

# Course : Java, optimization: CPU, memory

**Developing efficient, reliable applications**

**Practical course - 4d - 28h00 - Ref. JOT**

**Price : 2100 € E.T.**



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Optimize the performance of Java applications, respecting certain programming patterns. Analyze certain JVM mechanisms that contribute to performance, as well as aspects specific to multithreading. This course focuses on CPU and memory management.



## Teaching objectives

**At the end of the training, the participant will be able to:**

- ✓ Optimize Java application code to improve performance
- ✓ Mastering optimization tools
- ✓ Optimizing virtual machine operation
- ✓ Optimizing the use of standard libraries
- ✓ Optimizing the use of multithreading

## Intended audience

Developers, engineers, project managers close to development.

## Prerequisites

Good knowledge of Java. Experience in Java programming required.

## Practical details

### Hands-on work

The practical exercises in this course do not involve programming, but consist in the use of tools and the analysis of optimized code.

### Teaching methods

Throughout the session, you'll become familiar with optimization tools.

## Course schedule

### PARTICIPANTS

Developers, engineers, project managers close to development.

### PREREQUISITES

Good knowledge of Java. Experience in Java programming required.

### TRAINER QUALIFICATIONS

The experts leading the training are specialists in the covered subjects. They have been approved by our instructional teams for both their professional knowledge and their teaching ability, for each course they teach. They have at least five to ten years of experience in their field and hold (or have held) decision-making positions in companies.

### ASSESSMENT TERMS

The trainer evaluates each participant's academic progress throughout the training using multiple choice, scenarios, hands-on work and more. Participants also complete a placement test before and after the course to measure the skills they've developed.

## 1 Optimization methodology and tools

- Optimization principles and strategies.
- Profiling, testing and support tools.
- The elements involved in optimization.

### Hands-on work

Use of a profiling tool (VisualVM or JFR) and a unit testing tool (JUnit).

## 2 Caches

- The general principle of caches, important methods.
- The main collections used as caches.

### Hands-on work

Improve application performance by introducing caches. Use of a profiling tool (VisualVM or JFR).

## 3 Memory optimization and management

- Create and copy objects and arrays (clone vs. copy constructors).
- Non-modifiable objects, non-mutable objects, object pools.
- The different GCs (algorithms, parameterization, activity visualization).
- Memory dumps, memory saturation (causes, diagnosis, solutions).
- Soft, weak, phantom references;

### Hands-on work

Improving application performance through better object management. Use of a tool for visualizing memory (VisualVM) and GC activity (Visual GC).

## 4 Optimization and multithreading

- Parallelism versus competition.
- Main concepts: Runnable, Thread, Callable<T>, ExecutorService, ...
- The impact of parallelism and concurrency on performance.
- Some optimization solutions.

### Hands-on work

The introduction of threads (parallelization and concurrency management) improves the performance of the control application.

## 5 Optimization and language

- Different execution and compilation modes.
- Optimal use of types, instructions and methods.
- Lambda-expressions, streams, ...
- String manipulation.

### Hands-on work

Improved benchmark application performance.

## 6 Optimization and I/O

- The nio library. Buffers and channels. Selectors and their use.
- Choosing the right stream classes.
- Optimizing serialization.

### Hands-on work

Improved witness application performance through better IO management.

## TEACHING AIDS AND TECHNICAL RESOURCES

- The main teaching aids and instructional methods used in the training are audiovisual aids, documentation and course material, hands-on application exercises and corrected exercises for practical training courses, case studies and coverage of real cases for training seminars.
- At the end of each course or seminar, ORSYS provides participants with a course evaluation questionnaire that is analysed by our instructional teams.
- A check-in sheet for each half-day of attendance is provided at the end of the training, along with a course completion certificate if the trainee attended the entire session.

## TERMS AND DEADLINES

Registration must be completed 24 hours before the start of the training.

## ACCESSIBILITY FOR PEOPLE WITH DISABILITIES

Do you need special accessibility accommodations? Contact Mrs. Fosse, Disability Manager, at psh-accueil@orsys.fr to review your request and its feasibility.

Dates and locations

REMOTE CLASS  
2026 : 23 June, 3 Nov.

PARIS LA DÉFENSE  
2026 : 23 June, 3 Nov.