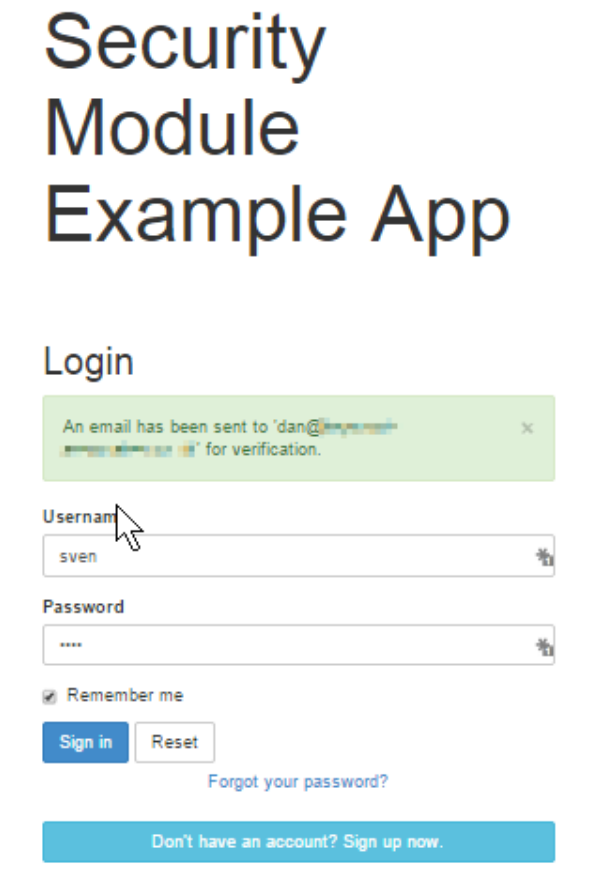
The user is presented with a login page:



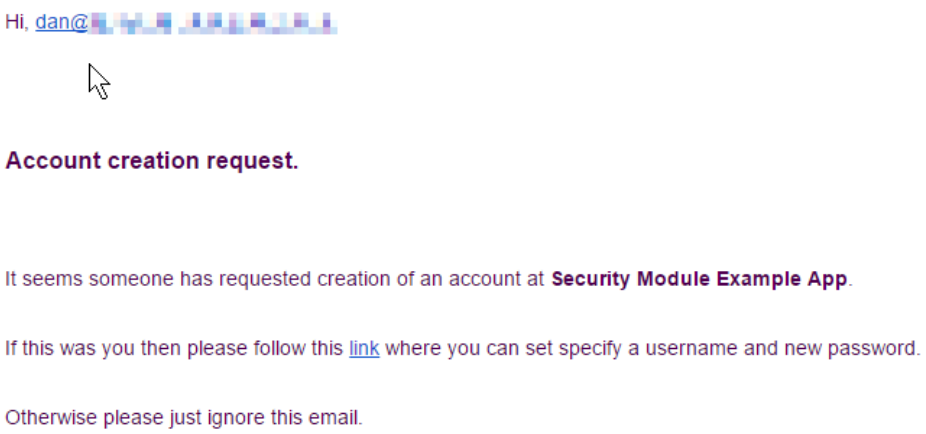
Navigate to the sign up page. Complete the page, and verify:



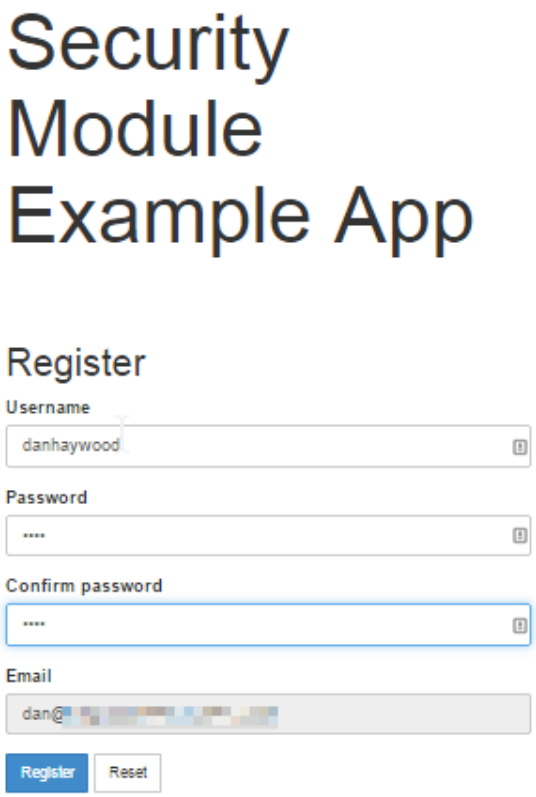
Back to the login page:



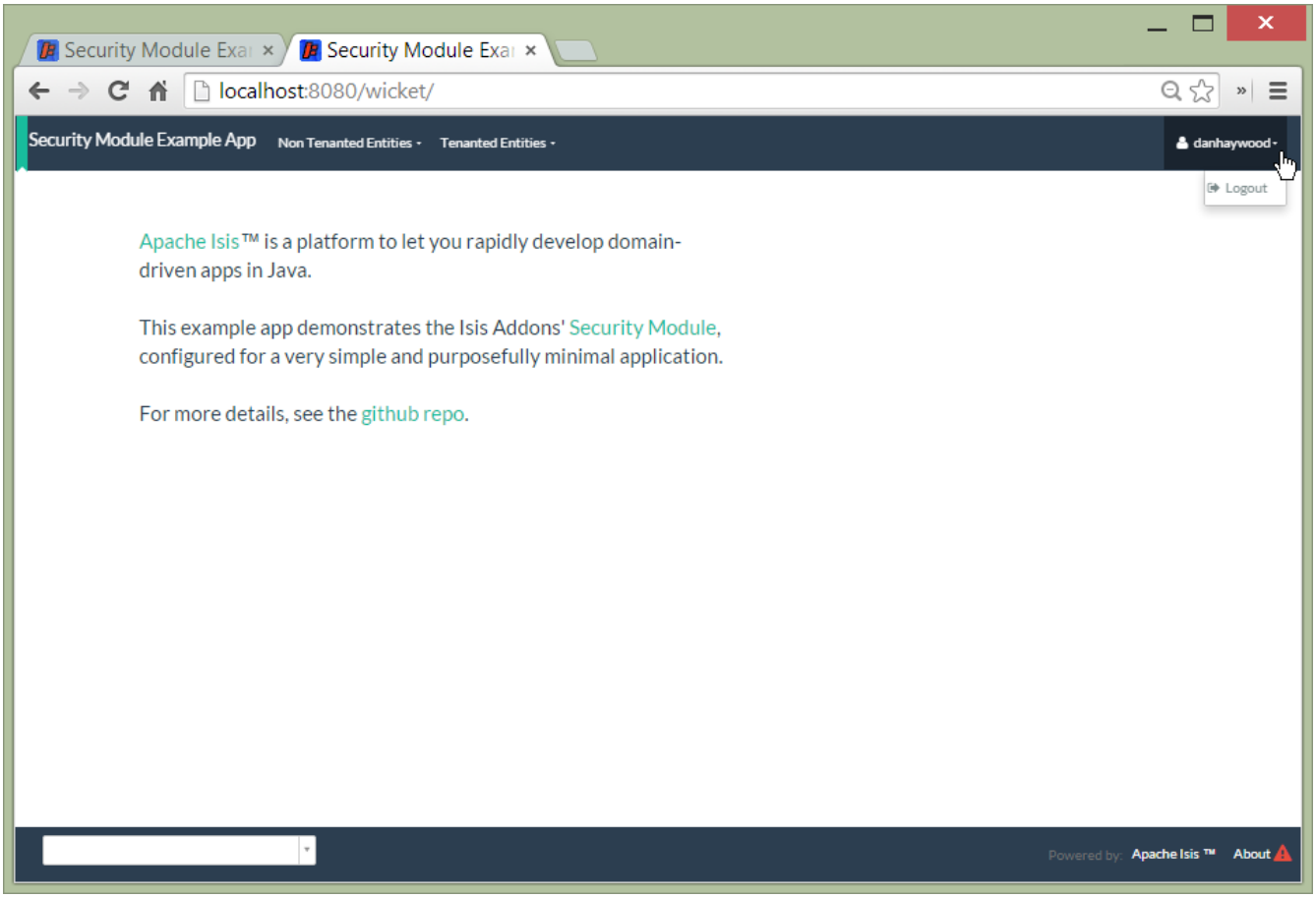
Email arrives, with link:



Follow the link, complete the page:



Automatically logged in:



2.8.2. Configuration

There are two prerequisites:

- register an implementation of the user registration service (eg by using the (non-ASF) Incode Platform's security module)
- configure the email service

The latter is required if you are using the default email notification service and email service. If you are using your own alternative implementation of the email notification service then it may be omitted (and configure your own alternative implementation as required).

It is also possible to configure the Wicket viewer to suppress the sign-up page link and/or the password reset page, see here for further details.

Chapter 3. Layout

In implementing the naked objects pattern, Apache Isis aims to infer as much information from the domain classes as possible. Nevertheless, some metadata relating solely to the UI is inevitably required. This chapter describes how this is done both for domain objects using either annotations or using an associated layout file.

The chapter also describes how to customising which columns of associated objects appear in tables. The layout of application menu items is described in a separate chapter.

3.1. Annotation-based Layout

Metadata providing UI hints can be specified either using annotations, or using a `layout.xml` file.

In most cases you will probably want to use the file-based approach: changes to file layouts are picked up dynamically, and using a file also allows tabs and tab groups to be specified: this is not supported using annotations.

Nevertheless, annotations are still supported and are sometimes useful for very simple objects or just when prototyping. This section explains how.

3.1.1. `@MemberOrder`

The `@MemberOrder` annotation is used to specify the relative order of domain class properties, collections and actions.

The annotation defines two attributes, `name()` and `sequence()`. Their usage depends on the member type:

- for properties, the `name()` is used to group properties together into a member group (also called a property group or a fieldset. The `sequence()` then orders properties within these groups. If no `name()` is specified then the property is placed in a fallback "General" group, called "General".

  The name of these member groups/fieldsets are then referenced by `@MemberGroupLayout`.

- for collections, the `name()` attribute is (currently) unused. The `sequence()` orders collections relative to one another
- for actions, the `name()` attribute associates an action with either a property or with a collection.
  - If the `name()` attribute matches a property name, then the action's button is rendered close to the property, according to `@ActionLayout#position()` attribute.
  - On the other hand if the `name() attribute matches a collection name, then the action's button is rendered on the collection's header.
  - If there is no `name()` value, then the action is considered to pertain to the object as a whole, and its button is rendered close to the object's icon and title.

Within any of these, the `sequence()` then determines the relative ordering of the action with respect to other actions that have been similarly associated with properties/collections or left as "free-

standing".

For example:

```
public class ToDoItem {
    @MemberOrder(sequence="1")
    public String getDescription() { ... }
    @MemberOrder(sequence="2")
    public String getCategory() { ... }
    @MemberOrder(sequence="3")
    public boolean isComplete() { ... }
    @MemberOrder(name="Detail", sequence="1")
    public LocalDate getDueBy() { ... }
    @MemberOrder(name="Detail", sequence="2")
    public BigDecimal getCost() { ... }
    @MemberOrder(name="Detail", sequence="4")
    public String getNotes() { ... }
    @MemberOrder(name="Misc", sequence="99")
    public Long getVersionSequence() { ... }
    ...
}
```

This defines three property (or member) groups, "General", "Detail" and "Misc"; "General" is the default if no `name` attribute is specified. Properties in the same member group are rendered together, as a fieldset.

In addition, actions can optionally be associated (rendered close to) either properties or actions. This is done by overloading the `@MemberOrder`'s `name()` attribute, holding the value of the property or collection.

For example:

```
public class ToDoItem {
    @MemberOrder(sequence="3")
    public boolean isComplete() { ... }
    @MemberOrder(name="complete", sequence="1")
    public ToDoItem completed() { ...}
    @MemberOrder(name="complete", sequence="2")
    public ToDoItem notYetCompleted() { ...}

    @MemberOrder(sequence="1")
    public SortedSet<ToDoItem> getDependencies() { ... }
    @MemberOrder(name="dependencies", sequence="1")
    public ToDoItem add(ToDoItem t) { ...}
    @MemberOrder(name="dependencies", sequence="2")
    public ToDoItem remove(ToDoItem t) { ...}
    ...
}
```

will associate the `completed()` and `notYetCompleted()` actions with the `complete` property, and will associate the `add()` and `remove()` actions with the `dependencies` collection.

The value of `sequence()` is a string. The simplest convention (as shown in the example above) is to use numbers — 1, 2, 3 — though it is a better idea to leave gaps in the numbers — 10, 20, 30 perhaps — such that a new member may be added without having to edit existing numbers.

Even better is to adopt the 'dewey-decimal' notation — 1, 1.1, 1.2, 2, 3, 5.1.1, 5.2.2, 5.2, 5.3 — which allows for an indefinite amount of future insertion. It also allows subclasses to insert their class members as required.

3.1.2. `@MemberGroupLayout`

The `@MemberGroupLayout` annotation specifies the relative positioning of property groups/fieldsets as being either in a left column, a middle column or in a right column. The annotation also specifies the relative width of the columns.

The property groups/fieldsets in this case are those that are inferred from the `@MemberOrder#name()` attribute.

It is also possible to combine `@MemberOrder` with a file-based layout. The layout file defines only the regions of a grid structure (fieldsets/columns etc), but does *not* specify the properties/collections/actions within those grid regions. The `@MemberOrder` annotation in effect "binds" the properties or collections to those regions of the grid.

When file-based layouts are used this way, the `@MemberGroupLayout` annotation is essentially ignored, but the metadata from the `@MemberOrder` annotation (and the other layout annotations, `@ActionLayout`, `@PropertyLayout` and `@CollectionLayout`) are all still honoured.

For example:

```
@MemberGroupLayout(
     columnSpans={3,3,0,6},
     left={"General", "Misc"},
     middle="Detail"
 )
public class ToDoItem {
    ...
}
```

Four values are given in the `columnSpans` attribute. The first three are the relative widths of the three columns of property groups. The fourth, meanwhile, indicates the width of a final column that holds all the collections of the object.

The values of these spans are taken as proportions of 12 virtual columns across the page (this taken from the Bootstrap library).

For example:

- `{3,3,0,6}` indicates:
  - a left column of properties taking up 25% of the width
  - a middle column of properties taking up 25% of the width
  - a right column of collections taking up 50% of the width
- `{2,6,0,4}` indicates:
  - a left column of properties taking up ~16% of the width
  - a middle column of properties taking up 50% of the width
  - a right column of collections taking up ~33% of the width
- `{2,3,3,4}` indicates:
  - a left column of properties taking up ~16% of the width
  - a middle column of properties taking up 25% of the width
  - a right column of properties taking up 25% of the width
  - a far right column of collections taking up ~33% of the width

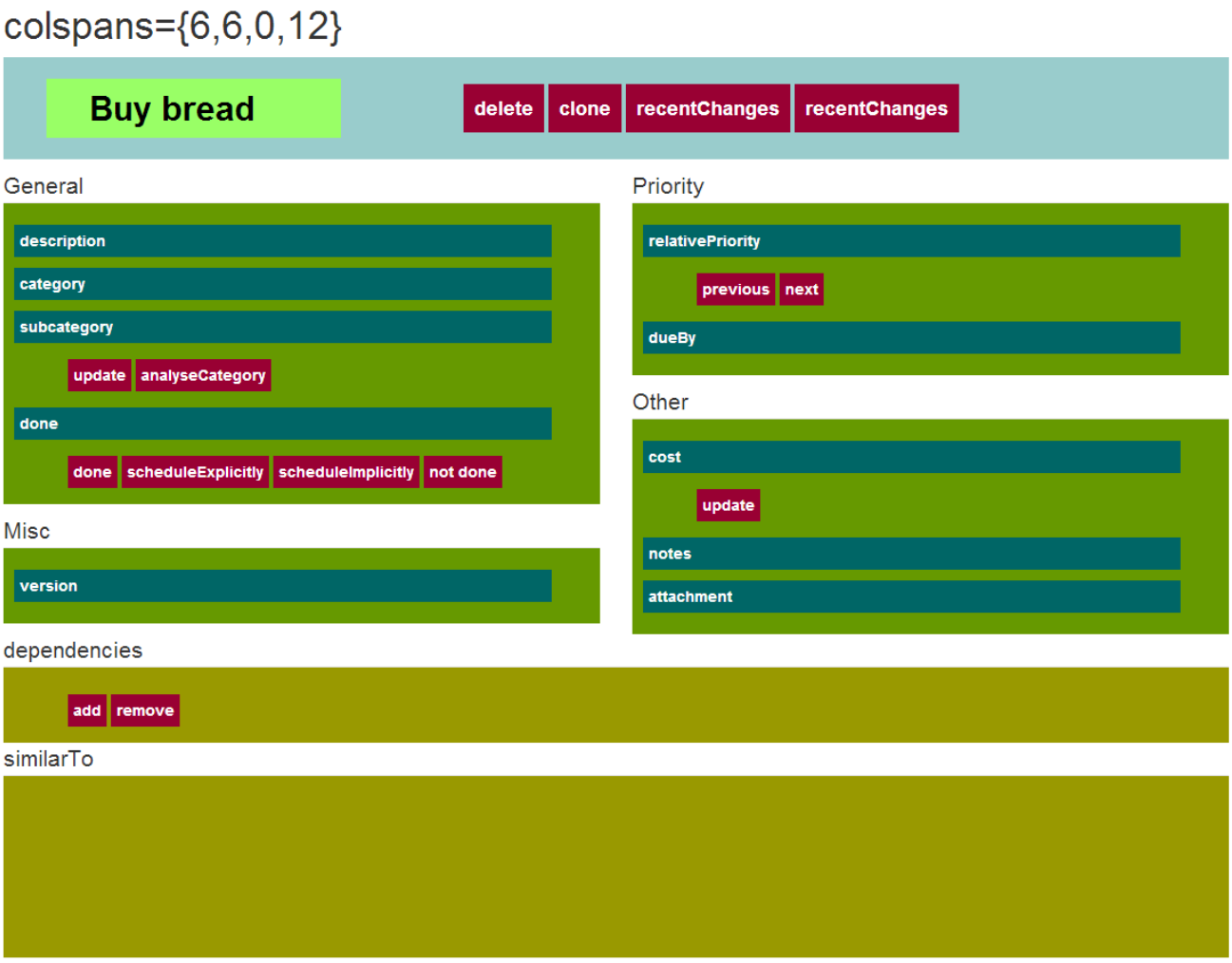
If the sum of all the columns exceeds 12, then the collections are placed underneath the properties, taking up the full span. For example:

- {4,4,4,12} indicates:
  - a left column of properties taking up ~33% of the width
  - a middle column of properties taking up ~33% of the width
  - a right column of properties taking up ~33% of the width
  - the collections underneath the property columns, taking up the full width

