



Jmix

# Jmix framework training

Catalog

<b>Course item name</b>	<b>Duration, hours</b>	<b>Cost, \$.</b>
<i>Introduction to Jmix<sup>1</sup></i>	4	1,000
<i>Jmix security basics</i>	1	250
<i>Working with data</i>	1	250
<i>Administrative user interface</i>	1	250
<i>Jmix applications deployment</i>	1	250
<i>Working with files in Jmix</i>	1	250
Jmix for CUBA developers	6	1,500
Advanced data manipulation	12	3,000
Access control subsystem	8	2,000
Jmix applications deployment	8	2,000
Developing an administrative user interface for Jmix applications	12	3,000
Reporting development	8	2,000
Using the Jmix Business Process Execution engine	12	3,000
Full-text search	2	500
Maps add-on	4	1,000
Charts add-on	4	1,000
Emailing functionality in Jmix	2	500
Multi-tenant applications	2	500
Testing Jmix applications	2	500
Using Jmix Studio efficiently	2	500

<sup>1</sup> Topics in italics are free for self-study. The cost is indicated for training with a tutor.



# Introduction to Jmix

Duration: 4 hours

Cost: 1,000

This course is designed to familiarize you with the Jmix framework, its main features, and the Jmix Studio development environment.

## Course program:

- What is Jmix. The purpose and architecture of the framework
- Application data model. Creating a data model in Jmix Studio
- Database versioning. Database versioning scripts creation
- Administrative user interface. Generating screens for working with data
- Security basics. Jmix role types. User creation
- Working with data. Using DataManager
- Business logic creation. Using Business Logic in the administrative user interface
- FatJar. Application deployment



## Jmix security basics

Duration: 1 hour

Cost: 250

This course is designed to study the architecture and basic principles of the Jmix security subsystem, and the rules for building a role model for the data access and the functionality.

### Course program:

- The "User" entity. Purpose and usage
- "DatabaseUserRepository" Service
- Resource roles. Defining resource roles in code and in an application
- Database-level roles. Definition, usage, rules of creation
- Roles combining. Rules for applying security policies



## Working with data

Duration: 1 hour

Cost: 250

This course is designed to study the architecture and API of the data access layer of the Jmix framework.

### Course program:

- Data store concept. Main data store of the application
- JPA entities and DTOs. Creation and usage rules
- Entity graph for select queries. Concept and benefits of usage
- DataManager - the main data access service. Methods for working with data. Transactions
- JPQL-queries execution. Query parameter



# Administrative user interface

Duration: 1 hour

Cost: 250

This course is designed to explore the principles of developing an administrative user interface for Jmix applications.

## Course program:

- Components and containers
- Positioning elements
- Components for working with data. Data loading
- Binding data to user interface elements
- Handling UI events



# Deploying Jmix Applications

Duration: 1 hour

Cost: 250

This course covers the basic ways to deploy Jmix applications.

Course program:

- Deployment format: WAR and JAR
- Creation of an executable file
- Execution profiles. Configuration options specific for a deployment environment
- Deployment format guidelines



# Working with files in Jmix

Duration: 1 hour

Cost: 250

This course covers the API and ways to work with files in Jmix.

Course program:

- Storing files in the application - approaches and Jmix implementation
- The byte[] field in an entity
- The FileStorage service - architecture and usage
- Working with files in the administrative user interface. FileUploadField, FileStorageUploadField, and Image components







# Jmix for CUBA developers

Duration: 6 hours

Cost: 1,500

This course covers the new features of the Jmix framework and techniques for migrating from CUBA to Jmix.

## Course program:

- Jmix application architecture
- Defining a data model in Jmix
- Database versioning tools
- Security model
- Application modules
- Application templates
- Preparing a CUBA application for migration to Jmix
- Migrating with Jmix Studio
- Incompatible changes and required code updates

# Advanced data manipulation

Duration: 12 hours

Cost: 3,000

The course details the architecture and services of the Jmix data access layer.

## Course program:

- Entity types in Jmix
- Jmix framework annotations for entities
- Data store. Supported databases
- Multiple data stores. Referencing entities from different data stores
- Traits: Versioned, Audit, HasUUID, SoftDelete
- Key-value entities
- Entity states
  
- Database versioning. Liquibase Tool
- Non-standard data types (JPA converters)
  
- Entity Manager service. Usage and transaction management
- Entity graph for data fetch
- DataManager and EntityManager services. Similarities and differences
- Data Security and DataManager
- Data and Query Cache. Cache customization
  
- JPA callbacks
- Entity lifecycle events
  
- Optimistic and pessimistic locks

## Additional Topics:

- Data change audit
- Dynamic attributes

## Access control subsystem

Duration: 8 hours

Cost: 2,000

This course examines in detail the architecture and services of the security and access control system of the Jmix framework.

### Course program:

- Security and access control subsystem architecture. Role-based access
- Role types. Creating roles in the code and in the app interface
- Access Control API
  - User creation
  - Role assignment
  - Roles changing
- Components for integration: SSO / LDAP / SAML
- Social login
- Custom provider for authentication and authorization
- Data access security
  - Access verification
  - Applying predicates
- Creating custom authentication screen
- Accessing data via the API
- Anonymous access to the application

# Jmix applications deployment

Duration: 8 hours

Cost: 2,000

This course covers various ways to deploy Jmix applications.

