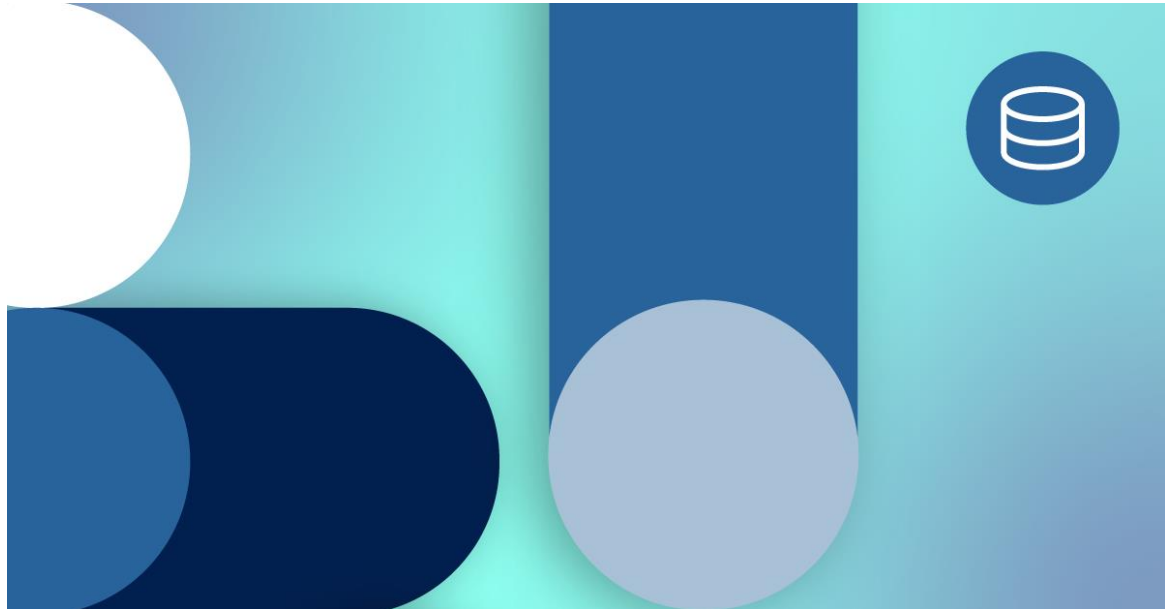




Complete Guide to Data Migration

Complete Guide to Data Migration: What It Is & How It Works

Reference : <https://www.matillion.com/blog/why-data-migration-is-important-to-transform-your-business>



Data migration is the process of moving data from one place to another. While that might sound relatively simple, there's a lot going on behind the scenes to make this happen—and it's not something you can afford to mess up.

Modern-day businesses generate and accumulate massive amounts of data. This data is scattered across various systems and platforms, and it holds valuable insights for driving better decision-making, improving customer experiences, and streamlining operations. However, you can't do much with this data until you consolidate it into a single, accessible location.

And that's where data migration comes in.

Below, we'll explain everything you need to know about data migration to help you confidently navigate its complexities.

What Is Data Migration?

Data migration is the process of transferring data from one system or storage location to another. This can involve moving data between different databases, from on-premises to cloud-based systems, or even from one application to another.

It's an essential modern data management step that guarantees your data is in the right place, in the right format, and accessible when you need it.

The primary purpose of data migration is to consolidate data from various sources into a single, unified location. This process helps improve data accessibility, enhances data quality, and supports better decision-making by providing a comprehensive view of your business operations.

Complete Guide to Data Migration



Data Migration vs. Integration vs. Aggregation

Data migration, integration, and aggregation often get used interchangeably, but they don't mean quite the same thing. Here's a quick explainer to clear up the differences:

- **Data Migration:** Data migration focuses on moving data from one location to another.
- **Data Integration:** [Data integration](#) involves combining data from different sources to provide a unified view.
- **Data Aggregation:** Data aggregation involves collecting and summarizing data from various sources for analysis.

Types of Data Migration

Data migration comes in a few shapes and sizes:

- **Storage Migration:** Moving data from one storage device to another, such as from on-premises servers to cloud storage.
- **Database Migration:** Transferring data between different database management systems or versions.
- **Application Migration:** Moving data from one application to another, often involving changes in data structure or format.
- **Cloud Migration:** Shifting data from on-premises systems to cloud-based platforms.

Benefits of Data Migration

Data migration isn't just about *moving* data from one place to another—it's about [unlocking the potential of your data](#) to drive business growth. Consolidating your data into a unified location gives you a clearer, more comprehensive view of your business—and this leads to better decision-making and operational efficiency.