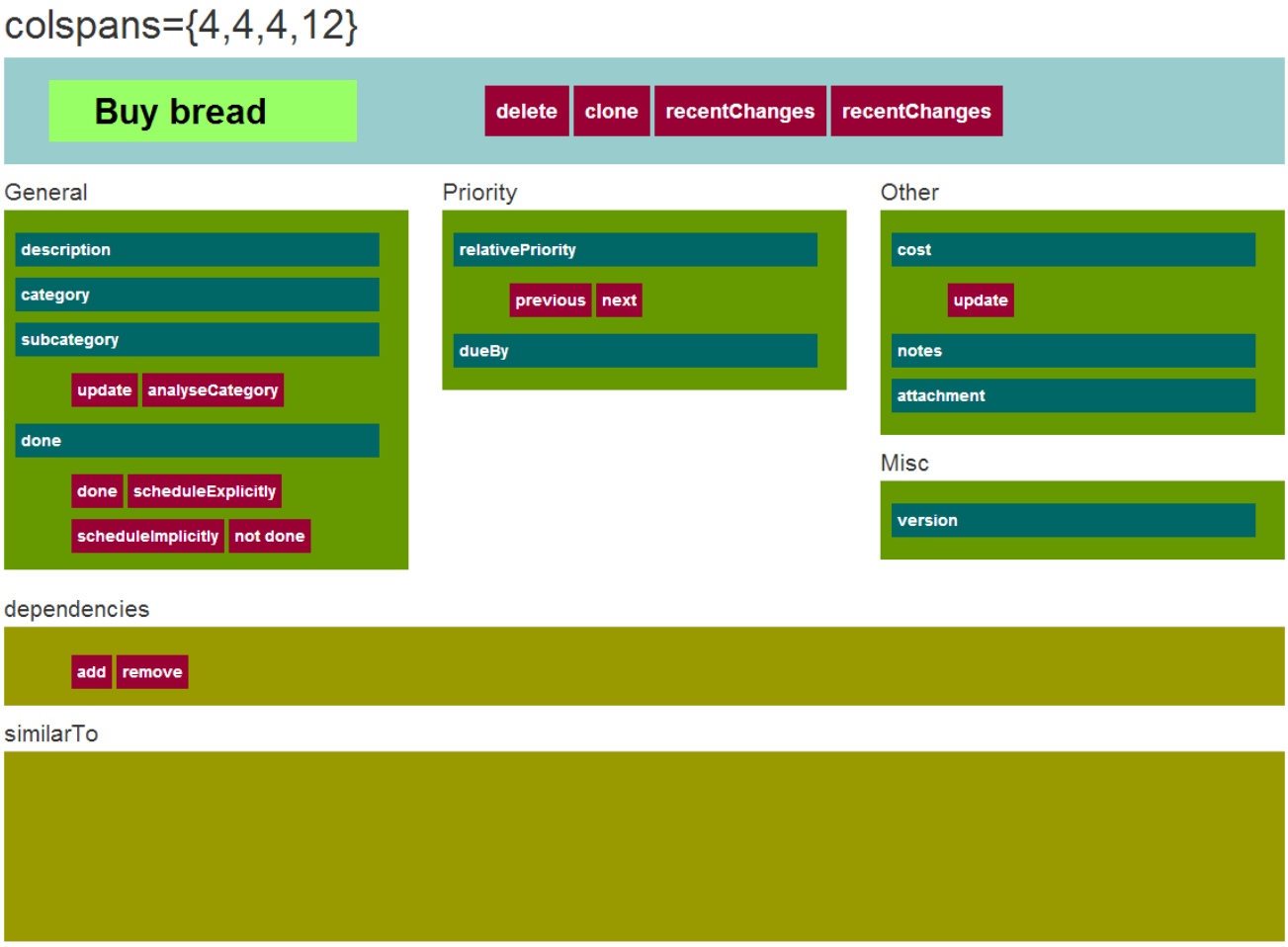
3.1.3. Example Layouts

Below are sketches for the layout of the ToDoItem class of the Isis addons example todoapp (not ASF):

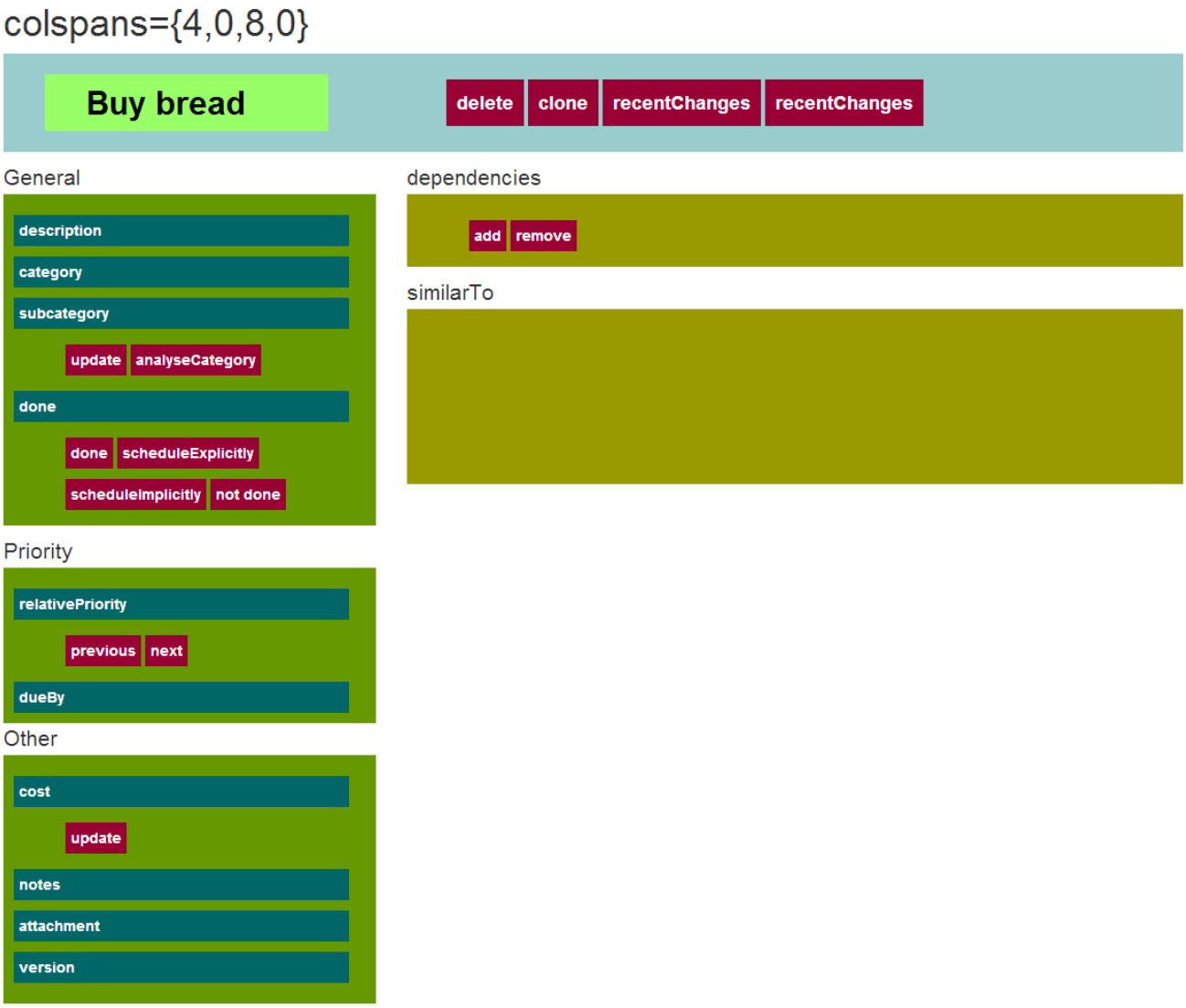
The first divides the properties into two equal sized columns (6-6-0) and puts the collections underneath (12):



The next divides the collections into three equal sized columns (4-4-4) and again puts the collections underneath (12):



The last puts the properties into a single column (4-0) and places the collections into the other larger column (8-0):



3.1.4. Other Annotations

Layout semantics can also be specified using the various `XxxLayout` annotations:

- for domain services: `@DomainServiceLayout`
- for domain objects: `@DomainObjectLayout` and `@ViewModelLayout`
- for actions: `@ActionLayout` and `@ParameterLayout`
- for properties: `@PropertyLayout`
- for collections: `@CollectionLayout`

3.2. File-based Layouts

Metadata providing UI hints can be specified either using annotations, or using an `Xxx.layout.xml` file (where `Xxx` is the entity or view model object to be rendered).

File-based layouts offer a number of benefits:

- Probably most significantly, the layout can be updated without requiring a recompile of the code and redeploy of the app; fine-tuning the layout with your end users is easy to do

- Many developers also find it easier to rationalize about layout when all the hints are collated together in a single place (rather than scattered across the class members as annotations).
- UI hints can be provided for contributed associations and actions that are synthesised at runtime.

It is also possible to download an initial `.layout.xml` - capturing any existing layout metadata - using the `LayoutService` (exposed on the prototyping menu) or using a mixin action contributed to every domain object.

There are some downsides, though:

- file-based layouts are not typesafe: a typo will result in the metadata not being picked up for the element.
- they suffer from syntactic fragility: an invalid XML document will result in no metadata for the entire class.
- there is no notion of inheritance, so a `.layout.xml` is required for all concrete classes and also for any abstract classes (if used as a collection type). In contrast, the dewey-decimal format `@MemberOrder` annotation allows the metadata of the subclass its superclasses to fit together relatively seamlessly.

The `Xxx.layout.xml` file is just the serialized form of a `Grid` layout class defined within Apache Isis' applib. These are JAXB-annotated classes with corresponding XSD schemas; the upshot of that is that IDEs such as IntelliJ and Eclipse can provide "intellisense", making iteasy to author such layout files.

3.2.1. Alternative Layouts

A domain object may also have multiple layouts. For example, there may be the capability to switch into an "edit" mode, which perhaps hides some class members, shows others (perhaps mixins specific to data entry). Another reason might be to support different tenancies/user groups, where different business processes might require a slightly different UI representation.

One way in which the domain object can specify an alternate layout is through its `layout()` method. If this returns a non-null value, say "edit", then this is used to locate an alternative layout, in the form `Xxx-edit.layout.xml`.

3.2.2. Search Algorithm (Library Support)

For a given domain object `Xxx`, if it has specified a layout `yyy`, then the framework will search for a file `Xxx.yyy.layout.xml` on the classpath.

If no layout has been specified (or if the specified layout cannot be found), then the framework searches for a file called `Xxx.layout.xml`.

Finally, if this can't be found, then the framework will search for a file named `Xxx.layout.fallback.xml`. If present, this will be used instead.

The "fallback" layout this therefore allows libraries that provide a domain entities/view models (for example, the (non-ASF) Incode Platform modules) to define the UI of these objects using a layout

file, while still allowing the consuming application to override that layout if it so requires.

3.2.3. Grids vs Components

The layout file distinguishes between two types of element:

- those that define a grid structure, of: rows, columns, tab groups and tabs.

  The rows and columns are closely modelled on Bootstrap 3 (used in the implementation of the Wicket viewer).

- those that defines common components, of: fieldsets (previously called member groups or property groups), properties, collections, actions and also the title/icon of the domain object itself.

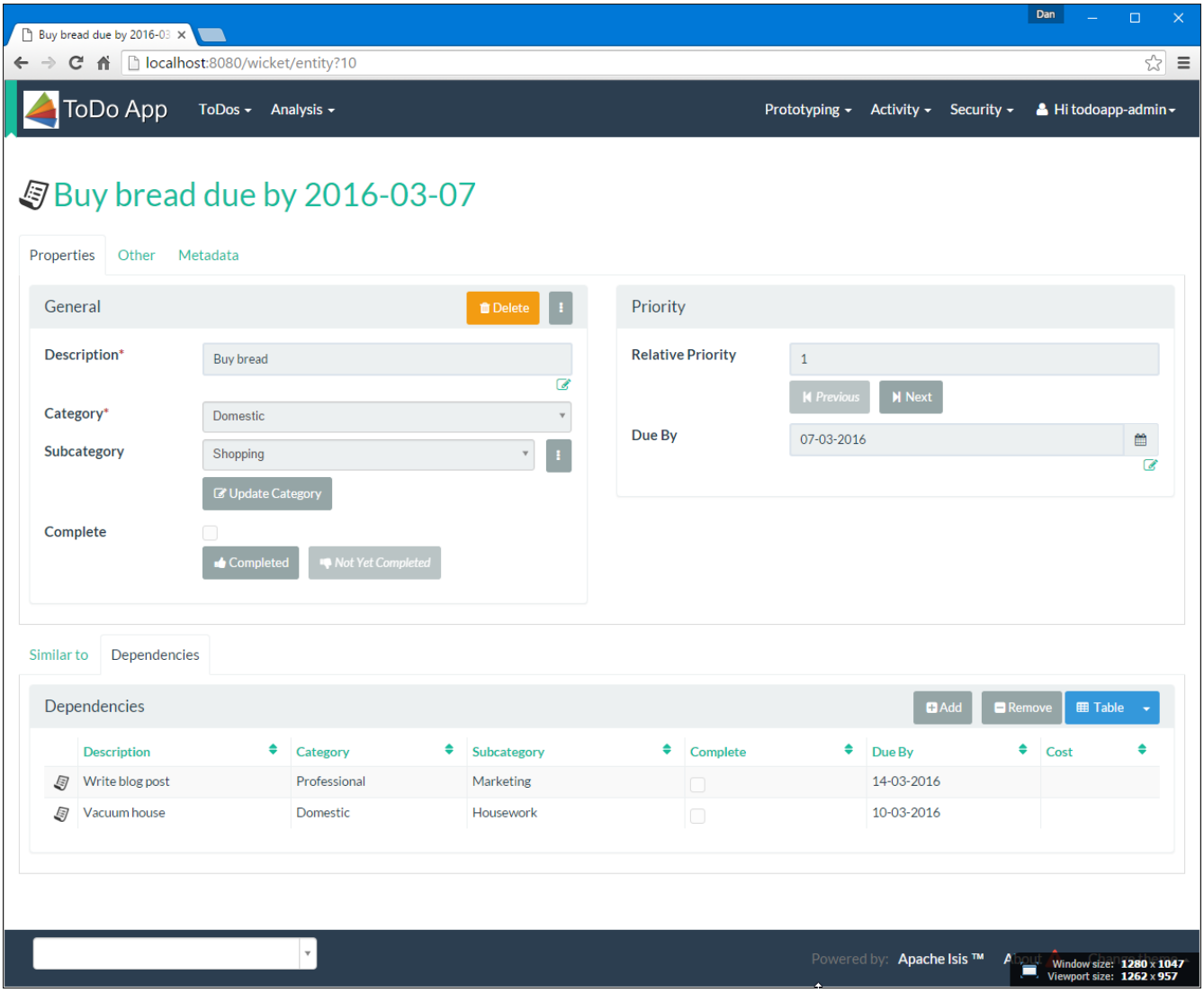
More information about these classes can be found in the reference guide. More information on Bootstrap 3's grid system can be found here.

3.2.4. Screencast

This screencast describes the feature.

3.2.5. Examples

Probably the easiest way to understand dynamic XML layouts is by example. For this we'll use the `ToDoItem` from the (non-ASF) Isis addons' todoapp:



Namespaces

First things first; every `.layout.xml` file must properly declare the XSD namespaces and schemas. There are two: one for the grid classes, and one for the common component classes:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<bs3:grid
  xsi:schemaLocation="http://isis.apache.org/applib/layout/component
                      http://isis.apache.org/applib/layout/component/component.xsd
                      http://isis.apache.org/applib/layout/grid/bootstrap3

http://isis.apache.org/applib/layout/grid/bootstrap3/bootstrap3.xsd"
  xmlns:bs3="http://isis.apache.org/applib/layout/grid/bootstrap3"
  xmlns:c="http://isis.apache.org/applib/layout/component"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    ...
</bs3:grid>
```

Most IDEs will automatically download the XSD schemas from the specified schema locations, thereby providing "intellisense" help as you edit the file.

Rows, full-width cols, and tabs

The example layout consists of three rows: a row for the object/icon, a row containing a properties, and a row containing collections. In all three cases the row contains a single column spanning the full width of the page. For the property and collection rows, the column contains a tab group.

This corresponds to the following XML:

```
<bs3:row>
    <bs3:col span="12" unreferencedActions="true">
        <c:domainObject bookmarking="AS_ROOT"/>
    </bs3:col>
</bs3:row>
<bs3:row>
    <bs3:col span="12">
        <bs3:tabGroup>
            <bs3:tab name="Properties">...</bs3:tab>
            <bs3:tab name="Other">...</bs3:tab>
            <bs3:tab name="Metadata">...</bs3:tab>
        </bs3:tabGroup>
    </bs3:col>
</bs3:row>
<bs3:row>
    <bs3:col span="12">
        <bs3:tabGroup unreferencedCollections="true">
            <bs3:tab name="Similar to">...</bs3:tab>
            <bs3:tab name="Dependencies">...</bs3:tab>
        </bs3:tabGroup>
    </bs3:col>
</bs3:row>
```

You will notice that one of the `col`umns has an `unreferencedActions` attribute, while one of the `tabGroup`s has a similar `unreferencedCollections` attribute. This topic is discussed in more detail below.

Fieldsets

The first tab containing properties is divided into two columns, each of which holds a single fieldset of multiple properties. Those properties in turn can have associated actions.

This corresponds to the following XML:

```
<bs3:tab name="Properties">
    <bs3:row>
        <bs3:col span="6">
            <c:fieldSet name="General" id="general" unreferencedProperties="true">
                <c:action id="duplicate" position="PANEL_DROPDOWN"/>
                <c:action id="delete"/>
                <c:property id="description"/>
                <c:property id="category"/>
                <c:property id="subcategory">
                    <c:action id="updateCategory"/>
                    <c:action id="analyseCategory" position="RIGHT"/>
                </c:property>
                <c:property id="complete">
                    <c:action id="completed" cssClassFa="fa-thumbs-up"/>
                    <c:action id="notYetCompleted" cssClassFa="fa-thumbs-down"/>
                </c:property>
            </c:fieldSet>
        </bs3:col>
        <bs3:col span="6">
            ...
        </bs3:col>
    </bs3:row>
</bs3:tab>
```

The tab defines two columns, each span of 6 (meaning half the width of the page).

In the first column there is a single fieldset. Notice how actions - such as `duplicate` and `delete` - can be associated with this fieldset directly, meaning that they should be rendered on the fieldset's top panel.

Thereafter the fieldset lists the properties in order. Actions can be associated with properties too; here they are rendered underneath or to the right of the field.

Note also the `unreferencedProperties` attribute for the fieldset; this topic is discussed in more detail below.

The `<fieldset>`'s "name" attribute is optional. If omitted, then the title panel is suppressed, freeing more real estate.

Do be aware though that if there are any actions that have been placed on the fieldset's panel, then these *will **not** be displayed*.

Collections

In the final row the collections are placed in tabs, simply one collection per tab. This corresponds to the following XML:

