Advanced SQL Database Administration and Performance Tuning Training Course

16 - 20 Nov 2026

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4100 € (Per Person)

Ref: #DM8427_273065

Course Introduction / Overview:

This comprehensive course provides an in-depth exploration of SQL database administration and performance tuning, designed to transform participants into proficient database managers capable of ensuring system reliability, security, and speed. In today's data-driven world, the efficiency of a database directly impacts business operations and strategic decision-making. This program moves beyond basic SQL commands to cover the critical architectural and operational aspects of database management. As detailed by authors like Thomas M. Connolly and Carolyn E. Begg in their seminal work, "Database Systems: A Practical Approach to Design, Implementation, and Management," a robust understanding of database internals is paramount. This training course from BIG BEN Training Center is meticulously structured to cover everything from initial installation and configuration to advanced topics like query optimization, high availability solutions, and robust security protocols. Participants will gain hands-on experience in troubleshooting common performance bottlenecks, implementing effective backup and recovery strategies, and managing database security to prevent unauthorized access and data breaches. The curriculum is designed to equip attendees with the practical skills and theoretical knowledge needed to maintain a high-performing, secure, and resilient database environment, making them invaluable assets to any organization.

Target Audience / This training course is suitable for:

- Database Administrators.
- SQL Developers and Engineers.
- IT Professionals managing database systems.
- Systems Analysts and Architects.
- Business Intelligence Professionals.
- Application Developers who write SQL queries.
- IT Managers overseeing data infrastructure.
- Data Analysts seeking to understand database performance.

Target Sectors and Industries:

- Financial Services and Banking.
- Healthcare and Pharmaceuticals.
- Information Technology and Software Development.
- E-commerce and Retail.
- Telecommunications.
- Government and Public Sector Agencies.
- Manufacturing and Logistics.
- Consulting Services.

Target Organizations Departments:

- Information Technology (IT).
- Software Development and Engineering.
- Data Management and Analytics.
- Business Intelligence.
- Infrastructure and Operations.
- Application Support.
- Research and Development.

Course Offerings:

By the end of this course, the participants will have able to:

- Install and configure a SQL Server instance according to best practices.
- Implement comprehensive backup and recovery strategies for business continuity.
- Design and manage robust database security models to protect sensitive data.
- Analyze query execution plans to identify and resolve performance issues.
- Create and manage indexes effectively to accelerate data retrieval.
- Troubleshoot and resolve common database performance bottlenecks like locking and blocking.
- Configure and manage high availability and disaster recovery solutions.
- Automate routine database maintenance tasks to ensure system health.
- Monitor database activity and performance using built-in tools and dynamic management views.
- Apply advanced T-SQL programming techniques for complex data manipulation.

Course Methodology:

The training methodology at BIG BEN Training Center is centered on creating an immersive and practical learning experience. This course eschews a purely theoretical approach, instead focusing on the real-world application of database administration and tuning concepts. Sessions are highly interactive, combining expert-led instruction with hands-on labs, allowing participants to directly apply what they learn in a controlled environment. We utilize a blend of teaching techniques, including detailed presentations, live demonstrations of troubleshooting scenarios, and collaborative group discussions where participants can share experiences and solve problems together. A significant portion of the course is dedicated to case studies drawn from various industries, illustrating how to tackle complex performance and security challenges. Participants will receive continuous, constructive feedback from the instructor throughout the five days. This active learning model ensures that attendees not only understand the principles of SQL database management but also develop the confidence and competence to implement these skills effectively in their own professional environments, ensuring a lasting impact on their organization's data infrastructure.

Course Agenda (Course Units):

Unit One: SQL Server Architecture and Administration Fundamentals

- Introduction to SQL Server architecture and its core components.
- Planning and executing a SQL Server installation.
- Post-installation configuration and best practices.
- Understanding database files, filegroups, and transaction logs.
- Creating and managing databases and database objects.
- Introduction to SQL Server Management Studio (SSMS).
- Basic security concepts and server-level logins.

Unit Two: Backup, Recovery, and Database Maintenance

- Understanding SQL Server recovery models.
- Developing and implementing a robust backup strategy.
- Performing full, differential, and transaction log backups.
- Executing database restore and recovery operations.
- Automating database maintenance with maintenance plans.
- Implementing database integrity checks (DBCC CHECKDB).
- Configuring Database Mail for alerts and notifications.

Unit Three: SQL Server Security Management

- Differentiating between authentication and authorization.
- Configuring server and database-level security principals.
- Managing roles, permissions, and schemas.
- Implementing data encryption (TDE and column-level).
- Understanding and mitigating SQL injection vulnerabilities.
- Configuring and using the SQL Server Audit feature.
- Implementing row-level security and dynamic data masking.

Unit Four: Performance Tuning and Query Optimization

- Introduction to query processing and execution plans.
- Analyzing and interpreting graphical execution plans.
- Designing effective clustered and non-clustered indexes.
- Understanding index fragmentation and maintenance.
- Using SQL Profiler and Extended Events for monitoring.
- Identifying and resolving locking, blocking, and deadlocking issues.
- Writing efficient, optimizable T-SQL code.

Unit Five: Advanced Administration and High Availability

- Monitoring server health with Dynamic Management Views (DMVs).
- Configuring and managing SQL Server Agent jobs.
- Introduction to high availability and disaster recovery concepts.
- Implementing and managing Log Shipping.
- Configuring Database Mirroring and Replication.
- Introduction to Always On Availability Groups.
- Basics of administering SQL Server in a cloud environment.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

In an era of rapidly growing data volumes and cloud-native solutions, how must the traditional role of a Database Administrator evolve to remain critical to business success?

What unique qualities does this course offer compared to other courses?

This training course distinguishes itself by focusing on the strategic mindset required for modern database administration, rather than merely providing a checklist of technical functions. While many courses teach what tools to use, we emphasize the "why" behind performance tuning and security protocols, enabling participants to diagnose and solve novel problems creatively. The curriculum is built around real-world, complex scenarios that challenge participants to think critically about trade-offs between performance, security, and cost. We delve deep into the analysis of query execution plans and troubleshooting methodologies, providing a level of insight that goes far beyond surface-level tutorials. The course fosters a deep understanding of the SQL Server engine's internal workings, empowering administrators to make informed decisions instead of relying on guesswork. Furthermore, the interactive, lab-intensive format ensures that theoretical knowledge is immediately translated into practical, repeatable skills. Participants leave not just with a set of commands, but with a comprehensive framework for maintaining and optimizing mission-critical database systems in any environment, ensuring they can deliver tangible value to their organizations from day one.