Here are just a handful of the benefits of data migration:

Improved Analytics and Business Intelligence

When all your data is in one place, it becomes much easier to analyze. Unified data allows for more accurate and comprehensive analytics, helping you gain deeper insights into your business operations. This consolidated view can reveal trends, patterns, and opportunities that might be missed when data is scattered across different systems.

Better Decision-Making

Data migration provides a single source of truth, enabling your team to make informed decisions based on complete and accurate data. With all relevant information accessible in one place, managers and analysts can quickly access the insights they need to plan and execute strategies.

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Operational Efficiency

Consolidating your data can streamline business processes and reduce redundancy. With all data in one location, employees can access the information they need without having to navigate multiple systems. This can boost productivity and reduce the time spent on data management tasks.

Cost Savings

Migrating data to modern, cloud-based systems can lead to major cost savings. Cloud storage and processing often cost less than maintaining on-premises infrastructure, and reducing the number of legacy systems can lower maintenance costs and free up IT resources for more strategic initiatives.

Scalability

As your business grows, so does your data. Data migration to scalable cloud platforms helps your data infrastructure grow with your business. Cloud solutions offer virtually unlimited storage and processing capabilities, allowing you to handle increasing data volumes without a proportional increase in costs or complexity.

Data Quality and Governance

Data migration provides an opportunity to clean and standardize your data. During the migration process, you can identify and rectify data quality issues, such as duplicates, inconsistencies, and inaccuracies. Improved data quality leads to more reliable analytics and reporting.

How Data Migration Works

The data migration process involves several key steps, from initial analysis to data extraction and final testing—it's a lot. Fortunately, many data migration tools simplify and streamline this process, but it's still helpful to understand each phase:

1. Analysis and Planning

The first step in data migration is to thoroughly analyze the data landscape and develop a comprehensive plan. This includes identifying the data to be migrated, determining the technical requirements, and defining the migration's scope and objectives.

2. Backup and Recovery Preparation

Before any data is moved, it's important to have a robust backup and recovery strategy in place. This guarantees that in the event of a migration failure, data can be restored without loss. Regular backups also provide a safety net during the migration process.

3. Initial Testing and Validation

Before fully migrating the data, you'll want to perform initial testing in a controlled environment. This testing phase helps identify any issues with data quality, compatibility, or the migration process itself. Validating the data early on guarantees that it meets the necessary criteria for accuracy and completeness.



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4. Data Extraction

This step involves pulling data from its original source systems. The extraction should minimize disruption to normal business operations. Double-check that the data extracted is consistent and complete.

5. Data Transformation

Once the data is extracted, [it may need to be transformed](#) into a format suitable for the new environment. This could involve cleansing, deduplication, or other modifications to improve data quality and compatibility.

6. Data Loading

After transformation, the data is loaded into the target system. Check that data integrity is maintained and that all data is accurately transferred.

7. Final Testing and Verification

The last stage of the process involves thorough testing and verification to confirm that the data migration has been successful. This includes checking that all data has been accurately transferred, that it integrates well with the new system, and that it supports operational needs and analytics.

Strategies for Data Migration

You can choose from several different approaches to data migration depending on your organization's specific needs and constraints. Here are some common strategies to consider for data migration:

- **Big Bang Migration:** In this approach, all data is migrated at once within a limited timeframe. This method is fast but often requires significant downtime, which can disrupt business operations.
- **Trickle Migration:** Trickle migration involves moving data incrementally, allowing the old and new systems to run in parallel. This minimizes downtime and provides opportunities for continuous testing and adjustments.
- **Hybrid Approaches:** Some migrations may benefit from a combination of big bang and trickle strategies. A hybrid approach can balance the need for speed with the benefits of incremental data transfer, tailoring the migration process to specific business needs and technical environments.

Common Challenges (and Solutions) of Data Migration

Data migration is an important (and necessary) part of [data management](#), but that doesn't mean it's without its challenges. Despite the best tools and planning, you'll likely still encounter a handful of obstacles. Here's what to expect (and what to do about it):

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1. Data Quality Issues

- *Challenge:* Data from different sources can be inconsistent, incomplete, or outdated. Poor data quality can lead to inaccurate insights and ineffective decision-making.
- *Solution:* Implement robust data cleaning and validation processes before migration. Use ETL tools to transform and standardize data. Regularly audit data quality throughout the migration process to catch and correct errors early.

2. Compatibility Problems

- *Challenge:* Different data formats and structures can create compatibility issues during migration. This can cause delays and errors, complicating the data integration process.
- *Solution:* Conduct a thorough analysis of source and target systems to identify compatibility issues early. Use data transformation tools to convert data into compatible formats. Establish a clear mapping strategy to guarantee data is correctly transformed and integrated.

