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# Course : PostgreSQL, PL/pgSQL development

***Practical course - 2d - 14h00 - Ref. GVE***
***Price : 1600 CHF E.T.***

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After introducing the basics of the PL/pgSQL language (cursor, record, array, object), this practical course will teach you how to implement stored functions and triggers (their security, rights). You'll also learn how to handle errors and exceptions, particularly in the case of nested transactions.

## Teaching objectives

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

- Understanding transactional processing in PostgreSQL
- Master the elements of the PL/pgSQL language
- Handling data in a PostgreSQL database
- Create stored functions (SQL and PL/pgSQL)
- Using different types of triggers
- Managing exceptions

## Intended audience

Designers, developers and anyone involved in developments using the PostgreSQL database.

## Prerequisites

Good knowledge of SQL in a PostgreSQL environment.

## Practical details

**Hands-on work**

Discussions, experience-sharing, demonstrations, tutorials and case studies to train you throughout the course.

**Teaching methods**

Active pedagogy based on examples, demonstrations, experience sharing, case studies and assessment of learning throughout the course.

## Course schedule

**PARTICIPANTS**

Designers, developers and anyone involved in developments using the PostgreSQL database.

**PREREQUISITES**

Good knowledge of SQL in a PostgreSQL environment.

**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 The fundamentals

- Transaction processing in PostgreSQL.
- PostgreSQL database objects and dictionary.
- SQL and PL/PgSQL. PL/pgSQL overview.
- Tools and documentation.

**Storyboarding workshops**

## 2 Language elements

- Host environments and syntax introduction.
- PL/pgSQL variable and constant declarations.
- Data types, conversion and predefined functions.
- Control instructions: IF- ELSE, LOOP loop, FOR loop.
- Composite types: records, tables.
- Object types.

**Hands-on work**

Variable declaration, date manipulation, typing attributes and array use.

## 3 Database access

- The base and the notion of cursor.
- Access via implicit cursor: update, delete, insert, select. Use RETURNING clause.
- FOR cursor loops and cursors in update mode.
- Explicit cursors, FETCH, MOVE and cursor movement.
- Using dynamic SQL: EXECUTE ... USING.
- Use of GET DIAGNOSTICS and runtime information.

**Hands-on work**

Use of explicit cursors and update cursors.

## 4 Stored treatments

- Stored SQL functions.
- Stored PL/pgSQL functions.
- Function parameters.
- Executing stored functions: SELECT versus PERFORM.
- Using functions in the FROM clause.
- Volatility of stored functions.
- PL/pgSQL functions returning the result of a query.
- Security and rights for stored functions.

**Hands-on work**

Create stored functions, use different parameter modes and the effect of function volatility.

## 5 Error management

- Exception handling.
- SQLSTATE and sqlerrm variables, error diagnosis.
- Using RAISE.
- Error propagation and transactional management.

**Hands-on work**

Use of RAISE and retrieval of error information.

**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.

### 6 Triggers

- E/C/A triggers and use of the WHEN clause. Differentiated processing.
- Event/Action triggers definition and types. Instruction-level triggers.
- Line-level triggers (use NEW and OLD).
- Triggers "INSTEAD OF" on views.
- Atomicity of operations and execution model for triggers.

**Hands-on work**
Creation of instruction-level triggers and line-level triggers. Execution model for triggers.

## Dates and locations

**REMOTE CLASS**
2026 : 23 Mar., 22 June, 5 Oct., 19 Nov.