Architecture and Design

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This guide describes the internal architecture and design of the framework.

Chapter 1. Maven modules

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example/             # see 'archetypes', below
scripts/
```

1.1. core

The core modules ....

All of these have the same Maven `groupId`, namely `org.apache.isis.core`.

```
core/
 ├─── .m2/                            # used in gitlab CI
 ├─── applib/                         # isis-core-applib
 ├─── commons/                        # isis-core-commons
 ├─── integtestsupport/               # isis-core-integtestsupport
 ├─── log4j/                          # isis-core-log4j
 ├─── maven-plugin/                   # see 'maven plugins', below
 ├─── mavendeps/                      # see 'mavendeps', below
 ├─── runtime/                        # isis-core-runtime
 ├─── schema/                         # isis-core-schema
 ├─── security/                       # isis-core-security
 ├─── security-shiro/                 # isis-core-security-shiro
 ├─── specsupport/                    # isis-core-specsupport
 ├─── unittestsupport/                # isis-core-unittestsupport
 ├─── unittestsupport-test/           # isis-core-unittestsupport-test
 ├─── viewer-restfulobjects-applib/   # isis-core-viewer-restfulobjects-applib
 ├─── viewer-restfulobjects-rendering/ # isis-core-viewer-restfulobjects-rendering
 ├─── viewer-restfulobjects-server/   # isis-core-viewer-restfulobjects-server
 ├─── viewer-wicket-applib/           # isis-core-viewer-wicket-applib
 ├─── viewer-wicket-impl/             # isis-core-viewer-wicket-impl
 ├─── viewer-wicket-model/            # isis-core-viewer-wicket-model
 ├─── viewer-wicket-ui/               # isis-core-viewer-wicket-ui
 ├─── webdocker/                      # isis-webdocker
 ├─── webserver/                      # isis-core-webserver
 └─── wrapper/                        # isis-core-wrapper
```

Table 1. core maven modules

Module	Description
`isis-core-applib`	Core application library.

Module	Description
isis-core-integtestsupport	Integration test support. Application integration tests typically extend from adapter superclasses defined in this module.
isis-core-log4j	Configures Log4j as the logging framework
isis-core-metamodel	The classes that make up the metamodel which is used to render the UI. See the section below which also includes a simplified UML diagram of these classes.
isis-core-runtime	The classes that make up runtime management and persistence of domain objects, as well as framework for security (concepts of authentication or authorisation).
isis-core-schema	Defines XSDs and generated classes that capture commands and interactions in XML form.
isis-core-security	Defines a "bypass" implementation of security, for prototyping only. Using this implementation, any user/password is accepted and
isis-core-security-shiro	Defines an implementation of security authentication which delegates to Apache Shiro.
isis-core-specsupport	Application BDD specs typically inherit from classes defined in this module.
isis-core-unittestsupport	Application unit tests may use some of the utilities defined in this module.
isis-core-viewer-restfulobjects-applib	Defines a client-side Java library for interacting with the REST API exposed by the Restful Objects viewer.
isis-core-viewer-restfulobjects-rendering	Provides a RepresentationService API and a lower-level ContentNegotiationService API, along with implementations of each. These implementations provide support for the representations defined by Restful Objects spec v1.0, as well as a number of other Apache Isis-specific representations.
isis-core-viewer-restfulobjects-server	Defines the JAX-RS resources supported by the Restful Objects viewer. These parse the input, delegate to the runtime for a response, and hand control to the rendering module to generate a representation.
isis-core-viewer-wicket-applib	Currently just defines WicketDeveloperUtilitiesService, for clearing the cache.
isis-core-viewer-wicket-impl	The top-level integration with Wicket, for example defining the Apache Isis-specific implementations/subclasses of the Wicket APIs for application, web session, localizer and request cycle. Also defines registries of pages and components, as well as a number of domain services and mixins (for use by applications) that are only available within the Wicket viewer.
isis-core-viewer-wicket-model	Serializable mementos representing the state of runtime domain objects (or their individual members).

Module	Description
`isis-core-viewer-wicket-ui`	UI components that render the moduls.
`isis-core-webserver`	For development within an IDE, provides a utility class to bootstrap the application (using Jetty).
`isis-core-wrapper`	Provides an implementation of the `WrapperFactory` domain service.

1.2. core/mavendeps

The `core/mavendeps` modules …

All of these have the same Maven `groupId`, namely `org.apache.isis.mavendeps`.

mavendeps Modules