## Course program:

- Preparing the application for deployment
  - Deployment checklist
- Execution profiles
- Types of artifacts for deployment
  - Fat Jar
  - War
  - Docker image
- Application runtime overview
  - Dedicated server
  - Container
  - Cloud Runtime
- Application deployment options
- Data transmission security
- Ensuring fault tolerance
  - Application clustering
  - Database replication
- Application monitoring and diagnostics tools

# Developing an administrative user interface for Jmix applications

Duration: 12 hours

Cost: 3,000

This course focuses on developing an administrative user interface: from placing elements on screens to creating custom visual components.

## Course program:

- Recommendations for designing complex user interface
- Working with data from third-party sources. Delegates
- Background tasks
- API for working with screens: ScreenBuilders
- Screen lifecycle
- Creating dialog windows and notifications
- Screen software components - facets
- Generating URLs for screens. URL parameters
- EventBus. Generating and processing events in screens
- Fragments
- Extending existing screens
- Changing the functionality of existing screens
- Component factories for custom data types
- Creating custom screen templates
- Creating visual components
- Creating themes

# Reporting development

Duration: 8 hours

Cost: 2,000

This course discusses the capabilities of the Jmix framework report generator.

## Course program:

- Jmix report generator overview
  - YARG
  - Templates
  - Fetch data
- Report Wizard
- Creating a simple report
  - XLS format
  - DOC format
- Using Groovy to fetch data
- Displaying graphic files in a report
- Generating a Master-detail report
- Creating a matrix report
- APIs for working with reports
  - Standard Actions
  - Services



# Using the Jmix Business Process Execution engine

Duration: 12 hours

Cost: 3,000

This course covers the Flowable Business Process Execution module and the capabilities of Jmix to create, run, and execute processes using this engine.

## Course program:

- Jmix BPM component overview
- Creating and executing a simple business process
- Integration of the administrative user interface with BPM
- Using Jmix software components as part of business processes
- Asynchronous task execution
- Parallel task execution
- Handling business process execution errors
- Role-based access and security
- Jmix execution event handlers
- Programming interfaces for working with business processes





# Full-text search

Duration: 2 hours

Cost: 500

This course covers the Full-text search module: connecting, configuring, and using in Jmix applications.

## Course program:

- Full-text search system architecture
  - Elastic search
  - The concept of a "document"
  - Indexes
- Integration with Jmix
  - Configuring an application
  - Starting indexing processes
  - Indexing data in a database
  - Indexing uploaded files
- Scaling the full-text search engine







## Maps add-on

Duration: 4 hours

Cost: 1,000

This course covers the module for working with maps: programming interfaces, layers, and maps in the administrative user interface.

### Course program:

- The main components of the Maps add-on
- Working with layers
  - Raster layers
  - Vector layers
- Working with objects
  - Painting
  - Clustering
  - Loading
- Drawing on a map
- Creating dialog windows



## Charts add-on

Duration: 4 hours

Cost: 1,000

This course covers the module for displaying diagrams in the administrative user interface of Jmix applications.

### Course program:

- Types of charts used in the module
- Data binding
  - Data containers
  - Programming interfaces
- Event Handling
- Incremental refresh for datasets
- Pivot table chart



## Emailing functionality

Duration: 2 hours

Cost: 500

This course covers the possibilities of working with email in Jmix applications.

### Course program:

- Features of the module for sending emails
- Customization
- Creating messages
  - Creating simple messages
  - Using templates
  - Creating attachments
- Administrative interface
- Program interface of the module

# Multi-tenant applications

Duration: 2 hours

Cost: 500

This course covers the possibilities of creating multi-tenant Jmix applications.

## Course program:

- Definition of multitenancy. Approaches to building multitenant applications
- Implementation in Jmix
- Data model design features
  - Shared data
  - Client data
- Administration of multitenant applications
  - User creation
  - Local administration
  - Authorization from URL
- Multi-tenancy module API



# Testing Jmix applications

Duration: 2 hours

Cost: 500

This course covers tools, libraries, and software components designed for testing Jmix applications, and their usage methodology.

## Course program:

- Server-side testing
  - Rules for tests writing
  - JUnit
  - SpringBootTest
- Administrative interface testing
  - Masquerade Library
- API testing
- BDD: using the Gauge Library



## Using Jmix Studio efficiently

Duration: 2 hours

Cost: 500

This course covers the unique features of Jmix Studio, which allow you to speed up the development and reduce the number of errors in the code.

Course program:

- Code refactoring capabilities
- Code generation (Intentions)
- Inspections
- Jmix Studio configuration



## Content

Introduction to Jmix .....	3
Jmix security basics .....	4
Working with data.....	5
Administrative user interface .....	6
Deploying Jmix Applications.....	7
Working with files in Jmix .....	8
Jmix for CUBA developers .....	9
Advanced data manipulation .....	10
Access control subsystem.....	11
Jmix applications deployment .....	12
Developing an administrative user interface for Jmix applications .....	13
Reporting development .....	14
Using the Jmix Business Process Execution engine .....	15
Full-text search.....	16
Maps add-on .....	17
Charts add-on .....	18
Emailing functionality.....	19
Multi-tenant applications.....	20
Testing Jmix applications .....	21
Using Jmix Studio efficiently.....	22