```
<bs3:tab name="Similar to">
    <bs3:row>
        <bs3:col span="12">
            <c:collection defaultView="table" id="similarTo"/>
        </bs3:col>
    </bs3:row>
</bs3:tab>
<bs3:tab name="Dependencies">
    <bs3:row>
        <bs3:col span="12">
            <c:collection defaultView="table" id="dependencies">
                <c:action id="add"/>
                <c:action id="remove"/>
            </c:collection>
        </bs3:col>
    </bs3:row>
</bs3:tab>
```

As with properties, actions can be associated with collections; this indicates that they should be rendered in the collection's header.

3.2.6. Unreferenced Members

As noted in the preceding discussion, several of the grid's regions have either an `unreferencedActions`, `unreferencedCollections` or `unreferencedProperties` attribute.

The rules are:

- `unreferencedActions` attribute can be specified either on a column or on a fieldset.

  It would normally be typical to use the column holding the `<domainObject/>` icon/title, that is as shown in the example. The unreferenced actions then appear as top-level actions for the domain object.

- `unreferencedCollections` attribute can be specified either on a column or on a tabgroup.

  If specified on a column, then that column will contain each of the unreferenced collections, stacked one on top of the other. If specified on a tab group, then a separate tab will be created for each collection, with that tab containing only that single collection.

- `unreferencedProperties` attribute can be specified only on a fieldset.

The purpose of these attributes is to indicate where in the layout any unreferenced members should be rendered. Every grid *must* nominate one region for each of these three member types, the reason being that to ensure that the layout can be used even if it is incomplete with respect to the object members inferred from the Java source code. This might be because the developer forgot to update the layout, or it might be because of a new mixin (property, collection or action) contributed to many objects.

The framework ensures that in any given grid exactly one region is specified for each of the three

`unreferenced···` attributes. If the grid fails this validation, then a warning message will be displayed, and the invalid XML logged. The layout XML will then be ignored.

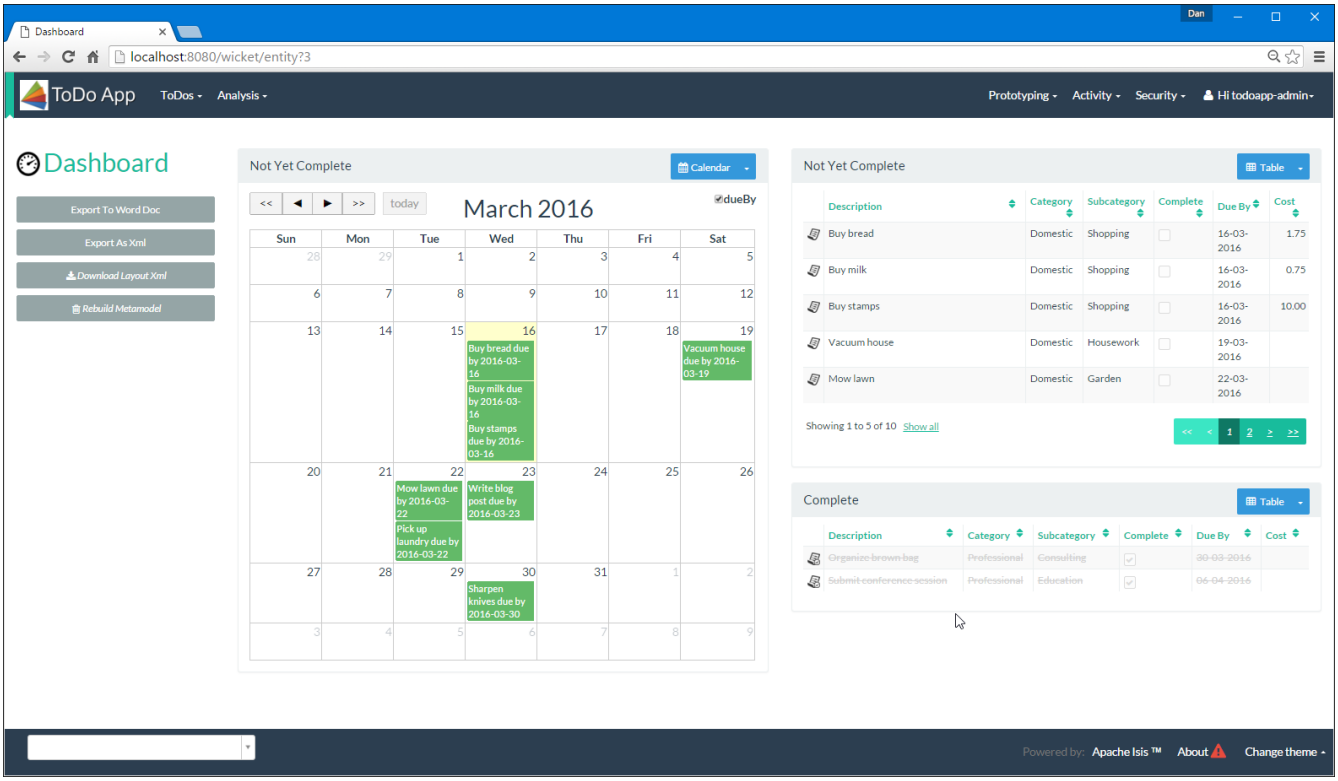
3.2.7. More advanced features

This section decribes a number of more features useful in more complex layouts.

Multiple references to a feature

One feature worth being aware of is that it is possible to render a single feature more than once.

For example, the dashboard home page for the (non-ASF) Isis addons' todoapp shows the "not yet complete" collection of todo items twice, once as a table and also as a calendar:



This is accomplished using the following (slightly abbreviated) layout:

```
<grid ...>
    <row>
        <col span="2" unreferencedActions="true">
            ...
        </col>
        <col span="5" unreferencedCollections="true" cssClass="custom-padding-top-20">
            <ns2:collection id="notYetComplete" defaultView="calendar"/>
①
        </col>
        <col span="5" cssClass="custom-padding-top-20">
            <ns2:collection id="notYetComplete" defaultView="table" paged="5"/>
②
            <ns2:collection id="complete" defaultView="table"/>
        </col>
        <col span="0">
            <ns2:fieldSet name="General" id="general" unreferencedProperties="true"/>
        </col>
    </row>
</grid>
```

① render the collection in "calendar" view

② also render the collection in "table" view

In the middle column the `notYetComplete` collection is rendered in "calendar" view, while in the right-most column it is rendered in "table" view.

It is also possible to reference object properties and actions more than once. This might be useful for a complex domain object with multiple tabs; certain properties or actions might appear on a summary tab (that shows the most commonly used info), but also on detail tabs.

Custom CSS

The ToDoApp's dashboard (above) also shows how custom CSS styles can be associated with specific regions of the layout:

```
<grid ...>
    <row>
        <col span="2" unreferencedActions="true">
            <ns2:domainObject/>
            <row>
                <col span="12" cssClass="custom-width-100">
①
                    <ns2:action id="exportToWordDoc"/>
                </col>
            </row>
            ...
        </col>
        <col span="5" unreferencedCollections="true" cssClass="custom-padding-top-20">
②
            ...
        </col>
        <col span="5" cssClass="custom-padding-top-20">
③
            ...
        </col>
    </row>
</grid>
```

① Render the column with the `custom-width-100` CSS class.

② Render the column with the `custom-padding-top-20` CSS class.

③ Ditto

For example the `custom-width-100` style is used to "stretch" the button for the `exportToWordDoc` action in the left-most column. This is accomplished with the following CSS in `application.css`:

```
.custom-width-100 ul,
.custom-width-100 ul li,
.custom-width-100 ul li a.btn {
    width: 100%;
}
```

Similarly, the middle and right columns are rendered using the `custom-padding-top-20` CSS class. This shifts them down from the top of the page slightly, using the following CSS:

```
.custom-padding-top-20 {
    padding-top: 20px;
}
```

3.2.8. Migrating from earlier versions

As noted earlier on, it is possible to download layout XML files using the `LayoutService` (exposed on

the prototyping menu); this will download a ZIP file of layout XML files for all domain entities and view models. Alternatively the layout XML for a single domain object can be downloaded using the mixin action (contributed to every domain object).

There are four "styles":

- current
- complete
- normalized
- minimal

Ignoring the "current" style (which merely downloads the currently cached layout), the other three styles allow the developer to choose how much metadata is to be specified in the XML, and how much (if any) will be obtained from annotations in the metamodel. The table below summarises the choices:

Table 1. Table caption

Style	`@MemberGroupLayout`	`@MemberOrder`	`@ActionLayout`, `@PropertyLayout`, `@CollectionLayout`
`COMPLETE`	serialized as XML	serialized as XML	serialized as XML
`NORMALIZED`	serialized as XML	serialized as XML	not in the XML
`MINIMAL`	serialized as XML	not in the XML	not in the XML

As a developer, you therefore have a choice as to how you provide the metadata required for customised layouts:

- if you want all layout metadata to be read from the `.layout.xml` file, then download the "complete" version, and copy the file alongside the domain class. You can then remove all `@MemberGroupLayout`, `@MemberOrder`, `@ActionLayout`, `@PropertyLayout` and `@CollectionLayout` annotations from the source code of the domain class.
- if you want to use layout XML file to describe the grid (columns, tabs etc) and specify which object members are associated with those regions of the grid, then download the "normalized" version. You can then remove the `@MemberGroupLayout` and `@MemberOrder` annotations from the source code of the domain class, but retain the `@ActionLayout`, `@PropertyLayout` and `@CollectionLayout` annotations.
- if you want to use layout XML file ONLY to describe the grid, then download the "minimal" version. The grid regions will be empty in this version, and the framework will use the `@MemberOrder` annotation to bind object members to those regions. The only annotation that can be safely removed from the source code with this style is the `@MemberGroupLayout` annotation.

Download either for a single domain object, or download all domain objects (entities and view models).

3.2.9. Domain Services

For more information about layouts, see:

- `LayoutService` (whose functionality is exposed on the prototyping menu as an action) and lso the a mixin action
- `GridService` and its supporting services, `GridLoaderService` and `GridSystemService`
- grid layout classes, defined in the Apache Isis applib

3.2.10. Required updates to the dom project's pom.xml

Any `.layout.xml` files must be compiled and available in the classpath. Ensure the following is defined in the dom project's `pom.xml`:

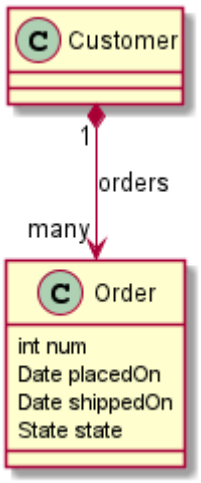
```
<resources>
    <resource>
        <filtering>false</filtering>
        <directory>src/main/resources</directory>
    </resource>
    <resource>
        <filtering>false</filtering>
        <directory>src/main/java</directory>
        <includes>
            <include>**</include>
        </includes>
        <excludes>
            <exclude>**/*.java</exclude>
        </excludes>
    </resource>
</resources>
```

If using an Apache Isis HelloWorld SimpleApp archetypes, then the POM is already correctly configured.

3.3. Table Columns

The optional `TableColumnOrderService` SPI service can be used to reorder columns in a table, either for a parented collection (owned by parent domain object) or a standalone collection (returned from an action invocation).

For example, suppose there is a `Customer` and an `Order`:



The order of these properties of `Order`, when rendered in the context of its owning `Customer`, can be controlled using this implementation of `TableColumnOrderService`:

```
@DomainService(
    nature = NatureOfService.DOMAIN,
    menuOrder = "100"                                   ①
)
public class TableColumnOrderServiceForCustomerOrders
                implements TableColumnOrderService {
    public List<String> orderParented(
            final Object parent,
            final String collectionId,
            final Class<?> collectionType,
            final List<String> propertyIds) {
        return parent instanceof Customer && "orders".equals(collectionId)
             ? Arrays.asList("num", "placedOn", "state", "shippedOn")
             : null;
    }
    public List<String> orderStandalone(
            final Class<?> collectionType,
            final List<String> propertyIds) {
        return null;
    }
}
```

① specifies the order in which the `TableColumnOrderService` implementations are called.

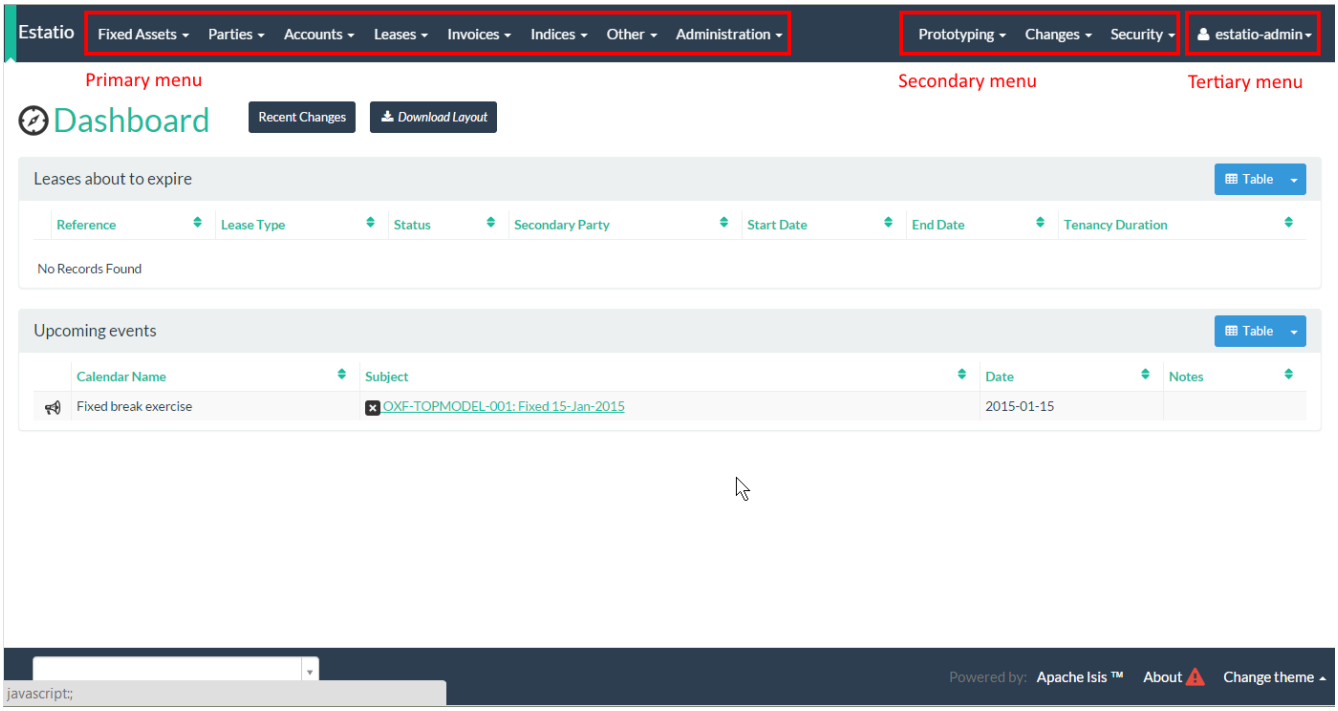
Chapter 4. Menu Bars Layout

The actions of domain services are made available as menu items on menus. By default each domain service corresponds to a single menu on this menu bar, with its actions as the drop-down menu items. This is rarely exactly what is required, however; it often makes sense to group menu items for similar domain services together.

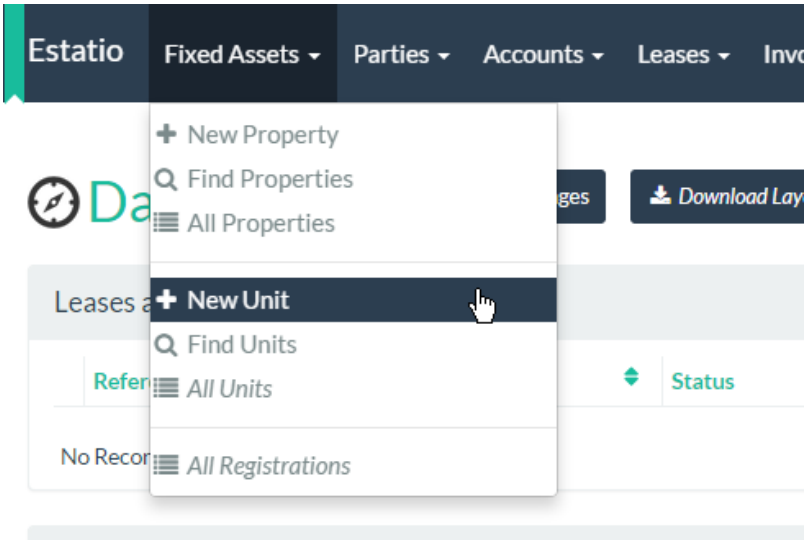
For example, the (non-ASF) Incode Platform modules provides services whose actions appear into two top-level menus:

- its `ApplicationUsers`, `ApplicationRoles`, `ApplicationPermission`, `ApplicationFeatureViewModels` and `ApplicationTenancies` domain services are all grouped together in a single "Security" top-level menu, on the SECONDARY menu bar
- its `MeService` domain service, which provides the `me()` action, is placed on the TERTIARY menu bar.

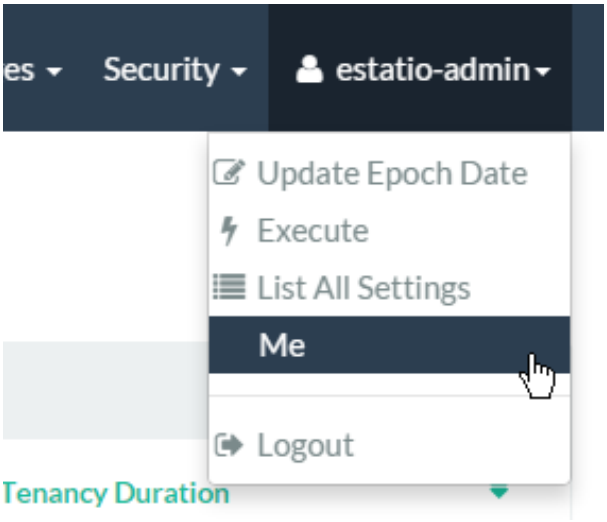
The menus themselves can be placed either on a primary, secondary or tertiary menu bar, as shown in this screenshot (taken from Estatio, an open source estate management application built using Apache Isis):



Within a single top-level menu (eg "Fixed Assets") there can be actions from multiple services. The Wicket viewer shows these as separate sections, with a divider between each:



The tertiary menu bar consists of a single unnamed menu, rendered underneath the user's login, top right. This is intended primarily for actions pertaining to the user themselves, eg their account, profile or settings:



The Apache Isis framework provides two mechanisms to control the arrangement of domain service actions across menubars and menus, either using annotations or using a file-based layout.

4.1. Annotation-based Menu Bars

The annotations-based approach for arranging the placement of menu items is achieved through the `@MemberOrder` and `@DomainServiceLayout` annotations.

4.1.1. @DomainServiceLayout

In the example from Estatio shown above the top-level menu combines the actions from the `Properties`, `Units` and `FixedAssetRegistrations` services. The `Properties` service is annotated:

```
@DomainServiceLayout(
        named="Fixed Assets",
        menuBar = DomainServiceLayout.MenuBar.PRIMARY,
        menuOrder = "10.1"
)
public class Properties ... { ... }
```

while the `Units` service is annotated:

```
@DomainServiceLayout(
        named="Fixed Assets",
        menuBar = DomainServiceLayout.MenuBar.PRIMARY,
        menuOrder = "10.2"
)
public class Units ... { ... }
```

and similarly `FixedAssetRegistrations` is annotated:

```
@DomainServiceLayout(
        named="Fixed Assets",
        menuBar = DomainServiceLayout.MenuBar.PRIMARY,
        menuOrder = "10.3"
)
public class FixedAssetRegistrations ... { ... }
```

Note that in all three cases the value of the `named` attribute and the `menuBar` attribute is the same: "Fixed Assets" and PRIMARY. This means that all will appear on a "Fixed Assets" menu in the primary menu bar.

Meanwhile the value of `menuOrder` attribute is significant for two reasons:

- for these three services on the same ("Fixed Assets") top-level menu, it determines the relative order of their sections (`Properties` first, then `Units`, then `FixedAssetRegistrations`)
- it determines the placement of the top-level menu itself ("Fixed Assets") with respect to other top-level menus on the menu bar.

To illustrate this latter point, the next top-level menu on the menu bar, "Parties", is placed after "Fixed Assets" because the `menuOrder` of the first of its domain services, namely the `Parties` service, is higher than that for "Fixed Assets":

```
@DomainServiceLayout(
        named="Parties",
        menuBar = DomainServiceLayout.MenuBar.PRIMARY,
        menuOrder = "20.1"
)
public class Parties ... { ... }
```

Note that only the `menuOrder` of the *first* domain service is significant in placing the menus along the menu bar; thereafter the purpose of the `menuOrder` is to order the menu services sections on the menu itself.

4.1.2. Ordering menu actions

For a given service, the actions within a section on a menu is determined by the `@MemberOrder` annotation. Thus, for the `Units` domain service, its actions are annotated:

```
public class Units extends EstatioDomainService<Unit> {

    @MemberOrder(sequence = "1")
    public Unit newUnit( ... ) { ... }

    @MemberOrder(sequence = "2")
    public List<Unit> findUnits( ... ) { ... }

    @ActionLayout( prototype = true )
    @MemberOrder(sequence = "99")
    public List<Unit> allUnits() { ... }
    ...
}
```

Note that the last is also a prototype action (meaning it is only displayed in SERVER_PROTOTYPE (=Wicket Development) mode). In the UI it is rendered in italics.

4.1.3. Tertiary Menu

Domain services' actions can be associated with the tertiary menu using the same `@DomainServiceLayout` annotation, but be aware that the `@DomainServiceLayout#name()` attribute will be ignored (there is only one effective menu).

For example, the `updateEpochDate(…)` and `listAllSettings(…)` actions come from the following service:

```
@DomainServiceLayout(
        menuBar = DomainServiceLayout.MenuBar.TERTIARY,
        menuOrder = "10.1"
)
public class EstatioAdministrationService ... {

    @MemberOrder(sequence = "1")
    public void updateEpochDate( ... ) { ... }

    @MemberOrder(sequence = "2")
    public List<ApplicationSetting> listAllSettings() { ... }
    ...
}
```

Because the number of items on the tertiary menu is expected to be small and most will pertain to the current user, the viewer does *not* place dividers between actions from different services on the tertiary menu.

4.2. File-based Menu Bars

The domain service actions can be arranged across menu items using the `menubars.layout.xml` file. Not only is this easier to work with, it also can be reloaded dynamically (if in prototype mode), substantially reducing the edit compile run cycle.

As for file-based object layouts, this offers a number of benefits:

- Probably most significantly, the layout can be updated without requiring a recompile of the code and redeploy of the app; fine-tuning the layout with your end users is easy to do
- Many developers also find it easier to rationalize about menu bars layout when all the hints are collated together in a single place (rather than scattered across the domain service classes as annotations).

There are some disadvantages to using file-based layouts:

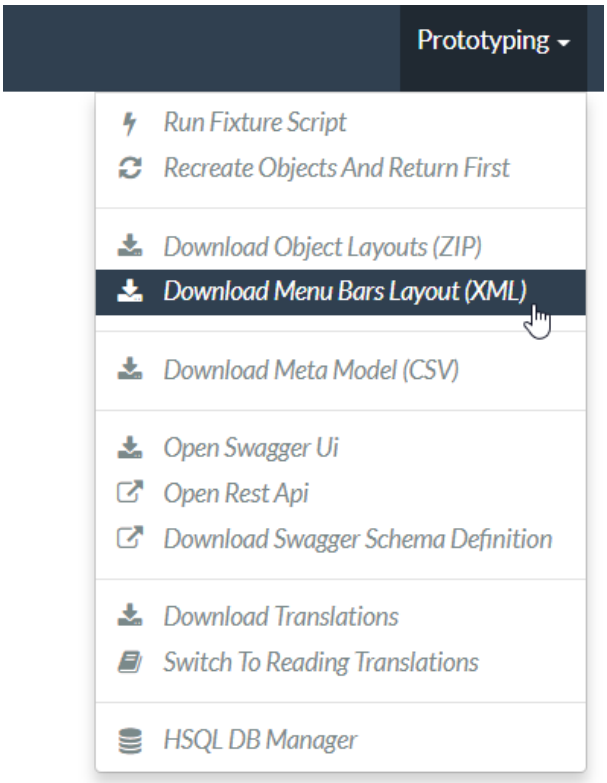
- file-based layouts are not typesafe: a typo will result in the metadata not being picked up for the element.
- they also suffer from syntactic fragility: an invalid XML document will result in no metadata for the entire class.

The `menubars.layout.xml` file is just the serialized form of a `MenuBars` layout class defined within Apache Isis' applib. These are JAXB-annotated classes with corresponding XSD schemas; the upshot of that is that IDEs such as IntelliJ and Eclipse can provide "intellisense", making it easy to author such layout files.

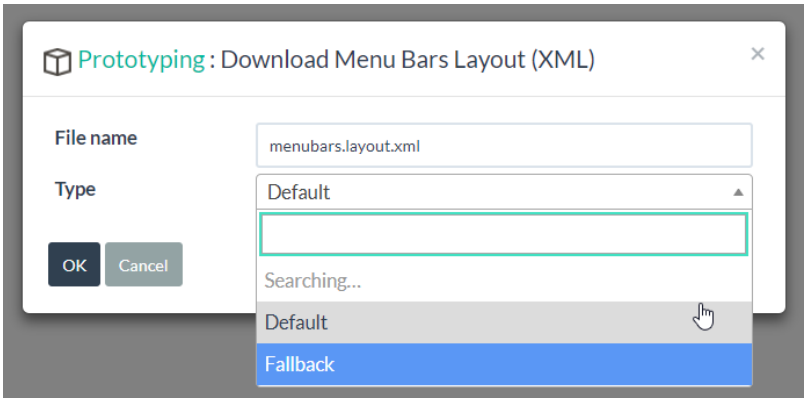
4.2.1. Obtaining an initial layout

An initial `menubars.layout.xml` - capturing any existing metadata either implicit or explicitly specified through annotations can be downloaded from the `MenuBarsService` (exposed on the

prototyping menu):



This action allows either the "Default" or the "Fallback" layout to be downloaded.



The "Default" layout is that currently in use, while the "Fallback" layout is that provided only from the annotations. Initially these are identical.

For example, here's a fragment of that provided by the simpleapp archetype:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<mb3:menuBars
    xsi:schemaLocation="..."
    xmlns:cpt="http://isis.apache.org/applib/layout/component"
    xmlns:lnk="http://isis.apache.org/applib/layout/links"
    xmlns:mb3="http://isis.apache.org/applib/layout/menubars/bootstrap3"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <mb3:primary>
        <mb3:menu>
            <mb3:named>Simple Objects</mb3:named>
            <mb3:section>
                <mb3:serviceAction objectType="simple.SimpleObjectMenu" id="listAll">
                    <cpt:named>List All</cpt:named>
                </mb3:serviceAction>
                <mb3:serviceAction objectType="simple.SimpleObjectMenu" id="
findByName">
                    <cpt:named>Find By Name</cpt:named>
                </mb3:serviceAction>
                <mb3:serviceAction objectType="simple.SimpleObjectMenu" id="create">
                    <cpt:named>Create</cpt:named>
                </mb3:serviceAction>
            </mb3:section>
        </mb3:menu>
        <mb3:menu unreferencedActions="true">
            <mb3:named>Other</mb3:named>
        </mb3:menu>
    </mb3:primary>
    <mb3:secondary>
        <mb3:menu>
            <mb3:named>Prototyping</mb3:named>
            ...
    </mb3:secondary>
    <mb3:tertiary>
        <mb3:menu>
            ...
        </mb3:menu>
    </mb3:tertiary>
</mb3:menuBars>
```

Note the "Other" menu, with `unreferencedActions` attribute set to `true`. For a layout file to be valid there must be exactly one `<menu>` with this attribute set. Any domain service actions that are not explicitly listed will be placed under this menu.

4.2.2. Adjusting the layout

The downloaded `menubars.layout.xml` file can be adjusted as necessary, creating new menus and menu sections. Once done, it can be saved in the same package as the `AppManifest` used to bootstrap the application. Subsequently, the file is then parsed and used when the application is started.

If running in prototype mode, the file will be dynamically reloaded from the classpath.

Once the application has bootstrapped with a layout file, downloading the "Default" layout (from the prototyping menu) in essence just returns this file.

If, when the application is run, unwanted service actions are shown in the "Other" menu (which you would like to place elsewhere), then download the "Default" layout again. The downloaded file will list out all these domain service actions, so that they can easily be moved elsewhere.

Chapter 5. Configuration Properties

Wicket configuration properties alter the way in which Apache Isis' Wicket viewer renders domain objects.

5.1. Loading Configuration Properties

Configuration properties are typically stored in `WEB-INF/isis.properties` or in `WEB-INF/viewer_wicket.properties`.

To tell Apache Isis that the Wicket viewer is in use (and should therefore search for the `viewer_wicket.properties` file), add the following to `WEB-INF/web.xml`:

```
<context-param>
    <param-name>isis.viewers</param-name>
    <param-value>wicket</param-value>
</context-param>
```

Alternatively, because most of these configuration properties tend not to change between environment (development and production), another practice is to load them programmatically from the `AppManifest`:

```
public class MyAppAppManifest extends AppManifestAbstract2 {

    public static final Builder BUILDER = Builder
            .forModule(new MyApplicationModule())
            ...
            .withConfigurationPropertiesFile(
            MyAppManifest.class, "isis-non-changing.properties") ;

    ...
}
```

where `isis-non-changing.properties` is on the classpath in the same package as `MyAppAppManifest`.

Whichever approach is used, the configuration properties from all config files are merged together.

5.2. Application Identity

Configuration properties that identify the application, in the sign-in page, welcome and about pages.

These also include top-level overrides for CSS and Javascript.

Table 2. Application Identity

Property	Value (*default value*)	Description
`isis.viewer.wicket.application.about`	Apache Isis ™	Label used on the about page. If not specified, then `application.name` is used instead.
`isis.viewer.wicket.application.brandLogoHeader`	Image URL	Either the location of the image file (relative to `src/main/webapp`), or an absolute URL. This is rendered on the header panel. An image with a size of 160x40 works well. If not specified, the `application.name` is used instead.
`isis.viewer.wicket.application.brandLogoSignin`	Image URL	Either the location of the image file (relative to `src/main/webapp`), or an absolute URL. This is rendered on the sign-in page. An image with a size of 400x40 works well. If not specified, the `application.name` is used instead.
`isis.viewer.wicket.application.css`	File name (`*scripts/application.css*`)	File to read any custom CSS, relative to `src/main/webapp` directory.
`isis.viewer.wicket.application.js`	File name (`*scripts/application.js*`)	File to read any custom Javascript, relative to `src/main/webapp` directory.
`isis.viewer.wicket.application.name`	Apache Isis ™	Identifies the application on the sign-in page (unless a `brandLogoSignin` image is configured) and on top-left in the header (unless a `brandLogoHeader` image is configured).
`isis.viewer.wicket.application.version`	(none)	The version of the application, eg `1.0`, `1.1`, or something more complex such as `20181115.2011.EST-1862.8d8e1c16`. If present, then this will be shown in the footer on every page as well as on the about page. See below for further discussion on this topic.

Property	Value (*default value*)	Description
`isis.viewer.wicket.welcome.file`	File name (`*welcome.html*`)	Location of the HTML file (relative to `src/main/webapp`) whose contents should be displayed on the application's home page. Note though that if a @HomePage action exists, then that will take precedence. If no welcome file exists, then the value of `welcome.text` is shown as a fallback.
`isis.viewer.wicket.welcome.text`	Text	To be displayed on the application's home page, used as a fallback if `welcome.file` is not specified. Note though that if a @HomePage action exists, then that will take precedence.

5.2.1. Application versioning

If the `isis.viewer.wicket.application.version` configuration property is present, then this will be shown in the footer on every page as well as on the about page.

However, maintaining this configuration property manually is likely to be error prone. An alternative approach is to configure your build system to generate a version identifier automatically.

For example, the version `20181115.2011.EST-1862.8d8e1c16` consists of four parts:

- the date of the build
- the time of the build (to the nearest minute)
- the branch
- the git shaId

This can be computed using a simple script, for example:

```
DATE=$(date +%Y%m%d.%H%M)
BRANCH=$(echo $GIT_BRANCH | sed 's|^rel/||g' | sed 's|[.]|_|g' | awk -F/ '{ print $NF
}')
GIT_SHORT_COMMIT=$(echo $GIT_COMMIT | cut -c1-8)
REVISION=$DATE.$BRANCH.$GIT_SHORT_COMMIT
```

where `$GIT_BRANCH` and `$GIT_COMMIT` are provided by the CI server/build environment.

This environment variable can be passed into the (Maven) build using a system property, for

example:

```
mvn -Drevision=$REVISION clean install
```

If we provide a file `application-version.properties` is in the same package as the app manifest file, but in the `src/main/resources` directory:

application-version.properties

```
isis.viewer.wicket.application.version=${revision}
```

then Maven will automatically interpolate the actual revision when this file is copied over to the build (ie `target/classes`) directory.

Finally, this file can be loaded in the app manifest using:

```
public class MyAppManifest extends AppManifestAbstract2 {

    public static final AppManifestAbstract2.Builder BUILDER =
            AppManifestAbstract2.Builder.forModule(new MyApplicationModule())
            .withConfigurationPropertiesFile(
                    MyAppManifest.class, "application-version.properties");

    public MyAppManifest() {
        super(BUILDER);
    }
}
```

5.3. Sign-in, Sign-up and Remember Me

Configuration properties that influence the behaviour and appearance of the sign-in page.

Table 3. Sign-in, Sign-up and Remember Me

Property	**Value** (*default value*)	**Description**
`isis.viewer.wicket.rememberMe.cookieKey`	ascii chars (`isisWicketRememberMe`)	Cookie key holding the (encrypted) 'rememberMe' user/password. There is generally no need to change this. Valid values as per this StackOverflow answer.

Property	Value (*default value*)	Description
`isis.viewer.wicket.rememberMe.encryptionKey`	any string (in prod, a random UUID each time)	Encryption key is used to encrypt the rememberMe user/password. Apache Isis leverages Apache Wicket's rememberMe support which holds remembered user/passwords in an encrypted cookie. If a hard-coded and publicly known value were to be used (as was the case prior to `1.13.0`), then it would be possible for rememberMe user/password to be intercepted and decrypted, possibly compromising access. This configuration property therefore allows a private key to be specified, baked into the application. If no value is set then, in production, a random UUID will be used as the encryption key. The net effect of this fallback behaviour is that 'rememberMe' will work, but only until the webapp is restarted (after which the end-user will have to log in again. In prototype mode, though, a fixed key will still be used; this saves the developer having to login each time.
`isis.viewer.wicket.rememberMe.suppress`	`true`,`false` (`false`)	Whether to suppress "remember me" checkbox on the login page. Further discussion below.
`isis.viewer.wicket.suppressPasswordReset`	`true`,`false` (`false`)	If user registration is enabled, whether to suppress the "password reset" link on the login page. Further discussion below.
`isis.viewer.wicket.suppressRememberMe`	`true`,`false` (`false`)	Whether to suppress "remember me" checkbox on the login page. Further discussion below.  (Deprecated in `1.13.0`, replaced by `rememberMe.suppress`).

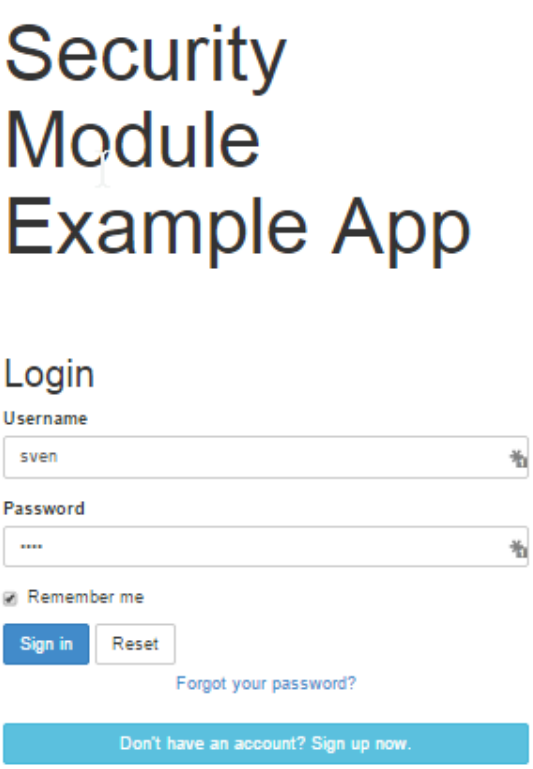
Property	Value (*default value*)	Description
`isis.viewer.wicket.suppressSignUp`	`true`,`false` (`false`)	Whether to suppress "sign-up" link. Note though that user registration services must also be configured. Further discussion below.

5.3.1. Remember Me

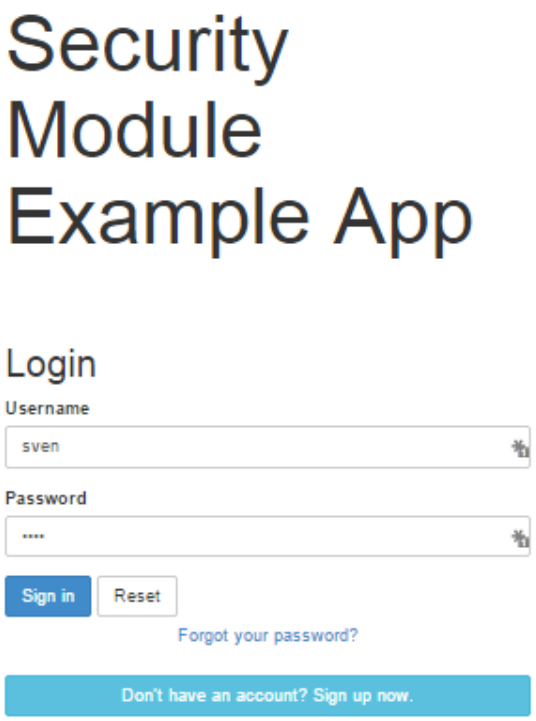
The 'remember me' checkbox on the login page can be suppressed, if required, by setting a configuration flag:

```
isis.viewer.wicket.rememberMe.suppress=true
```

With 'remember me' not suppressed (the default):



and with the checkbox suppressed:



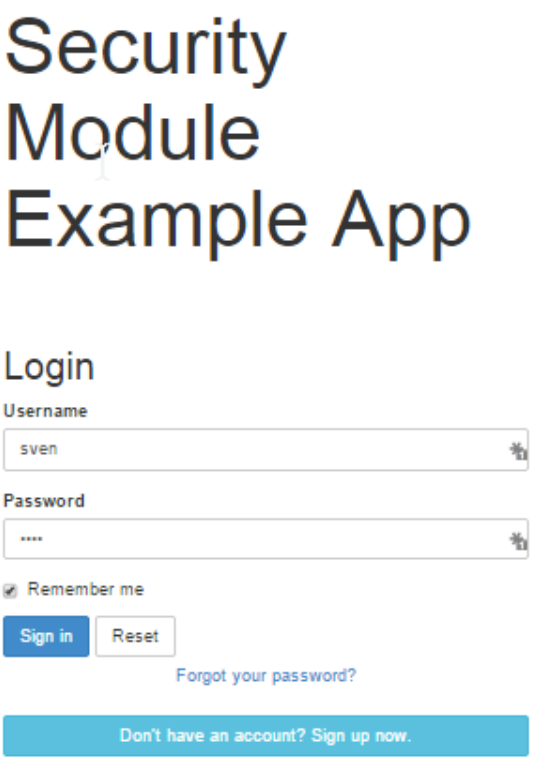
5.3.2. Sign-up

If user registration has been configured, then the Wicket viewer allows the user to sign-up a new account and to reset their password from the login page.

