



# Modality

## What is Modality?

Modality is a free, open-source, hospitality-oriented booking system, currently in development. It will support significant event complexity, unmatched by any existing open-source solution.

Modality will support:

- short and long events (evenings, days, weekends, weeks)
- one-time and recurring events
- partial and full attendance
- single and multiple venues
- multiple accommodation locations and types
- transport options (parking and shuttles)
- catering options
- multi-stage payments and discounts
- detailed statistics

Modality will be useful for:

- event-oriented organisations
- hotels

## Why the name?

'Modality' is a fusion of two words, 'modular' and 'hospitality', a nod to both the software's design and purpose.

# Status

Modality is in the early stages of active development, and we intend to release a functioning MVP by early-2024.

Whilst the server and data models are complete, the clients have significant work remaining before they are viewable. Currently, only the Back-Office client can be compiled and run successfully from the IDE.

## Open-source

Modality is licensed under the [Apache License Version 2.0](#), is completely free to use and modify, and is available on [GitHub](#).

# The Modality Architecture

## Java for the Web

Modality is the first large-scale Java project to use [WebFX](#) - a toolkit that transpiles JavaFX applications into pure JavaScript web apps for direct execution in the browser.

## Technologies

Modality is developed using the following technologies:

Technology	Purpose	Version
<a href="#">Java</a>	Codebase	18
<a href="#">JavaFX</a>	Desktop + mobile user interfaces	18
<a href="#">WebFX</a>	Web user interfaces	Latest (Beta)

...consists of four end-user client applications:

Application	Used By	Compilation Toolchain
Back-Office Web	Administrator	WebFX + GWT
Back-Office Mobile	Administrator	Gluon
Front-Office Web	Customer	WebFX + GWT
Front-Office Mobile	Customer	Gluon

...two developer client applications:

Application	Used By	Compilation Toolchain
Back-Office Desktop	Developer	JavaFX

Application	Used By	Compilation Toolchain
Front-Office Desktop	Developer	JavaFX

...one web server:

Application	Purpose	Version
<a href="#">Vert.x</a>	Interface between client apps and back-end services; serves the SPA	Latest

...and depends on the following services:

Service	Purpose	Version
<a href="#">Postgres</a>	Database	14.2
<a href="#">Redis</a>	Session management	6.2.6
<a href="#">Flyway</a>	Database schema updates	Latest

The services are orchestrated by [Docker](#) when running Modality on development machines (instructions given later in this document).

## Layers

Modality is divided into layers of functionality, shown below:

Layer	Repository	Java Modules
Business Logic (top layer)	<a href="#">modality</a>	modality-event, modality-hotel, modality-restaurant, modality-catering
Ecommerce	<a href="#">modality</a>	modality-ecommerce
CRM	<a href="#">modality</a>	modality-crm
Base	<a href="#">modality</a>	modality-base
WebFX Stack	<a href="#">webfx-stack</a>	webfx-stack
WebFX (bottom layer)	<a href="#">webfx</a>	webfx-kit

### Business logic

The highest layer of the architecture consists of business-specific modules implementing logic for events, hotels, restaurants etc. This is a customisable layer, and developers can choose to add only the modules they need, as well as provide their own.

### Ecommerce

The next layer down is the ecommerce layer. This provides a generic domain model for ecommerce,

which models sales, accounts etc. It is the location for payment gateway integration and ecommerce-specific UIs.

## CRM

The CRM layer provides the essential CRM features, including customer accounts, integrated mailing system etc.

## Base

The Base layer is a fully operational implementation of the WebFX Stack layer beneath, based on the Postgres database. This layer is a pure technical solution that isn't bound to any specific domain, and so is large in application scope.

## WebFX Stack

The WebFX Stack layer provides an opinionated framework for developing enterprise applications with WebFX. This layer is responsible for communication between client and server (using a WebSocket bus), UI routing, ORM, push notification, auth, i18n, etc. Interfaces in all cases, but not always full implementations, allowing this layer to be adapted to any kind of system.

Unlike most Java frameworks, this layer works principally on the client side, following the trend initiated by mobile apps where most of the application code has been moved to the client and can run offline.

It is designed to work with JavaFX (for example, i18n provides JavaFX bindings for use with any kind of control; and the authorisation framework automatically enables/disables and shows/hides controls depending on user access).

## WebFX

WebFX is the foundation layer, providing a web port of JavaFX (in the webfx-kit module) that can be compiled by GWT together with your application code. It is a Java-based cross-platform solution that can be used in any domain.

## All-Layer Aggregation

Modality ships with the `modality-all` module, which aggregates together the full set of modules across all layers, for use by developers right away.

# The Modality Apps

## Web apps

Modality uses WebFX to transpile its JavaFX codebase into a single-page application for direct execution in the browser. No server-side rendering, and no plugins required.

## Mobile apps

Modality uses the [Gluon](#) toolchain to compile the codebase into native, installable apps ready for inclusion into the Google Play and Apple App stores.

## Desktop apps

Modality also provides desktop apps, which have exactly the same UI as the web apps generated from the same source. This is useful for developers, allowing Java code to be rapidly developed and tested via the desktop, before subsequent transpilation into JavaScript and mobile (which takes time).