3. Data Security Concerns

- *Challenge:* Migrating sensitive data can expose it to security risks such as breaches or unauthorized access. Protecting data during transit and maintaining compliance with data protection regulations is essential.
- *Solution:* Use strong encryption methods for data in transit and at rest. Maintain compliance with relevant data protection regulations and conduct regular security audits. Implement access controls and monitor data migration activities to prevent unauthorized access.

4. Downtime and Disruption

- *Challenge:* Migrating data can cause system downtime, disrupting business operations and affecting productivity. Unplanned downtime can lead to significant financial losses and operational issues.
- *Solution:* Plan the migration during low-traffic periods and use strategies like trickle migration to minimize downtime. Create a rollback plan in case of issues. Communicate the migration schedule with all stakeholders to minimize disruption.

5. Resource Constraints

- *Challenge:* Data migration projects can be resource-intensive, requiring significant time, effort, and expertise. Limited resources can lead to project delays and incomplete migrations.
- *Solution:* Allocate sufficient resources and budget for the project. Consider using automated data migration tools to streamline the process and reduce manual effort. Train existing staff or hire experts to manage the migration.

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6. Stakeholder Alignment

- *Challenge:* Different stakeholders may have varying expectations and requirements for the migration. Misalignment can lead to conflicting priorities and project delays.
- *Solution:* Engage all relevant stakeholders early in the planning process. Maintain open communication and manage expectations for alignment and smooth execution. Regularly update stakeholders on progress and address any concerns promptly.

7. Data Loss and Integrity

- *Challenge:* There is a risk of data loss or corruption during migration, which can compromise the accuracy and reliability of the data.
- *Solution:* Perform comprehensive data backups before starting the migration. Implement rigorous testing and validation at each stage of the migration to confirm data integrity. Establish clear protocols for handling data discrepancies and recovering lost data.

9 Best Practices for Data Migration

These data migration best practices will help you minimize risks, maintain data integrity, and achieve your migration objectives:

1. **Conduct Thorough Planning:** Define the goals, scope, and expected outcomes of your data migration project. Create a detailed migration plan outlining each step, including timelines and resource allocation.
2. **Engage Stakeholders Early:** Identify and involve key stakeholders, including data owners, IT staff, and business users, in the planning process. Regularly update them on progress and challenges to keep everyone informed and aligned.
3. **Perform Data Assessment and Cleanup:** Assess the quality of your data, identifying inconsistencies, duplicates, and missing values. Implement data cleansing and standardization processes for data accuracy before migration.
4. **Use Robust Data Security:** Use strong encryption methods for data both in transit and at rest. Implement access controls to restrict data migration activities to authorized personnel and monitor all activities for security.
5. **Backup Data Before Migration:** Create comprehensive and up-to-date backups of all data to be migrated. Test backup and recovery procedures to confirm they are effective and reliable in case of any issues.
6. **Validate and Test Thoroughly:** Use a copy of your production environment to test the migration process. Conduct post-migration testing to confirm data integrity in the new environment.



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7. **Monitor and Optimize:** Track migration progress in real-time to identify and address any issues promptly. Evaluate and optimize the process to improve efficiency and reduce resource consumption.
8. **Document the Process:** Maintain detailed records of each step in the migration process, including decisions made and solutions implemented. Develop a knowledge base of best practices and lessons learned for future migrations.
9. **Plan for Ongoing Maintenance:** Conduct periodic data quality audits to maintain data integrity in the new environment.

Get Started with Data Migration with Matillion

Data migration doesn't have to be intimidating. With the right tools and strategies, you can streamline the process and unlock your data's full potential.

And we can help.

Matillion provides powerful, cloud-native solutions designed to simplify and accelerate your data migration journey:

- **Cloud-Native Architecture:** Matillion leverages the power and scalability of platforms like Snowflake, Amazon Redshift, Google BigQuery, and Microsoft Azure Synapse.
- **Comprehensive Features:** From data extraction and transformation to loading, Matillion provides end-to-end data integration capabilities.
- **User-Friendly Interface:** Matillion's intuitive, drag-and-drop interface makes it easy for users of all technical levels to manage data migrations.
- **Robust Security:** Matillion uses strong encryption and access controls to keep your data secure throughout the migration process.

How Does Data Migration Work?

