

# Migrating Databases in an Organization

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## WHAT'S COVERED

This lesson explores various issues with database migrations, in two parts. Specifically, this lesson will cover:

1. [Introduction](#)
2. [Planning and Executing a Data Migration](#)

## 1. Introduction

As technology evolves, organizations often find themselves needing to migrate (move) their databases to newer systems to keep pace with changing requirements, improve performance, and/or enhance scalability. **Data migration** is a complex process that requires careful planning and execution to ensure a smooth transition with minimal disruption to business operations.



### TERM TO KNOW

#### Data Migration

The process of moving data from one database system or platform to another.

## 2. Planning and Executing a Data Migration

The following steps outline the processes and considerations for a successful data migration. While every migration situation is different, the basic concerns and precautions are always the same: We need to safeguard the data's confidentiality, integrity, and availability, as you learned when studying the CIA triad earlier in the course. In other words, you want to make sure that the data is protected against unauthorized access, complete and uncorrupted, and available to the people and systems that need it.

Step 1: Define Objectives and Scope. Make sure that all the stakeholders in the organization understand what is going to happen, and why. Clearly define the reasons for the migration, such as upgrading to a newer database version, consolidating multiple databases, or moving to a cloud-based solution. Define the scope by specifying

which datasets, tables, or applications will be migrated and any dependencies or constraints that must be considered.

**Step 2: Assess Data Quality and Compatibility.** If there is no data integrity to start with, you won't be able to fairly access its integrity post-migration. Therefore, pre-migration is a great time to fix any problems with the data. Identify and correct any inconsistencies, duplicates, or other anomalies that may affect the migration process. Ensure that the target database system is compatible with the existing data formats, structures, and schemas.

**Step 3: Choose Migration Tools and Technologies.** Some database management systems include their own migration tools. You can also utilize third-party migration software and custom scripts or code. Select the appropriate migration tool(s) based on the characteristics of your database environment, such as size, complexity, and performance requirements. Consider factors such as data volume, how much downtime is acceptable during the changeover, and how compatible the source and target systems are.

**Step 4: Develop Migration Plan and Timeline.** Create a detailed migration plan that outlines the sequence of tasks, dependencies, and timelines for each phase of the process. Define the milestones and success criteria you will use to track the progress. The plan should be detailed and practical, explaining how you will handle data extraction, transformation, loading processes, testing, validation, and post-migration activities.



The migration plan should also include a plan for keeping data confidential at every phase of the process—the “C” in the CIA triad. Data being migrated should be encrypted both while in motion and while at rest, and the storage media should be physically inaccessible to unauthorized persons. If the data must be sent via an unsecure network such as the internet, plan to use a **virtual private network (VPN)** to create a secure tunnel through which data will travel.

**Step 5: Perform Pre-Migration Testing and Validation.** Before performing the actual migration, you should test the planned migration process so you can identify and correct any potential issues. Using a copy of the data (or a subset of a copy), test the proposed data extraction, transformation, and loading procedures to ensure data integrity. Validate the migrated test data against source data to verify consistency. You should also test the new system's functionality and performance under different scenarios to ensure that not only is the data intact, but it can be accessed in all the ways that are required.

**Step 6: Create a Backup.** As the final pre-migration step, create a full backup of the database. That way, if anything goes wrong, the data can be restored to its original state—even if there's a problem with one of the backups. It is a best practice to wait until just before the actual migration to make this full backup so that the backup will be as up to date as possible.

**Step 7: Execute the Migration Plan.** As the migration plan is executing, monitor the process closely, tracking key metrics such as data transfer rates, error rates, and resource utilization. Address any issues or bottlenecks promptly, adjusting plans or procedures as needed. Provide status updates to stakeholders regularly to maintain transparency and manage their expectations.

**Step 8: Conduct Post-Migration Activities.** Once the migration is complete, perform validation checks to ensure that migrated data matches the source data accurately. Test application functionality to confirm that all business

processes are functioning as expected. Address any post-migration issues or discrepancies promptly to minimize any disruption to business operations.



#### HINT

Do not decommission the old system until you are quite confident in the new one—and it may take a month or more for that confidence because some activities may only be performed once a month. In some cases, an IT department may want to keep an old system active for even longer, in case of a disaster with the new system.

**Step 9: Document Lessons Learned and Best Practices.** Document lessons learned, challenges encountered, and best practices identified during the migration process. Record key insights and recommendations for future migrations. Create a comprehensive migration report summarizing the migration process, its outcomes, and any recommendations you have for improving the process next time.

Remember that each data migration project is unique, and careful planning, collaboration, and execution are essential for achieving desired outcomes. With proper preparation and execution, organizations can leverage data migration as an opportunity to modernize their database infrastructure and drive business innovation and growth.



#### TERM TO KNOW

##### **Virtual Private Network (VPN)**

A software-based tunnel within a larger network that data can pass through securely, even if the larger network is not secure.



#### SUMMARY

In this lesson's **introduction**, you learned that a migration plan is a complex process that requires careful planning and execution. You learned a nine-step process for **planning and executing a data migration**.

The steps of this process are:

1. Define objectives and scope.
2. Assess data quality and compatibility.
3. Choose migration tools and technologies.
4. Develop a migration plan and timeline.
5. Perform testing and validation.
6. Create backups.
7. Execute the migration plan.
8. Conduct post-migration activities.
9. Document lessons learned and best practices.

If you follow these steps to prepare and execute a data migration plan, you can maximize the likelihood

of a successful, error-free migration process.

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