```
core
 └──── mavendeps/
        ├──── isis-mavendeps-intellij/    # isis-mavendeps-intellij
        ├──── isis-mavendeps-testing/     # isis-mavendeps-testing
        └──── isis-mavendeps-webapp/      # isis-mavendeps-webapp
```

Table 2. core/mavendeps maven modules

Module	Description
`isis-mavendeps-intellij`	Defunct.
`isis-mavendeps-testing`	Aggregates dependencies on various test-scope plugins useful for unit- and integration testing a module. These include Apache Isis' own `unittestsupport`, `integtestsupport` and `specsupport` modules, as well as a number of common testing/mocking/assertion libraries. These can then be included using a single dependency declaration: [source,xml] ---- <dependencies> <dependency> <groupId>org.apache.isis.mavendeps</groupId> <artifactId>isis-mavendeps-testing</artifactId> <type>pom</type> <scope>test</scope> </dependency> </dependencies> ----
`isis-mavendeps-webapp`	Aggregates dependencies on Apache Isis runtime itself when used within a webapp. These can then be included using a single dependency declaration: [source,xml] ---- <dependencies> <dependency> <groupId>org.apache.isis.mavendeps</groupId> <artifactId>isis-mavendeps-webapp</artifactId> <type>pom</type> </dependency> </dependencies> ----

1.3. core/mavenplugins

There is a single Maven plugin module. Its Maven `groupId` is `org.apache.isis.tools`.

Plugin Modules