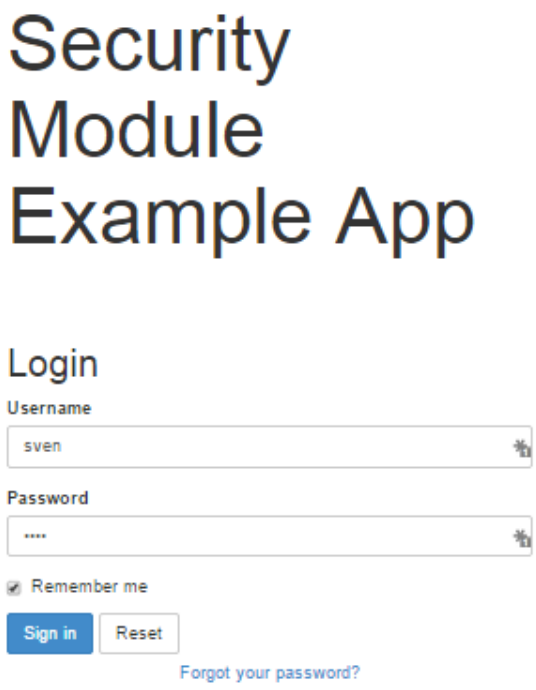
The 'sign up' link can be suppressed, if required, by setting a configuration flag.

```
isis.viewer.wicket.suppressSignUp=true
```

With 'sign up' not suppressed (the default):



and with the link suppressed:



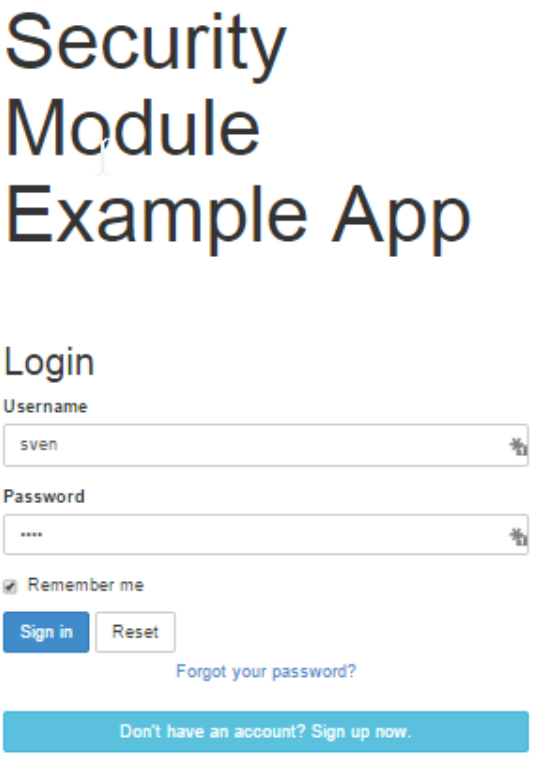
5.3.3. Password Reset

If user registration has been configured, then the Wicket viewer allows the user to sign-up a new account and to reset their password from the login page.

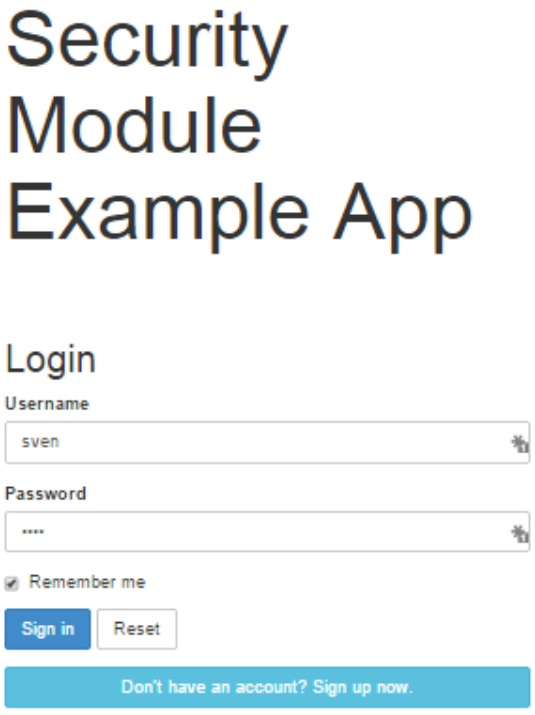
The 'password reset' link can be suppressed, if required, by setting a configuration flag:

```
isis.viewer.wicket.suppressPasswordReset=true
```

With 'password reset' not suppressed (the default):



and with the link suppressed:



5.4. Header and Footer

Configuration properties that influence the appearance of the header and footer panels.

See also the bookmarks and breadcrumbs and themes configuration properties, because these also control UI elements that appear on the header/footer panels.

Table 4. Header and Footer

Property	**Value** (*default value*)	**Description**
`isis.viewer.wicket.+ credit.1.image`	File path	File path to a logo image for the first credited organisation, relative to `src/main/webapp` directory. For example: `/images/apache-isis/logo-48x48.png`. Either/both of `name` and `image` must be defined for the credit to be rendered in the footer.
`isis.viewer.wicket.+ credit.1.name`	String	Name of the first credited organisation. For example: "Apache Isis" Either/both of `name` and `image` must be defined for the credit to be rendered in the footer.
`isis.viewer.wicket.+ credit.1.url`	URL	URL to the website of the first credited organisation. For example: `http://isis.apache.org`. Optional.
`isis.viewer.wicket.+ credit.2.image`	File path	File path to a logo image for the second credited organisation, relative to `src/main/webapp` directory. Either/both of `name` and `image` must be defined for the credit to be rendered in the footer.
`isis.viewer.wicket.+ credit.2.name`	String	Name of the second credited organisation. Either/both of `name` and `image` must be defined for the credit to be rendered in the footer.

Property	Value (*default value*)	Description
`isis.viewer.wicket.+ credit.2.url`	URL	URL to the website of the second credited organisation. Optional.
`isis.viewer.wicket.+ credit.3.image`	File path	File path to a logo image for the third credited organisation, relative to `src/main/webapp` directory. Either/both of `name` and `image` must be defined for the credit to be rendered in the footer.
`isis.viewer.wicket.+ credit.3.name`	String	Name of the third credited organisation. Either/both of `name` and `image` must be defined for the credit to be rendered in the footer.
`isis.viewer.wicket.+ credit.3.url`	URL	URL to the website of the third credited organisation. Optional.
`isis.viewer.wicket.showFooter`	`true`,`false` (`true`)	Whether to show the footer at all.

5.5. Presentation

These configuration properties that effect the overall presentation and appearance of the viewer.

Some of the properties below use the prefix `isis.viewers.` (rather than the usual `isis.viewer.wicket.`).

Table 5. Presentation

Property	Value (default value)	Description
isis.viewers.collectionLayout.defaultView	hidden, table (hidden)	Default for the default view for all (parented) collections if not explicitly specified using @CollectionLayout#defaultView() By default the framework renders (parented) collections as "hidden", ie collapsed. These can be overridden on a case-by-case basis using the @CollectionLayout#defaultView() or the corresponding <collectionLayout defaultView="…"> element in the Xxx.layout.xml layout file. If the majority of collections should be displayed as "table" form, then it is more convenient to specify the default view globally.
isis.viewers.paged.parented	positive integer (12)	Default page size for parented collections (as owned by an object, eg Customer#getOrders())
isis.viewers.paged.standalone	positive integer (25)	Default page size for standalone collections (as returned from an action invocation)
isis.viewers.propertyLayout.labelPosition	TOP, LEFT (LEFT)	Default for label position for all properties if not explicitly specified using @PropertyLayout#labelPosition() If you want a consistent look-n-feel throughout the app, eg all property labels to the top, then it'd be rather frustrating to have to annotate every property. If these are not present then Apache Isis will render according to internal defaults. At the time of writing, this means labels are to the left for all datatypes except multiline strings.
isis.viewer.wicket.maxTitleLength InParentedTables	+ve integer (12)	See further discussion (immediately below).
isis.viewer.wicket.maxTitleLength InStandaloneTables	+ve integer, (12)	See further discussion (immediately below).

Property	Value (default value)	Description
isis.viewer.wicket.maxTitleLengthInTables	+ve integer, (12)	See further discussion (immediately below).
isis.viewer.wicket.promptStyle	dialog,inline, inline_as_if_edit (inline)	whether the prompt for editing a domain object property or invoking an action (associated with a property) is shown inline within the property's form, or instead shown in a modal dialog box. For actions, inline_as_if_edit will suppress the action's button, and instead let the action be invoked as if editing the property. The net effect is that being able to "edit" complex properties with multiple parts (eg a date) using a multi-argument editor (this editor, in fact, being the action's argument panel). The property can be overridden on a property-by-property basis using @Property#promptStyle()) or @Action#promptStyle()). Note that inline_as_if_edit does not make sense for a configuration property default, and will instead be interpreted as inline.
isis.viewer.wicket.dialogMode	sidebar,modal (sidebar)	Whether an action on a domain object (entity or view model) which prompts with a style of DIALOG - as in, @ActionLayout(promptStyle="DIALOG") - should be rendered using a sidebar or alternatively in a modal dialog box. See the discussion on the sidebar vs modal dialogs feature for further details.
isis.viewer.wicket.dialogModeForMenu	sidebar,modal (sidebar)	Whether an action for a domain service should be rendered using a sidebar or alternatively in a modal dialog box. See the discussion on the sidebar vs modal dialogs feature for further details.

Objects whose title is overly long can be cumbersome in titles. The Wicket viewer has a mechanism to automatically shorten the titles of objects specified using @Title. As an alternative/in addition, the viewer can also be configured to simply truncate titles longer than a certain length.

The properties themselves are:

```
isis.viewer.wicket.maxTitleLengthInStandaloneTables=20
isis.viewer.wicket.maxTitleLengthInParentedTables=8
```

If you wish to use the same value in both cases, you can also specify just:

```
isis.viewer.wicket.maxTitleLengthInTables=15
```

This is used as a fallback if the more specific properties are not provided.

If no properties are provided, then the Wicket viewer defaults to abbreviating titles to a length of 12.

5.6. Bookmarks and Breadcrumbs

These configuration properties enable or disable the mechanisms for locating previously accessed objects.

Table 6. Bookmarks and Breadcrumbs

Property	**Value** (*default value*)	**Description**
isis.viewer.wicket whereAmI. maxParentChainLength	+ve int (64)	The number of levels to show in the "Where am I" chain.
isis.viewer.wicket. bookmarkedPages.maxSize	+ve int (15)	number of pages to bookmark
isis.viewer.wicket. bookmarkedPages.showChooser	+ve int (15)	whether to show the bookmark panel (top-left in the Wicket viewer)
isis.viewer.wicket. breadcrumbs.showChooser	true,false (true)	Whether to show chooser for Breadcrumbs (bottom-left footer in the Wicket viewer)

5.7. Themes

These configuration properties control the switching of themes.

Table 7. Themes

Property	Value (default value)	Description
isis.viewer.wicket.themes.enabled	comma separated list …	… of bootswatch themes. Only applies if themes.showChooser==true. See further discussion below.
isis.viewer.wicket.themes.initial	theme name	Which theme to show initially. See further discussion below.
isis.viewer.wicket.themes.showChooser	true,false (false)	Whether to show chooser for Bootstrap themes. See further discussion below.
isis.viewer.wicket.themes.default	bootswatch theme name (Flatly)	Which Bootstrap theme to use by default.

The Wicket viewer uses Bootstrap styles and components (courtesy of the Wicket Bootstrap integration).

By default the viewer uses the "Flatly" theme from bootswatch.com. This can be overridden using the following configuration property:

```
isis.viewer.wicket.themes.initial=Darky
```

Set this configuration property to different values for different environments (dev, test, prod) so you can know at a glance which environment you are connected to.

The end-user can also be given the choice of changing the theme:

```
isis.viewer.wicket.themes.showChooser=true
```

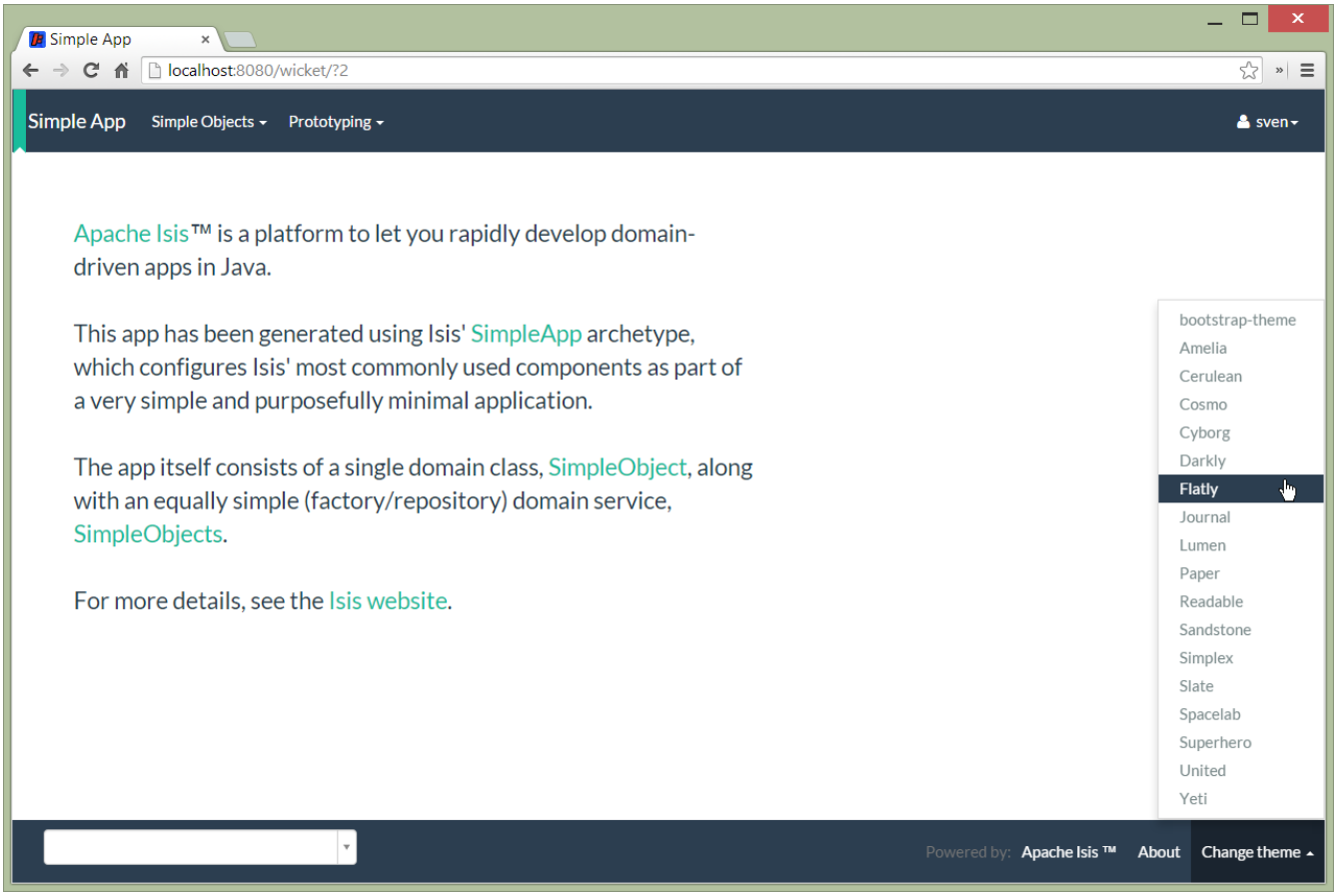


Figure 1. Example 1

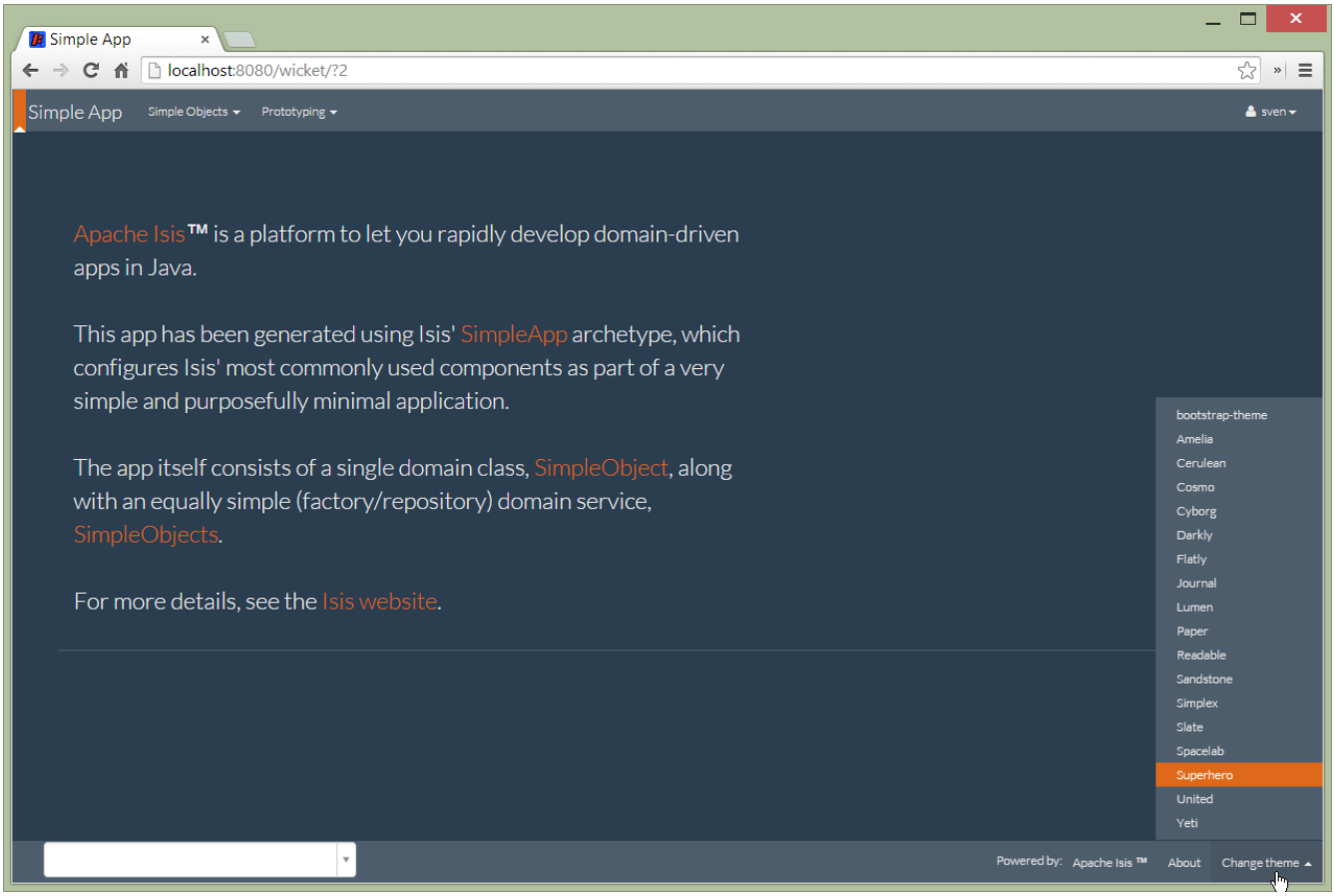


Figure 2. Example 2:

It is also possible to restrict the themes shown to some subset of those in bootswatch. This is done

using a further property:

```
isis.viewer.wicket.themes.enabled=bootstrap-theme,Cosmo,Flatly,Darkly,Sandstone,United
```

where the value is the list of themes (from bootswatch.com) to be made available.

