Course : PostgreSQL, advanced programming, transactions and internal objects

Practical course - 4d - 28h00 - Ref. POK
Price : 2760 CHF E.T.

NEW

Develop your database expertise through an active approach combining theory, demonstrations and case studies. You'll learn how to create functions, manage transactions and triggers, optimize objects and reinforce user security.

Teaching objectives

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

- Create and modify PostgreSQL objects using DDL (Data Definition Language) scripts
- Developing functions, procedures and triggers with PL/pgSQL
- Understanding and managing transactions, isolation levels and locks
- Exploit architectural concepts: bases, schemas, tablespaces
- Handling advanced structures: partitioned and temporary tables
- Managing user privileges and configuring PostgreSQL

Intended audience

Developers, engineers and database administrators wishing to learn more about PostgreSQL in a professional context.

Prerequisites

Bonne maîtrise de la syntaxe SQL et des bases de données relationnelles.
Connaissance de base de PostgreSQL (commandes SQL, utilisation de psql ou pgAdmin).

PARTICIPANTS

Developers, engineers and database administrators wishing to learn more about PostgreSQL in a professional context.

PREREQUISITES

Bonne maîtrise de la syntaxe SQL et des bases de données relationnelles.
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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.

Practical details

Hands-on work

Theoretical input, exchanges, experience sharing, demonstrations, tutorials and case studies

Teaching methods

Active teaching based on exchanges, examples, practical exercises and evaluation throughout the course.

Course schedule

1 Introduction and reminders

- PostgreSQL versions, SQL3 statement categories.
- Vocabulary of the relational model: bases, schemas, tablespaces.
- Interaction tools: psql, pgAdmin.
- Advanced types: numeric, strings, dates (DATE, TIMESTAMP, INTERVAL).
- PostgreSQL specific types : ARRAY, ENUM, OID.
- Operators and functions for arrays.
- Expression of constants.
- Introduction to transactions: start, end, SAVEPOINT.

2 PL/pgSQL language

- PL/pgSQL syntax and blocks.
- Variable declaration, %TYPE typing, name resolution.
- Control structures: IF, CASE, loops.
- Interaction with the database: update, consultation, FOUND variable.
- Cursors: declaration, open, FETCH, close.
- Stored procedures and functions.
- Parameter modes: IN, OUT, INOUT.
- Error diagnosis: EXCEPTION block, RAISE instruction.

Hands-on work

PL/pgSQL blocks, loops, cursors, stored procedures, error handling.

3 Triggers in PostgreSQL

- Types of triggers: instruction level versus line level.
- LMD events (INSERT, UPDATE, DELETE).
- Function executed by a trigger.
- Atomicity and consistency of operations.
- Use of triggers (audit, business automation).

Hands-on work

Creation of instruction-level and line-level triggers.

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.

4 Transaction management

- Competition and consistency: deadlocks.
- Scenarios illustrating transaction management.
- Use of SAVEPOINT and sub-transactions.
- Transactions in PL/pgSQL: effect of errors, nested transactions.
- Cursors and transactions.
- Isolation levels: READ COMMITTED, REPEATABLE READ, SERIALIZABLE.
- Explicit table locking (LOCK TABLE).
- Line locks and associated locks.

Hands-on work
Simulate concurrency, isolation, line and table locking.

5 Objects and maintenance

- Databases and tablespaces: definition, role in storage.
- Schema management: creation, deletion, usage.
- Sequences, identity columns, calculated columns.
- pg_class catalog: meta-schema exploration.
- Dynamic schema modifications: columns, constraints.
- Indexes: types, creation, reorganization.
- Query analysis : EXPLAIN, ANALYZE.
- Maintenance: VACUUM, AUTOVACUUM, REINDEX.
- Partitioned tables: partitioning methods (range, list, hash).
- Temporary tables: uses and life cycle.

Hands-on work
Add/delete columns, indexes, partitioning, temporary tables, plan analysis.

6 Gestion des utilisateurs et configuration

- User creation and configuration.
- Roles and privileges: GRANT, REVOKE, object and schema rights.
- Isolate privileges between users.
- Starting and stopping PostgreSQL.
- Configuration files: postgresql.conf, pg_hba.conf.
- Customer authentication.

Hands-on work
Create users, manage privileges, modify configuration files.

Dates and locations

REMOTE CLASS
2026 : 24 Mar., 30 June, 15 Sep., 8 Dec.