```
core/
 └─── maven-plugin/                # isis-maven-plugin
```

Module	Description
`isis-maven-plugin`	Code to build a maven plugin for the build. This plugin can validate the metamodel and generate Swagger specs for a domain model as part of the application's build pipeline.

1.4. archetypes

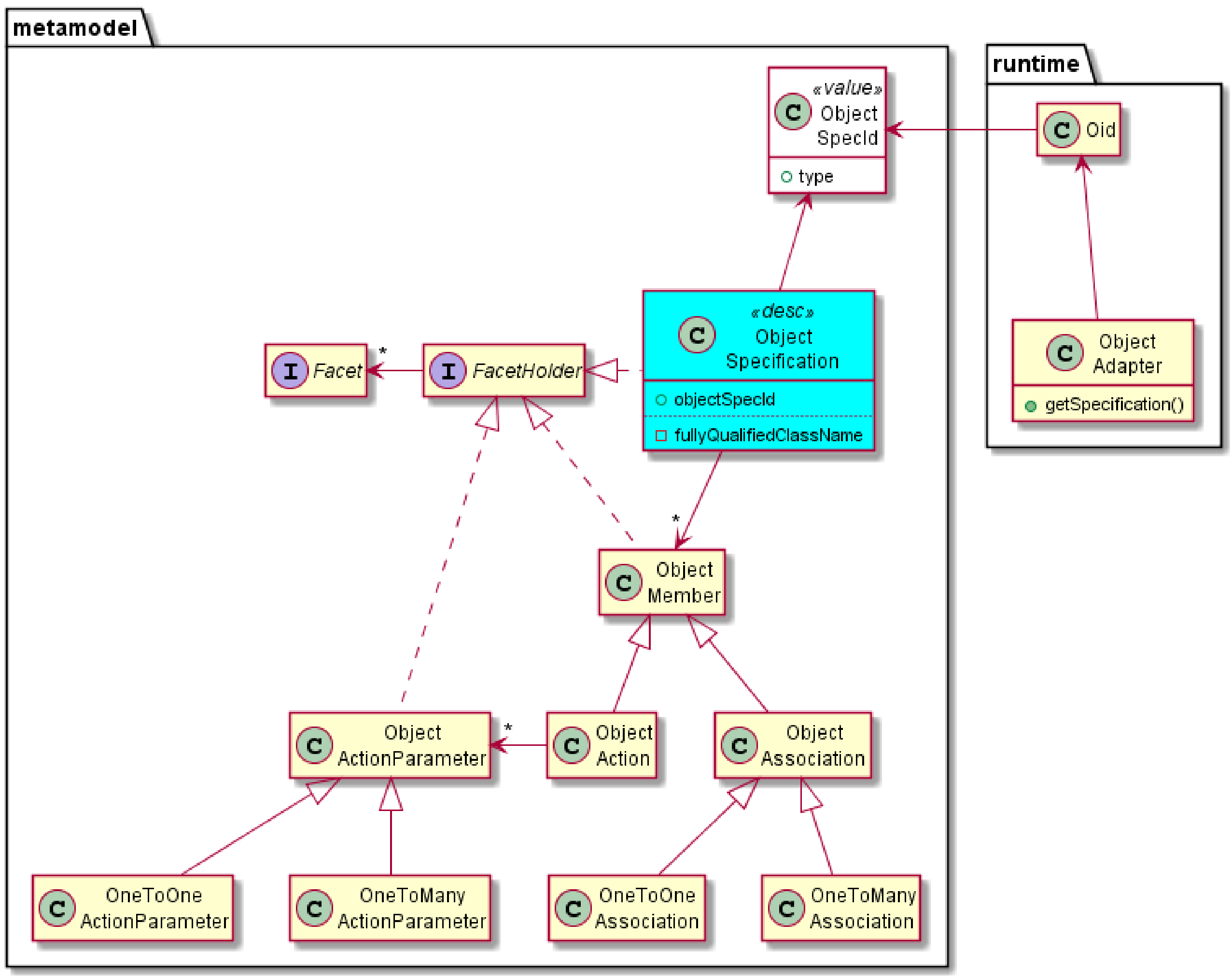
```
example/
 ├─── application/
 │    ├─── helloworld/     # org.apache.isis.example.application:helloworld
 │    └─── simpleapp/      # org.apache.isis.example.application:simpleapp
 │        ├─── application/   # org.apache.isis.example.application:simpleapp-
application
 │        ├─── module-simple/ # org.apache.isis.example.application:simpleapp-module-
simple
 │        └─── webapp/        # org.apache.isis.example.application:simpleapp-webapp
 └─── archetype/
     ├─── helloworld/     # org.apache.isis.archetype:helloworld-archetype
     └─── simpleapp/      # org.apache.isis.archetype:simpleapp-archetype
```

Module	Description
`helloworld`	An example application as a single Maven module, including domain classes themselves plus code to bootstrap Apache Isis. This is reverse engineered into the "helloworld" archetype.
`simpleapp`	The top-level aggregator module for the "simpleapp" example application. This is an extended version of helloworld, providing more structure (separating out domain model into modules) as well as unit tests, integration tests, BDD specs and fixtures. The simpleapp modules in aggregate are reverse engineered into the "simpleapp" archetype.
`simpleapp-application`	Defines the contents of the "simpleapp" application using Apache Isis-defined classes, as well as globally scoped domain services and the home page.
`simpleapp-module-simple`	Contains the domain model for a single module. The intention is to allow this module structure to be copied so that the developer can easily create further modules as their app increases in size.
`simpleapp-webapp`	Bootstraps Apache Isis as a webapp.
`helloworld-archetype`	Helloworld archetype, reverse engineered from the "helloworld" application (above).

Module	Description
`simpleapp-archetype`	Simpleapp archetype, reverse engineered from the "simpleapp" application (above).

Chapter 2. Metamodel

The diagram below shows a simplified version of Apache Isis' internal metamodel.



where in the `metamodel` package:

`ObjectSpecification`
: is equivalent to `java.lang.Class`

`ObjectSpecId`
: is a value object equivalent to the `@DomainObject#objectType` or `@DomainService#objectType` attribute

`OneToOneAssociation`
: represents a scalar property

`OneToManyAssociation`
: represents a collection

`ObjectAction`
: represents an action (with multiple parameters, either scalar or list)

and in the `runtime` package:

`Oid`
: is equivalent to the applib `Bookmark`

  and appears in URLs in the Wicket and Restful Objects viewers

`ObjectAdapter`
: is equivalent to `java.lang.Object`