You can also develop and install a custom themes (eg to fit your company's look-n-feel/interface guidelines); see the Extending chapter for further details.

5.8. Date Formatting & Date Picker

These configuration properties influence the way in which date/times are rendered and can be selected using the date/time pickers.

Table 8. Date Formatting & Date Picker

Property	Value (*default value*)	Description
`isis.viewer.wicket.datePattern`	date format (`dd-MM-yyyy`)	The `SimpleDateFormat` used to render dates. For the date picker (which uses `moment.js` library), this is converted dynamically into the corresponding `moment.js` format.
`isis.viewer.wicket.dateTimePattern`	date/time format (`dd-MM-yyyy HH:mm`)	The `SimpleDateFormat` used to render date/times. For the date picker (which uses `moment.js` library), this is converted dynamically into the corresponding `moment.js` format.
`isis.viewer.wicket.datePicker.maxDate`	ISO format date (`2100-01-01T00:00:00.000Z`)	Specifies a maximum date after which dates may not be specified. See datetimepicker reference docs for further details. The string must be in ISO date format (see here for further details).
`isis.viewer.wicket.datePicker.minDate`	ISO format date (`1900-01-01T00:00:00.000Z`)	Specifies a minimum date before which dates may not be specified. See datetimepicker reference docs for further details. The string must be in ISO date format (see here for further details).
`isis.viewer.wicket.timestampPattern`	date/time format (`yyyy-MM-dd HH:mm:ss.SSS`)	The `SimpleDateFormat` used to render timestamps.

5.9. Debugging

These configuration properties can assist with debugging the behaviour of the Wicket viewer itself.

Table 9. Debugging

Property	Value (*default value*)	Description
isis.viewer.wicket.ajaxDebugMode	true,false (false)	whether the Wicket debug mode should be enabled.
isis.viewer.wicket.developmentUtilities.enable	true,false (false)	when running in production mode, whether to show enable the Wicket development utilities anyway. From a UI perspective, this will cause the DebugBar to be shown (top-right). If running in prototyping mode, the development utilities (debug bar) is always enabled. This feature is primarily just to help track any memory leakage issues that might be suspected when running in production.
isis.viewer.wicket.liveReloadUrl	URL	Specifies the URL if live reload is set up, eg: http://localhost:35729/livereload.js?snipver=1
isis.viewer.wicket.stripWicketTags	true,false (true)	Whether to force Wicket tags to be stripped in prototype/development mode.  In 1.7.0 and earlier, the behaviour is different; the Apache Isis Wicket viewer will preserve wicket tags when running in Apache Isis' prototype/development mode, but will still strip wicket tags in Apache Isis' server/deployment mode. We changed the behaviour in 1.8.0 because we found that Internet Explorer can be sensitive to the presence of Wicket tags.

Property	Value (*default value*)	Description
isis.viewer.wicket.wicketSourcePlugin	true,false (false)	Whether the WicketSource plugin should be enabled; by default it is not enabled.  Enabling this setting can significantly slow down rendering performance of the Wicket viewer.

5.10. Feature Toggles

These configuration properties are used to enable/disable features that are either on the way to becoming the default behaviour (but can temporarily be disabled) or conversely for features that are to be removed (but can temporarily be left as enabled).

Table 10. Feature Toggles

Property	Value (*default value*)	Description
isis.viewer.wicket.whereAmI.enabled	true,false (true)	To disable the "Where am I" feature.
isis.viewer.wicket.disableDependentChoiceAutoSelection	true,false (false)	For dependent choices, whether to automatically select the first dependent (eg subcategory) when the parameter on which it depends (category) changes.
isis.viewer.wicket.disableModalDialogs	true,false (false)	No longer supported.
isis.viewer.wicket.preventDoubleClickForFormSubmit	true,false (true)	Whether to disable a form submit button after it has been clicked, to prevent users causing an error if they do a double click.
isis.viewer.wicket.preventDoubleClickForNoArgAction	true,false (true)	Whether to disable a no-arg action button after it has been clicked, to prevent users causing an error if they do a double click.

Property	Value (*default value*)	Description
isis.viewer.wicket.redirectEvenIfSameObject	true,false (false)	By default, an action invocation that returns the same object will result in the page being updated. The same is true for property edits. If this setting is enabled, then the viewer will always render to a new page.  Note that the default behaviour is new in 1.15.0, providing a better end-user experience. Setting this option retains the behaviour of the viewer pre-1.15.0.
isis.viewer.wicket.regularCase	true,false (false)	Ignored for 1.8.0+; in earlier versions forced regular case rather than title case in the UI
isis.viewer.wicket.replaceDisabledTagWithReadonlyTag	true,false (true)	Whether to replace 'disabled' tag with 'readonly' (for w3 spec-compliant browsers such as for Firefox and Chrome 54+) which prevent copy from 'disabled' fields.
isis.viewer.wicket.useIndicatorForFormSubmit	true,false (true)	Whether to show an indicator for a form submit button that it has been clicked.
isis.viewer.wicket.useIndicatorForNoArgAction	true,false (true)	Whether to show an indicator for a no-arg action button that it has been clicked.

Chapter 6. Customisation

6.1. Top-level Index Page

If the user visits the root of the webapp (eg http://localhost:8080), then a top-level index page can specified. This is a static file that typically has hyperlinks to the available resources available (eg the Wicket viewer at `/wicket/`, the Swagger UI is bound to `/swagger-ui`, the Restful at `/restful/`).

The archetypes provide an example in the `about/index.html` file (relative to `src/main/webapp`). This is configured using the `web.xml`:

web.xml

```
<welcome-file-list>
    <welcome-file>about/index.html</welcome-file>
</welcome-file-list>
```

If instead you want to redirect users directly to the Wicket viewer, then this file should contain simply:

about/index.html

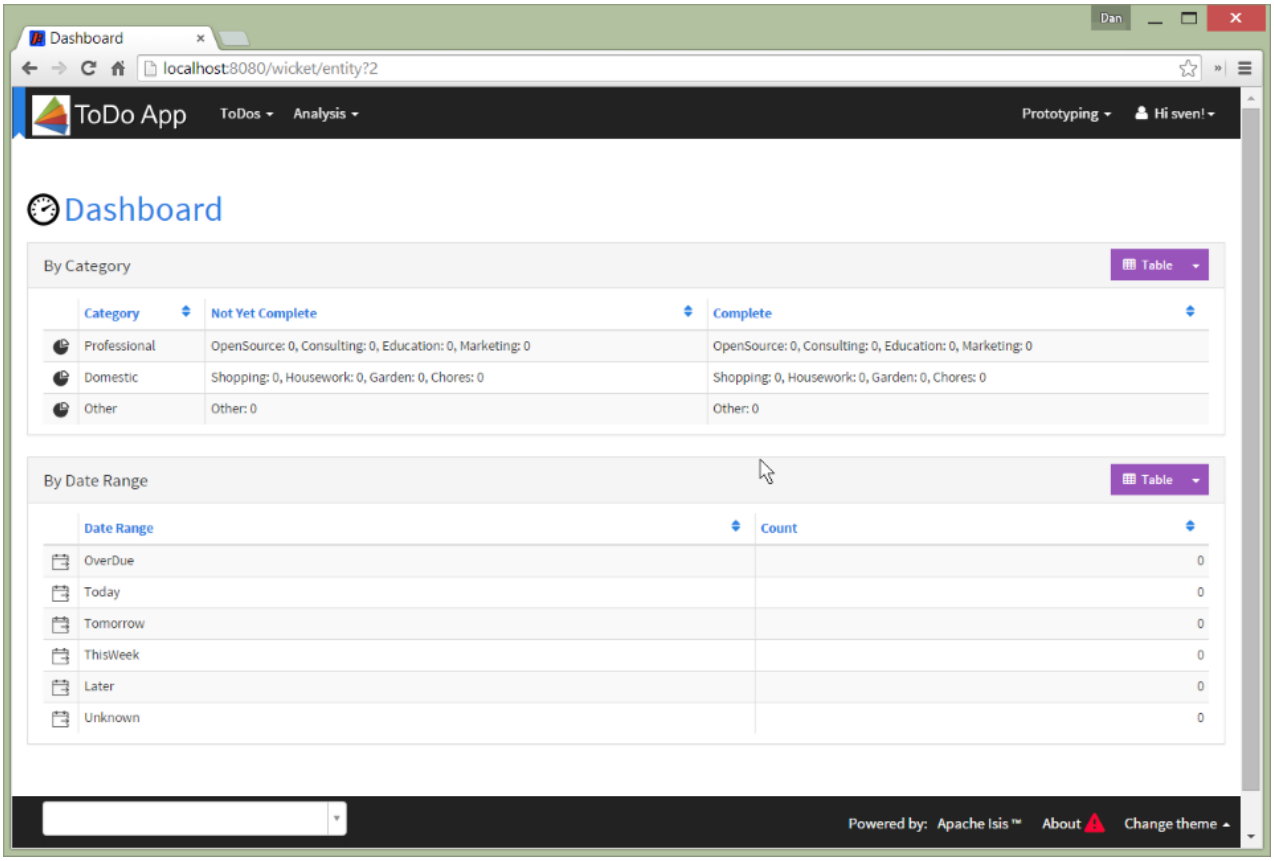
```
<html>
<head>
    <META HTTP-EQUIV="Refresh" CONTENT="0; URL=wicket/"/>
</head>
</html>
```

= Brand logo :Notice: Licensed to the Apache Software Foundation (ASF) under one or more contributor license agreements. See the NOTICE file distributed with this work for additional information regarding copyright ownership. The ASF licenses this file to you under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at. http://www.apache.org/licenses/LICENSE-2.0 . Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License. :_basedir: ../../ :_imagesdir: images/

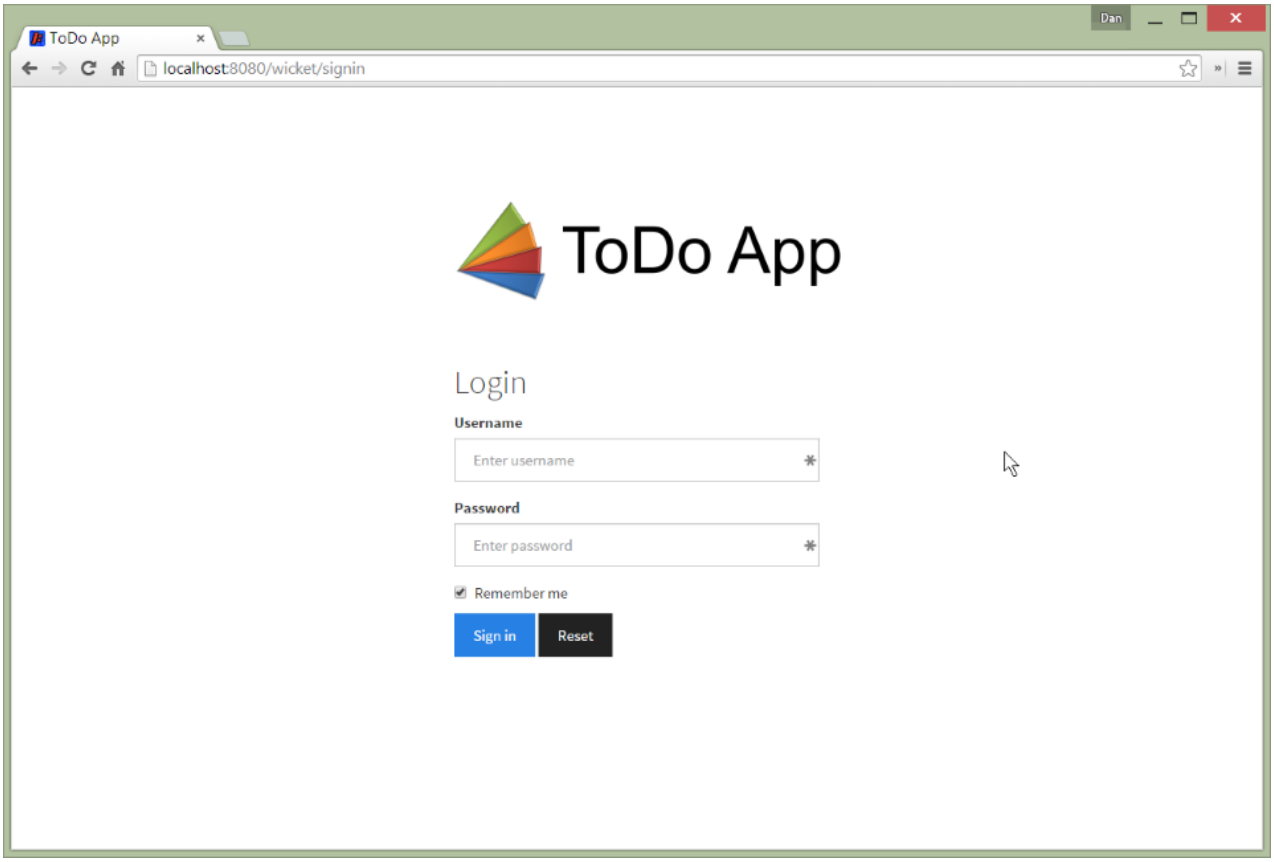
By default the Wicket viewer will display the application name top-left in the header menu. This can be changed to display a png logo instead.

== Screenshots

The screenshot below shows the Isis addons example todoapp (not ASF) with a 'brand logo' image in its header:



A custom brand logo (typically larger) can also be specified for the signin page:



To configure, simply specify the appropriate configuration properties:

```
isis.wicket.viewer.application.brandLogoSignin=/images/todoapp-logo-signin.png
isis.wicket.viewer.application.brandLogoHeader=/images/todoapp-logo-header.png
```

These are resolved relative to `src/main/webapp`, or an absolute URL can be specified.

- for the signin image, a size of 400x100 works well.
- for the header image, a size of 160x40 works well.

You may also wish to tweak the `application.css`. For example, a logo with height 40px works well with the following:

```
.navbar-brand img {
    margin-top: -5px;
    margin-left: 5px;
}
```

= Welcome page :Notice: Licensed to the Apache Software Foundation (ASF) under one or more contributor license agreements. See the NOTICE file distributed with this work for additional information regarding copyright ownership. The ASF licenses this file to you under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at. http://www.apache.org/licenses/LICENSE-2.0 . Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License. :_basedir: ../../ :_imagesdir: images/

It's possible to customize the application name, welcome message (as displayed on the home page if not home page service is configured) and the about message can all be customized. This is done by specifying the appropriate configuration properties:

```
isis.viewer.wicket.application.name=My Wonderful App
isis.viewer.wicket.welcome.file=welcome.html
isis.viewer.wicket.application.about=My Wonderful App v1.0
```

① the `welcome.html` file is resolved relative to `src/main/webapp`.

Do not confuse the welcome page file with the top-level index page; they are different things!

The `application.name` is used both on the sign-in page and also top-left on the header. It's also possible to replace this text with images:

```
isis.viewer.wicket.application.brandLogoSignin=/images/logo-512.png
isis.viewer.wicket.application.brandLogoHeader=/images/logo-80x32.png
```

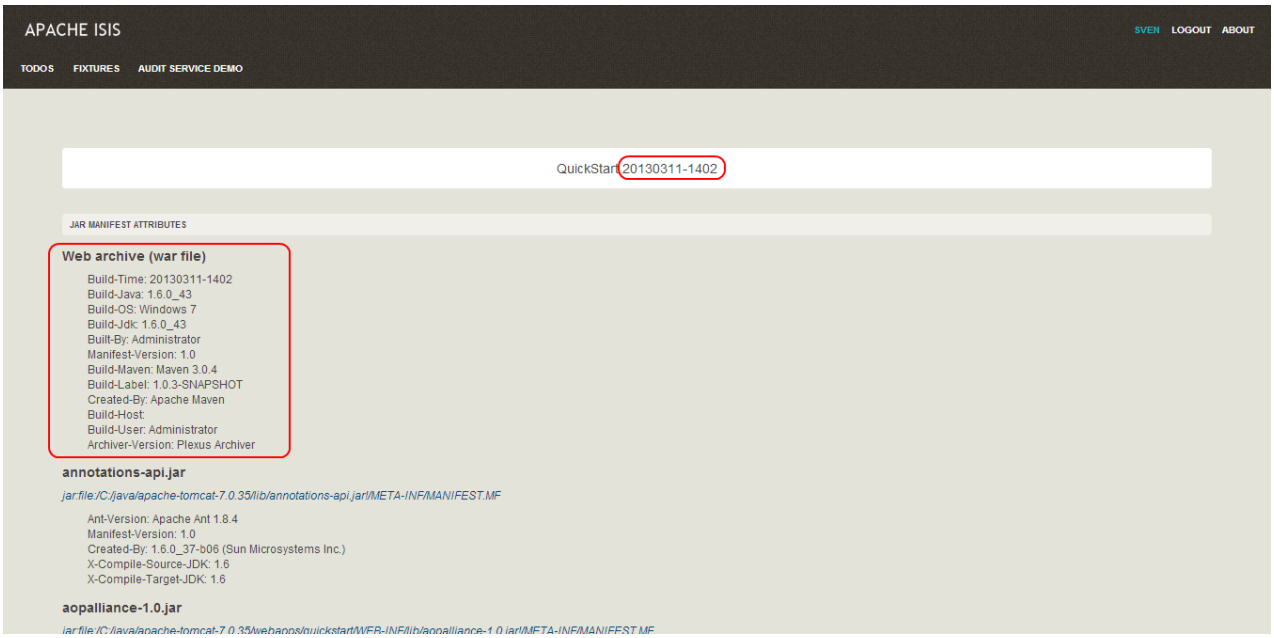
These images are resolved relative to `src/main/webapp`.

= About page :Notice: Licensed to the Apache Software Foundation (ASF) under one or more contributor license agreements. See the NOTICE file distributed with this work for additional information regarding copyright ownership. The ASF licenses this file to you under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at. http://www.apache.org/licenses/LICENSE-2.0 . Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License. :_basedir: ../../ :_imagesdir: images/

Isis' Wicket viewer has an About page that, by default, will provide a dump of the JARs that make up the webapp. This page will also show the manifest attributes of the WAR archive itself, if there are any. One of these attributes may also be used as the application version number.

== Screenshot

Here's what the About page looks like with this configuration added:



Note that this screenshot shows an earlier version of the Wicket viewer UI (specifically, pre 1.8.0).

Note that the `Build-Time` attribute has been used as the version number. The Wicket viewer is

hard-coded to search for specific attributes and use as the application version. In order, it searches for:

- `Implementation-Version`
- `Build-Time`

If none of these are found, then no version is displayed.

== Configuration

=== Adding attributes to the WAR's manifest

Add the following to the webapp's `pom.xml` (under `<build>/<plugins>`):

```
<plugin>
    <groupId>org.codehaus.mojo</groupId>
    <artifactId>build-helper-maven-plugin</artifactId>
    <version>1.5</version>
      <executions>
        <execution>
          <phase>validate</phase>
          <goals>
            <goal>maven-version</goal>
          </goals>
        </execution>
      </executions>
</plugin>

<plugin>
    <artifactId>maven-war-plugin</artifactId>
    <configuration>
        <archive>
            <manifest>
                <addDefaultImplementationEntries>
true</addDefaultImplementationEntries>
            </manifest>
            <manifestEntries>
                <Build-Time>${maven.build.timestamp}</Build-Time>
                <Build-Number>${buildNumber}</Build-Number>
                <Build-Host>${agent.name}</Build-Host>
                <Build-User>${user.name}</Build-User>
                <Build-Maven>Maven ${maven.version}</Build-Maven>
                <Build-Java>${java.version}</Build-Java>
                <Build-OS>${os.name}</Build-OS>
                <Build-Label>${project.version}</Build-Label>
            </manifestEntries>
        </archive>
    </configuration>
    <executions>
        <execution>
            <phase>package</phase>
            <goals>
                <goal>war</goal>
            </goals>
            <configuration>
                <classifier>${env}</classifier>
            </configuration>
        </execution>
    </executions>
</plugin>
```

If you then build the webapp from the Maven command line (`mvn clean package`), then the WAR should contain a `META-INF/MANIFEST.MF` with those various attribute entries. This will be

picked up automatically and used in the about page.

= Tweaking CSS classes :Notice: Licensed to the Apache Software Foundation (ASF) under one or more contributor license agreements. See the NOTICE file distributed with this work for additional information regarding copyright ownership. The ASF licenses this file to you under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at. http://www.apache.org/licenses/LICENSE-2.0 . Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License. :_basedir: ../../ :_imagesdir: images/

The HTML generated by the Wicket viewer include plenty of CSS classes so that you can easily target the required elements as required. For example, you could use CSS to suppress the entity's icon alongside its title. This would be done using:

```
.entityIconAndTitlePanel a img {
    display: none;
}
```

These customizations should generally be added to `application.css`; this file is included by default in every webpage served up by the Wicket viewer.

== Individual members

For example, the `ToDoItem` object of the Isis addons example todoapp (not ASF) has a `notes` property. The HTML for this will be something like:

```
<div>
  <div class="property ToDoItem-notes">
    <div class="multiLineStringPanel scalarNameAndValueComponentType">
      <label for="id83" title="">
        <span class="scalarName">Notes</span>
        <span class="scalarValue">
           <textarea
              name=
"middleColumn:memberGroup:1:properties:4:property:scalarIfRegular:scalarValue"
              disabled="disabled"
              id="id83" rows="5" maxlength="400" size="125"
              title="">
           </textarea>
         <span>
      </label>
    </div>
  </div>
</div>
```

The `application.css` file is the place to add application-specific styles. By way of an example, if

(for some reason) we wanted to completely hide the notes value, we could do so using:

```
div.ToDoItem-notes span.scalarValue {
    display: none;
}
```

You can use a similar approach for collections and actions.

== Custom CSS styles

The above technique works well if you know the class member to target, but you might instead want to apply a custom style to a set of members. For this, you can use the `@PropertyLayout(cssClass=…)`.

For example, in the `ToDoItem` class the following annotation (indicating that this is a key, important, property) :

```
@PropertyLayout(cssClass="x-myapp-highlight")
public LocalDate getDueBy() {
    return dueBy;
}
```

would generate the HTML:

```
<div>
    <div class="property ToDoItem-dueBy x-myapp-highlight">
        ...
    </div>
</div>
```

This can then be targeted, for example using:

```
div.x-myapp-highlight span.scalarName {
    color: red;
}
```

Note also that instead of using `@PropertyLayout(cssClass=…)` annotation, you can also specify the CSS style using a layout file.

== Table columns

Sometimes you may want to apply styling to specific columns of tables. For example, you might want to adjust width so that for certain properties have more (or less) room than they otherwise would; or you might want to hide the column completely. This also applies to the initial icon/title column.

There is also the issue of scoping:

- You may wish the style to apply globally: that is, dependent on the type of entity being rendered in the table, irrespective of the page on which it is shown.
- Alternativel, you may wish to target the CSS for a table as rendered either as a parented collection (owned by some other entity) or rendered as a standarlone collection (the result of invoking an action).

In each of these cases the Wicket viewer adds CSS classes either to containing `div`s or to the `<th>` and `<td>` elements of the table itself so that it can custom styles can be appropriately targetted.

=== Applying styles globally

Every rendered collection containing a domain class will be wrapped in a `<div>` that lists that domain class (in CSS safe form). For example:

```
<div class="entityCollection com-mycompany-myapp-Customer">
    ...
    <table>
        <tr>
            <th class="title-column">...</th>
            <th class="firstName">...</th>
            <th class="lastName">...</th>
            ...
        </tr>
        <tr>
            <td class="title-column">...</td>
            <td class="firstName">...</td>
            <td class="lastName">...</td>
            ...
        </tr>
        ...
    </table>
    ...
</div>
```

Using this, the `lastName` property could be targeted using:

```
.com-mycompany-myapp-Customer th.lastName {
    width: 30%;
}
```

=== Parented collections

Parented collections will be wrapped in `<div>`s that identify both the entity type and also the collection Id. For example:

```
<div class="entityPage com-mycompany-myapp-Customer">       ①
    ...
    <div class="orders">                                    ②
        <table>
            <tr>
                <th class="title-column">...</th>
                <th class="productRef">...</th>
                <th class="quantity">...</th>
                ...
            </tr>
            <tr>
                <td class="title-column">...</td>
                <td class="productRef">...</td>
                <td class="quantity">...</td>
                ...
            </tr>
            ...
        </table>
        ...
    </div>
    ...
</div>
```

① the parent class identifier

② the collection identifier. This element's class also has the entity type within the collection (as discussed above).

Using this, the `productRef` property could be targeted using:

```
.com-mycompany-myapp-Customer orders td.productRef {
    font-style: italic;
}
```

=== Standalone collections

Standalone collections will be wrapped in a `<div>` that identifies the action invoked. For example:

```
<div class="standaloneCollectionPage">
    <div class="com-mycompany-myapp-Customer_mostRecentOrders ...">     ①
        ...
        <div class="orders">
            <table>
                <tr>
                    <th class="title-column">...</th>
                    <th class="productRef">...</th>
                    <th class="quantity">...</th>
                    ...
                </tr>
                <tr>
                    <td class="title-column">...</td>
                    <td class="productRef">...</td>
                    <td class="quantity">...</td>
                    ...
                </tr>
                ...
            </table>
            ...
        </div>
        ...
    </div>
</div>
```

① action identifier. This element's class also identifies the entity type within the collection (as discussed above).

Using this, the `quantity` property could be targeted using:

```
.com-mycompany-myapp-Customer_mostRecentOrders td.quantity {
    font-weight: bold;
}
```

= Cheap-n-cheerful theme :Notice: Licensed to the Apache Software Foundation (ASF) under one or more contributor license agreements. See the NOTICE file distributed with this work for additional information regarding copyright ownership. The ASF licenses this file to you under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at. http://www.apache.org/licenses/LICENSE-2.0 . Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License. :_basedir: ../../ :_imagesdir: images/

The application name (as defined by `isis.viewer.wicket.application.name` configuration property) is also used (in sanitized form) as the CSS class in a `<div>` that wraps all the rendered content of every page.

For example, if the application name is "ToDo App", then the `<div>` generated is:

```
<div class="todo-app">
    ...
</div>
```

You can therefore use this CSS class as a way of building your own "theme" for the various elements of the wicket viewer pages.

Alternatively you could "do it properly" and create your own Bootstrap theme, as described in the Extending chapter.

= Using a different CSS file :Notice: Licensed to the Apache Software Foundation (ASF) under one or more contributor license agreements. See the NOTICE file distributed with this work for additional information regarding copyright ownership. The ASF licenses this file to you under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at. http://www.apache.org/licenses/LICENSE-2.0 . Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License. :_basedir: ../../ :_imagesdir: images/

If for some reason you wanted to name the CSS file differently (eg `stylesheets/myapp.css`), then just specify the appropriate configuration property:

```
isis.viewer.wicket.application.css=stylesheets/myapp.css
```

This file is resolved relative to `src/main/webapp`.

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The Wicket viewer ships with embedded JQuery, so this can be leveraged, for example to perform arbitrary transformations of the rendered page on page load.

Just because something is possible, it doesn't necessarily mean we encourage it. Please be aware that there is no formal API for any custom javascript that you might implement to target; future versions of Apache Isis might break your code.

If possible, consider using the `ComponentFactory` API described in the Extending chapter.

To register your Javascript code, then just specify the appropriate configuration property:

```
isis.viewer.wicket.application.js=stylesheets/myapp.js
```

This file is resolved relative to `src/main/webapp`.

Currently only one such `.js` file can be registered.

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This requirement from the users mailing list:

Suppose you want to build a monitoring application, eg for an electricity grid. Data is updated in the background (eg via the Restful Objects REST API). What is needed is the ability to show an entity that includes a map, and have it auto-refresh every 5 seconds or so.

Here's one (somewhat crude, but workable) way to accomplish this.

- First, update the domain object to return custom CSS:

```
public class MyDomainObject {
    ...
    public String cssClass() {return "my-special-auto-updating-entity"; }
    ...
}
```

- Then, use javascript in `scripts/application.js` (under `src/main/webapp/`) to reload:

```
$(function() {
    if ($(".my-special-auto-updating-entity").length) {
        setTimeout(function() {document.location.reload();}, 5000); // 1000 is
5 sec
    }
});
```

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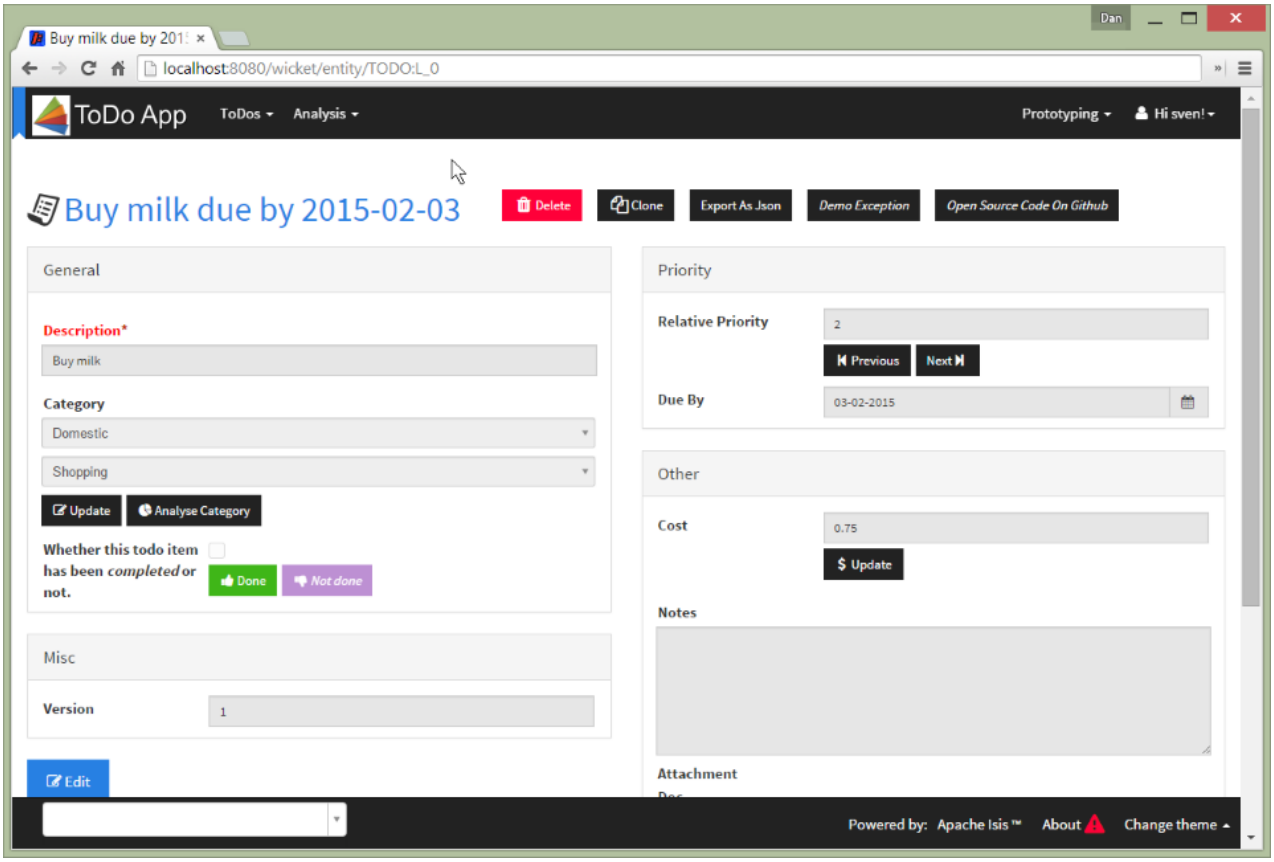
The Wicket viewer provides some support such that an Apache Isis application can be embedded within a host webapp, for example within an iframe.

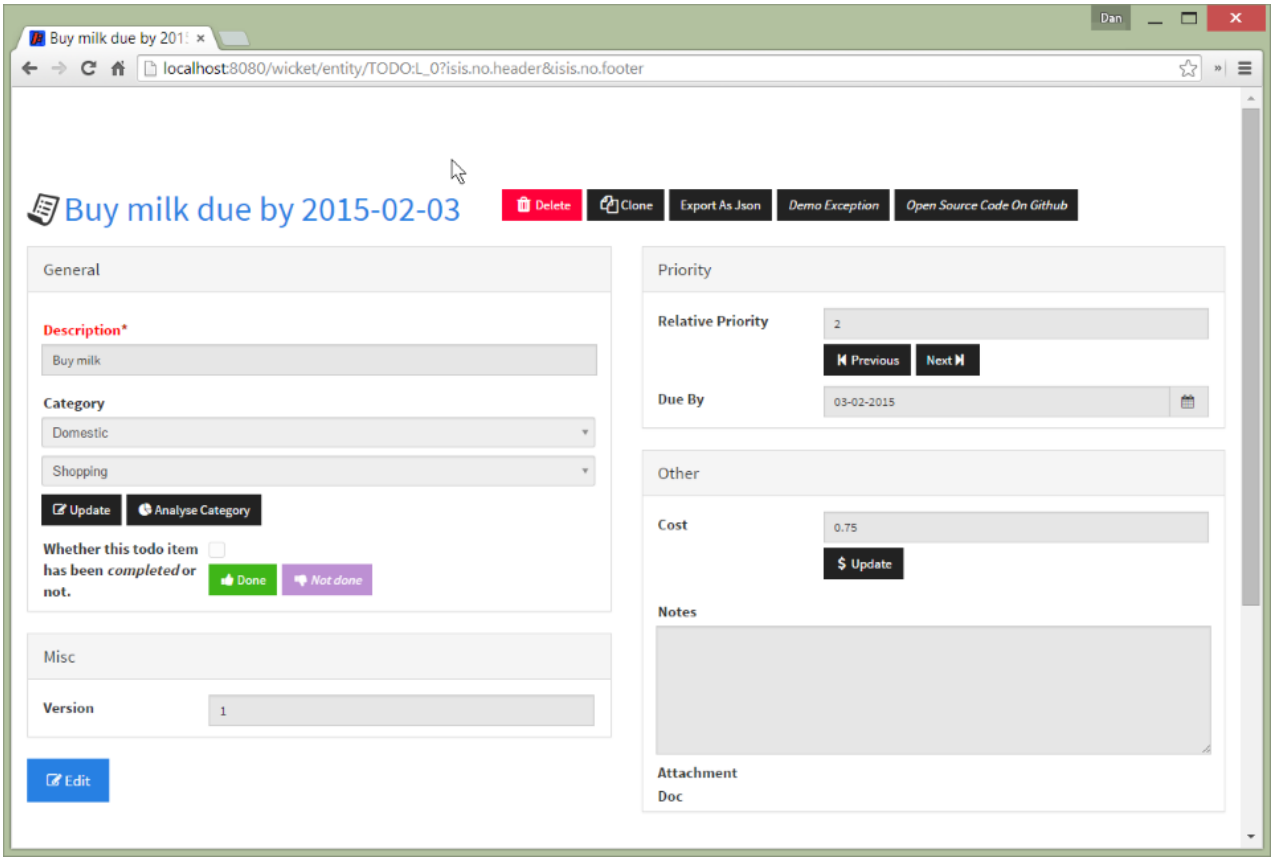
Currently this support consists simply of being able to suppress the header and/or footer.

== Screenshots

For example, the regular view is:



With the header and footer both suppressed only the main content is shown:



It is also possible to suppress just the header, or just the footer.

== Request parameters

To suppress the header, add the following as a request parameter:

```
isis.no.header
```

and to suppress the header, add the following as a request parameter:

```
isis.no.footer
```

For example,

```
http://localhost:8080/wicket/entity/TODO:0?isis.no.header&isis.no.footer
```

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The Wicket viewer allows you to customize the GUI in several (progressively more sophisticated) ways:

- by tweaking the UI using CSS
- by tweaking the UI using Javascript
- by writing a custom bootstrap theme
- by replacing elements of the page using the `ComponentFactory` interface
- by implementing replacement page implementations for the standard page types

The first two of these options are discussed in the Wicket viewer chapter. This chapter describes the remaining "heavier-weight/more powerful" options.

The chapter wraps up with a technique for prototyping, allowing user/passwords to be specified as query arguments.

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The Apache Isis Wicket viewer uses Bootstrap styles and components (courtesy of the Wicket Bootstrap integration).

By default the viewer uses the default bootstrap theme. It is possible to configure the Wicket viewer to allow the user to select other themes provided by bootswatch.com, and if required one of these can be set as the default.

However, you may instead want to write your own custom theme, for example to fit your company's look-n-feel/interface guidelines. This is done by implementing Wicket Bootstrap's `de.agilecoders.wicket.core.settings.ITheme` class. This defines:

- the name of the theme
- the resources it needs (the CSS and optional JS and/or fonts), and
- optional urls to load them from a Content Delivery Network (CDN).

To make use of the custom `ITheme` the application should register it by subclassing `IsisWicketApplication` (also register this in `web.xml`) and add the following snippet:

```
public void init() {
    ...
    IBootstrapSettings settings = new BootstrapSettings();
    ThemeProvider themeProvider = new SingleThemeProvider(new MyTheme());
    settings.setThemeProvider(themeProvider);
    Bootstrap.install(getClass(), settings);
}
```

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Replacing elements of the page is the most powerful general-purpose way to customize the look-n-feel of the viewer. Examples in the (non-ASF) Incode Platform include the gmap3, fullcalendar2, excel, pdfjs and wickedcharts components.

The pages generated by Apache Isis' Wicket viewer are built up of numerous elements, from fine-grained widgets for property/parameter fields, to much larger components that take responsibility for rendering an entire entity, or a collection of entities. Under the covers these are all implementations of the the Apache Wicket `Component` API. The larger components delegate to the smaller, of course.

== How the viewer selects components

Components are created using Apache Isis' `ComponentFactory` interface, which are registered in turn through the `ComponentFactoryRegistrar` interface. Every component is categorizes by type (the `ComponentType` enum), and Apache Isis uses this to determine which `ComponentFactory` to use. For example, the `ComponentType.BOOKMARKED_PAGES` is used to locate the `ComponentFactory` that will build the bookmarked pages panel.

Each factory is also handed a model (an implementation of `org.apache.wicket.IModel`) appropriate to its `ComponentType`; this holds the data to be rendered. For example, `ComponentType.BOOKMARKED_PAGES` is given a `BookmarkedPagesModel`, while `ComponentType.SCALAR_NAME_AND_VALUE` factories are provided a model of type of type `ScalarModel` .

In some cases there are several factories for a given `ComponentType`; this is most notably the case for `ComponentType.SCALAR_NAME_AND_VALUE`. After doing a first pass selection of candidate factories by `ComponentType`, each factory is then asked if it `appliesTo(Model)`. This is an opportunity for the factory to check the model itself to see if the data within it is of the appropriate type.

Thus, the `BooleanPanelFactory` checks that the `ScalarModel` holds a boolean, while the

`JodaLocalDatePanelFactory` checks to see if it holds `org.joda.time.LocalDate`.

There will typically be only one `ComponentFactory` capable of rendering a particular `ComponentType`/`ScalarModel` combination; at any rate, the framework stops as soon as one is found.

There is one refinement to the above algorithm where multiple component factories might be used to render an object; this is discussed in Additional Views of Collections, below.

== How to replace a component

This design (the chain of responsibility design pattern) makes it quite straightforward to change the rendering of any element of the page. For example, you might switch out Apache Isis' sliding bookmark panel and replace it with one that presents the bookmarks in some different fashion.

First, you need to write a `ComponentFactory` and corresponding `Component`. The recommended approach is to start with the source of the `Component` you want to switch out. For example:

```
public class MyBookmarkedPagesPanelFactory extends ComponentFactoryAbstract {
    public MyBookmarkedPagesPanelFactory() {
        super(ComponentType.BOOKMARKED_PAGES);
    }
    @Override
    public ApplicationAdvice appliesTo(final IModel<?> model) {
        return appliesIf(model instanceof BookmarkedPagesModel);
    }
    @Override
    public Component createComponent(final String id, final IModel<?> model) {
        final BookmarkedPagesModel bookmarkedPagesModel = (BookmarkedPagesModel)
model;
        return new MyBookmarkedPagesPanel(id, bookmarkedPagesModel);
    }
}
```

and

```
public class MyBookmarkedPagesPanel
    extends PanelAbstract<BookmarkedPagesModel> {
   ...
}
```

Here `PanelAbstract` ultimately inherits from `org.apache.wicket.Component`. Your new `Component` uses the information in the provided model (eg `BookmarkedPagesModel`) to know what to render.

Next, you will require a custom implementation of the `ComponentFactoryRegistrar` that registers your custom `ComponentFactory` as a replacement:

```
@Singleton
public class MyComponentFactoryRegistrar extends ComponentFactoryRegistrarDefault
{
    @Override
    public void addComponentFactories(ComponentFactoryList componentFactories) {
        super.addComponentFactories(componentFactories);
        componentFactories.add(new MyBookmarkedPagesPanelFactory());
    }
}
```

This will result in the new component being used instead of (that is, discovered prior to) Isis' default implementation.

Previously we suggested using "replace" rather than "add"; however this has unclear semantics for some component types; see ISIS-996.

Finally, you'll need to subclass `IsisWicketApplication` (register in `web.xml`)and then adjust the Guice bindings returned in the Guice `Module` returned by `newIsisWicketModule()`:

```
public class MyAppApplication extends IsisWicketApplication {
    @Override
    protected Module newIsisWicketModule() {
        final Module isisDefaults = super.newIsisWicketModule();
        final Module myAppOverrides = new AbstractModule() {
            @Override
            protected void configure() {
                ...
                bind(ComponentFactoryRegistrar.class)
                    .to(MyComponentFactoryRegistrar.class);
                ...
            }
        };

        return Modules.override(isisDefaults).with(myAppOverrides);
    }
}
```

== Additional Views of Collections

As explained above, in most cases Apache Isis' Wicket viewer will search for the first `ComponentFactory` that can render an element, and use it. In the case of (either standalone or parented) collections, though, Apache Isis will show all available views.

For example, out-of-the-box Apache Isis provides a table view, a summary view (totals/sums/averages of any data), and a collapsed view. These are selected by clicking on the toolbar by each collection.

Additional views though could render the objects in the collection as a variety of ways. Indeed, some third-party implementations in the (non-ASF) Incode Platform already exist, including:

- excel component - collection as a downloadable excel spreadsheet
- gmap3 component - render any objects with a location on a map
- pdf.js component - render Blob containined PDF as a scrollable image
- wicked charts component - barchart of any data
- full calendar - render any objects with date properties on a calendar

Registering these custom views is just a matter of adding the appropriate Maven module to the classpath. Apache Isis uses the JDK `ServiceLoader` API to automatically discover and register the `ComponentFactory` of each such component.

If you want to write your own alternative component and auto-register, then include a file `META-INF/services/org.apache.isis.viewer.wicket.ui.ComponentFactory` whose contents is the fully-qualified class name of the custom `ComponentFactory` that you have written.

Wicket itself has lots of components available at its wicketstuff.org companion website; you might find some of these useful for your own customizations.

== Custom object view (eg dashboard)

One further use case in particular is worth highlighting; the rendering of an entire entity. Normally entities this is done using `EntityCombinedPanelFactory`, this being the first `ComponentFactory` for the `ComponentType.ENTITY` that is registered in Apache Isis default `ComponentFactoryRegistrarDefault`.

You could, though, register your own `ComponentFactory` for entities that is targeted at a particular class of entity - some sort of object representing a dashboard, for example. It can use the `EntityModel` provided to it to determine the class of the entity, checking if it is of the appropriate type. Your custom factory should also be registered before the `EntityCombinedPanelFactory` so that it is checked prior to the default `EntityCombinedPanelFactory`:

```
@Singleton
public class MyComponentFactoryRegistrar extends ComponentFactoryRegistrarDefault
{
    @Override
    public void addComponentFactories(ComponentFactoryList componentFactories) {
        componentFactories.add(new DashboardEntityFactory());
        ...
        super.addComponentFactories(componentFactories);
        ...
    }
}
```

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In the vast majority of cases customization should be sufficient by replacing elements of a page. However, it is also possible to define an entirely new page for a given page type.

Isis defines eight page types (see the `org.apache.isis.viewer.wicket.model.models.PageType` enum):

Table 11. PageType enum

Page type	Renders
SIGN_IN	The initial sign-in (aka login) page
SIGN_UP	The sign-up page (if user registration is enabled).
SIGN_UP_VERIFY	The sign-up verification page (if user registration is enabled; as accessed by link from verification email)
PASSWORD_RESET	The password reset page (if enabled).
HOME	The home page, displaying either the welcome message or dashboard
ABOUT	The about page, accessible from link top-right
ENTITY	Renders a single entity or view model
STANDALONE_COLLECTION	Page rendered after invoking an action that returns a collection of entites
VALUE	After invoking an action that returns a value type (though not URLs or Blob/Clobs, as these are handled appropriately automatically).
VOID_RETURN	After invoking an action that is `void`
ACTION_PROMPT	(No longer used).

The `PageClassList` interface declares which class (subclass of `org.apache.wicket.Page` is used to render for each of these types. For example, Apache Isis' `WicketSignInPage` renders the signin page.

To specify a different page class, create a custom subclass of `PageClassList`:

```
@Singleton
public class MyPageClassList extends PageClassListDefault {
    protected Class<? extends Page> getSignInPageClass() {
        return MySignInPage.class;
    }
}
```

You then need to register your custom `PageClassList`. This is done by subclassing `IsisWicketApplication` (register the subclass in `web.xml`) and adjusting the Guice bindings of the guice `Module` returned by the `newIsisWicketModule()` method:

```
public class MyAppApplication extends IsisWicketApplication {
    @Override
    protected Module newIsisWicketModule() {
        final Module isisDefaults = super.newIsisWicketModule();
        final Module myAppOverrides = new AbstractModule() {
            @Override
            protected void configure() {
                ...
                bind(PageClassList.class).to(MyPageClassList.class);
                ...
            }
        };
        return Modules.override(isisDefaults).with(myAppOverrides);
    }
}
```

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This section describes a (slightly hacky) way of allowing logins using query args, eg http://localhost:8080/?user=sven&pass=pass. This might be useful while prototyping or demonstrating a scenario involving multiple different interacting users.

First, you'll need to subclass `IsisWicketApplication` (and register in `web.xml`). Then, override `newSession()`:

```
private final static boolean DEMO_MODE_USING_CREDENTIALS_AS_QUERYARGS = false;

@Override
public Session newSession(final Request request, final Response response) {
    if(!DEMO_MODE_USING_CREDENTIALS_AS_QUERYARGS) {
        return super.newSession(request, response);
    }
    // else demo mode
    final AuthenticatedWebSessionForIsis s = (AuthenticatedWebSessionForIsis)
super.newSession(request, response);
    IRequestParameters requestParameters = request.getRequestParameters();
    final org.apache.wicket.util.string.StringValue user =
requestParameters.getParameterValue("user");
    final org.apache.wicket.util.string.StringValue password =
requestParameters.getParameterValue("pass");
    s.signIn(user.toString(), password.toString());
    return s;
}

@Override
public WebRequest newWebRequest(HttpServletRequest servletRequest, String
filterPath) {
    if(!DEMO_MODE_USING_CREDENTIALS_AS_QUERYARGS) {
        return super.newWebRequest(servletRequest, filterPath);
    }
    // else demo mode
    try {
        String uname = servletRequest.getParameter("user");
        if (uname != null) {
            servletRequest.getSession().invalidate();
        }
    } catch (Exception e) {
    }
    WebRequest request = super.newWebRequest(servletRequest, filterPath);
    return request;
}
```

Rather than using the static `DEMO_MODE_USING_CREDENTIALS_AS_QUERYARGS`, you might also explore using the feature toggle library provided by the (non-ASF) Incode Platform's togglz module.

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This chapter provides some solutions for problems we've encountered ourselves or have been raised on the Apache Isis mailing lists.

See also hints-n-tips chapters in the:

- the Developers' guide
- the Wicket viewer guide (this chapter)
- the Restful Objects viewer guide
- the Datanucleus ObjectStore guide
- the Security guide
- the Beyond the Basics guide.

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From this thread on the Apache Isis users mailing list:

- *Is it possible to have each of our resellers (using our Apache Isis application) use there own theme/branding with their own logo and colors? Would this also be possible for the login page, possibly depending on the used host name?*

Yes, you can do this, by installing a custom implementation of the Wicket Bootstrap's `ActiveThemeProvider`.

The Isis addons' todoapp (non-ASF) actually does this, storing the info via the (non-ASF) Incode Platform's settings module :

IActiveThemeProvider implementation

```
public class UserSettingsThemeProvider implements ActiveThemeProvider {
    ...
    @Override
    public ITheme getActiveTheme() {
        if(IsisContext.getSpecificationLoader().isInitialized()) {
            final String themeName = IsisContext.doInSession(new Callable<String>
() {
                @Override
                public String call() throws Exception {
                    final UserSettingsService userSettingsService =
                        lookupService(UserSettingsService.class);
                    final UserSetting activeTheme = userSettingsService.find(
                            IsisContext.getAuthenticationSession().getUserName(),
```

```
                            ACTIVE_THEME);
                    return activeTheme != null ? activeTheme.valueAsString() :
null;
                }
            });
            return themeFor(themeName);
        }
        return new SessionThemeProvider().getActiveTheme();
    }
    @Override
    public void setActiveTheme(final String themeName) {
        IsisContext.doInSession(new Runnable() {
            @Override
            public void run() {
                final String currentUsrName =
                    IsisContext.getAuthenticationSession().getUserName();
                final UserSettingsServiceRW userSettingsService =
                        lookupService(UserSettingsServiceRW.class);
                final UserSettingJdo activeTheme =
                        (UserSettingJdo) userSettingsService.find(
                                                currentUsrName, ACTIVE_THEME);
                if(activeTheme != null) {
                    activeTheme.updateAsString(themeName);
                } else {
                    userSettingsService.newString(
                        currentUsrName, ACTIVE_THEME, "Active Bootstrap theme for
user", themeName);
                }
            }
        });
    }
    private ITheme themeFor(final String themeName) {
        final ThemeProvider themeProvider = settings.getThemeProvider();
        if(themeName != null) {
            for (final ITheme theme : themeProvider.available()) {
                if (themeName.equals(theme.name()))
                    return theme;
            }
        }
        return themeProvider.defaultTheme();
    }
    ...
}
```

and

Using the ActiveThemeProvider

```
@Override
protected void init() {
    super.init();

    final IBootstrapSettings settings = Bootstrap.getSettings();
    settings.setThemeProvider(new BootswatchThemeProvider(BootswatchTheme.Flatly)
);

    settings.setActiveThemeProvider(new UserSettingsThemeProvider(settings));
}
```

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From this thread on the Apache Isis users mailing list:

- *I am trying to internationalize the label descriptions of form actions, eg those in* `ActionParametersFormPanel`. *Referencing those via their message id inside a .po file didn't work either. Can this be done?*

Yes, it *is* possible to internationalize both the Wicket viewer's labels as well as the regular translations of the domain object metadata using the `.po` translation files as supported by the `TranslationService`.

Full details of the `msgId`s that must be added to the `translations.po` file can be found in i18n section of the beyond the basics guide.

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Demo App: Highlighting Current As a by-the-by, the demo app has one further "trick up its sleeve". If you run the app you'll notice that the currently selected `DemoObject` is highlighted in the left-hand table of the `HomePageViewModel`.

This is accomplished by having the view model collaborate with a subscribing domain service that configures a CSS class.

We start by ensuring that the `DemoObject` emits an event for its CSS class:

DemoObject.java

```
@DomainObjectLayout(
...
cssClassUiEvent = DemoObject.CssClassUiEvent.class
)
public class DemoObject ... {

public static class CssClassUiEvent
extends org.apache.isis.applib.events.ui.CssClassUiEvent<DemoObject> {}
...
}
```

Next, we define the domain service to act as the subscriber:

HomePageViewModel.java

```
public class HomePageViewModel ... {
    @DomainService(nature = NatureOfService.DOMAIN)
    public static class CssHighlighter extends AbstractSubscriber {
        @org.axonframework.eventhandling.EventHandler       // if using axon
        @com.google.common.eventbus.Subscribe               // if using guava
        public void on(DemoObject.CssClassUiEvent ev) {
            if(getContext() == null) { return; }
            if(ev.getSource() == getContext().getSelected()) {      ①
                ev.setCssClass("selected");
            }
        }
        private HomePageViewModel getContext() {                    ②
            return (HomePageViewModel) scratchpad.get("context");
        }
        void setContext(final HomePageViewModel homePageViewModel) {
            scratchpad.put("context", homePageViewModel);
        }
        @Inject
        Scratchpad scratchpad;                                      ③
    }
}
```

① If the domain object is the currently selected then set the CSS class

② Provide methods to set and get the current `HomePageViewModel` (acting as the context)

③ Store the context using the `Scratchpad` domain service (request-scoped so thread-safe).

The `HomePageViewModel` is responsible for setting itself as the context for the domain service:

HomePageViewModel.java

```
public class HomePageViewModel ... {
    ...
    public TranslatableString title() {
        cssHighlighter.setContext(this);        ①
        ...
    }
    ...
    @javax.inject.Inject
    CssHighlighter cssHighlighter;
}
```

① set the context on the domain service

Finally we just need some CSS, in the `application.css` file:

application.css

```
.selected {
    font-style: italic; font-weight: bolder;
}
```

= SVG Support :Notice: Licensed to the Apache Software Foundation (ASF) under one or more contributor license agreements. See the NOTICE file distributed with this work for additional information regarding copyright ownership. The ASF licenses this file to you under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at. http://www.apache.org/licenses/LICENSE-2.0 . Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

(As per ISIS-1604), SVG images can be used:

- as Logo in the upper left corner (Wicket Menubar)
- on the Login Page (`login.html`)
- as favicon (`image/svg+xml`, cf. ISIS-1115)

However, SVGs are not, by default, displayed on the welcome page. SVGs can be attached as `Blob`s, but they are displayed as bitmaps (by means of the Batik rasterizer) and do not scale. The rasterizer (of course) can not deal with animations (cf. attachment).

To fix this, you can add the following dependencies:

```
<dependency>
    <groupId>com.twelvemonkeys.imageio</groupId>
    <artifactId>imageio-batik</artifactId> <!-- svg -->
    <version>3.3.2</version>
</dependency>
<dependency>
    <groupId>com.twelvemonkeys.imageio</groupId>
    <artifactId>imageio-batik</artifactId> <!-- svg -->
    <version>3.3.2</version>
    <type>test-jar</type>
    <scope>test</scope>
</dependency>
<dependency>
    <groupId>org.apache.xmlgraphics</groupId>
    <artifactId>batik-transcoder</artifactId>
    <version>1.8</version>
</dependency>
```

However, **please note** that these dependencies have high CVE values, and so may constitute a security risk.

Further discussion on this mailing list thread.

= Appendix: Incode Platform (not ASF) :Notice: Licensed to the Apache Software Foundation (ASF) under one or more contributor license agreements. See the NOTICE file distributed with this work for additional information regarding copyright ownership. The ASF licenses this file to you under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at. http://www.apache.org/licenses/LICENSE-2.0 . Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License. :_basedir: ../../ :_imagesdir: images/

The (non-ASF) Incode Platform provides a number of extensions to the Wicket viewer (leveraging the APIs described in Extending the Wicket viewer section, later. While you are free to fork and adapt any of them to your needs, they are also intended for use "out-of-the-box".

At the time of writing the addons available are:

- Excel Wicket component - to export a collection of domain objects as an Excel spreadsheet
  - see also the related Excel library module which can be used to read/import a spreadsheet as an collection of view models or entities
- ullcalendar2 Wicket component - to view a collection of domain objects (with a date) on a full-page calendar
- Gmap3 Wicket component - to view a collection of domain objects with a location on a google map

- pdf.js Wicket component - to view a `Blob` containing a PDF as an image
- Summernote Wicket component - to edit a string property using an RTF editor
  - (not yet compatible with `1.15.0`)
- Wickedcharts Wicket component - low-level integration with Highcharts charting library

Check the website for the most up-to-date list.

Note that the Incode Platform, while maintained by Apache Isis committers, are not part of the ASF.