Reference : <https://www.matillion.com/blog/how-does-data-migration-work>

Data migration is now a necessary task for data administrators and other IT professionals. A few data migration examples include:

- Application migration, in which an entire application is moved from an on-premises environment to the cloud.
- Cloud migration, which involves moving either data or an entire application and its data to the cloud.
- Database migrations, which involves moving data from an existing database to a new platform.



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- Storage migration, where an organization moves its backups for disaster recovery or other purposes to a new data storage medium, such as the cloud.

But how does data migration work?



What does data migration mean & why is it important?

Data migration is simply the process of moving data from one place to another. Data migration is becoming increasingly important because the systems we use to run our businesses are generating more and more data. The bottom line is that if we're going to create all this data, we have to be able to move it around as our application and storage needs change.

Organizations might need to migrate data:

- When combining data assets from separate organizations after a merger or acquisition
- After implementing a new application.
- When moving to a new database or data warehouse
- After adopting a cloud-based data platform
- Moving from an on-premises data center to the cloud
- After adding data-intensive applications such as a database, data warehouse, or data lake.

What is the data migration process?

How does data migration work? Your data migration plans might include the following steps:

Analysis Analyze the data that you'll be migrating. Factors to consider are the format of the data in the source system versus the format of the data in the target system. Compatibility issues can cause

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problems later on. Another issue to consider is whether your data migration project will involve data integration, which entails combining data from multiple data sources into a single target system.

Backups To minimize the chances of data loss during the data migration process, perform backups of all the data that will be migrated. Complete, up-to-date backups will be invaluable in the event of a disaster recovery situation.

Initial testing Using a copy of your production environment, test your migration code or application. Validate the data on the new source system.

Extraction Extract the data from the source system using a tool such as a data loader or ETL application.

Transformation If necessary, transform the data to the format needed on the target system.

Loading Load the data into the new system using the tool you've selected.

Verification and testing Confirm that your data transfer has been successful by testing the data on the new system. You'll want to make sure that data is complete and accessible.

Communication Communicate with the data owners and data owners throughout the process.

Retirement If your migration plans involve decommissioning an application or platform, one of the final data migration stages is to retire the old system. It's best to wait for a few weeks or even a couple of months to make sure that there are no issues with the new system. Your data migration process is now complete.

Learn more about how to have a successful data migration.

How long does data migration take?

The timeframe for a data migration can vary widely based on multiple factors.

The size of your data migration project. There's a big difference between migrating one database to the cloud and migrating nine different applications plus their data to multiple target systems. When estimating your timelines, consider the quantity of data you will be moving.

The type of migration you are planning to do. Migrating all of your data at the same time, also known as the "Big Bang" strategy, involves completing your data migration within a limited timeframe. The biggest benefit to this approach is speed. However, the trade-off is that this approach almost always requires system downtime. Going with a Big Bang migration completes the full transfer within a limited time window. There is some downtime during data processing and movement, but the project is completed quickly.

Trickle migration involves completing the project in phases, including running source and target systems in parallel. Migrating data incrementally will take longer, but it can usually be performed without having to shut down key systems. Trickle migration is more complex than Big Bang and takes longer but has less downtime and more testing opportunities. It's important to pick the data migration strategy that's right for your organization and your users.



Complete Guide to Data Migration

Whether or not you will write your own code. Do you plan to write your own code or use existing [data migration tools](#)? If you plan to do your own coding, you will need to include additional development time in your plan.

The amount of data transformation needed. If your migration is a simple transfer of data from one location to another, it will take less time than if you need to transform the data into a different format while you're moving it.

The complexity of the data that's being moved. Unfortunately, it's rarely as simple as moving your data from source system X to target system Y. You'll need to analyze the data in the source system to determine its complexity and evaluate how that will impact the move.

How to perform data migration & create your data migration plan

One of the most important data migration stages is actually the planning stage. Spending time to carefully create your data migration plan is one of the keys to a successful project. The more time you spend planning, the greater your chances of success. To create a data migration plan, consider the following steps.

- **Take a data inventory.** Take a careful inventory of all of the data that needs to be migrated, identifying where the data is located, what format it's in, and what format it will need to be in when it reaches the target system. You will be extracting the data, potentially transforming it and then loading it into the destination system. If it's a simple move, without transformation, a [data pipeline tool](#) may be the right way to go. If data transformation is required, you may need a more robust [ETL tool](#).
- **Identify data owners and data users.** After you have identified where the data is located, the next step is to figure out who is responsible for managing the systems that contain the data as well as who uses the data. You'll need to work with the data owners to gain access to the data systems. Data owners can help you figure out how to perform data migration with minimal impact to the data's users and to critical business processes.
- **Create a team.** After you have identified data owners, create a team to work together on the data migration project. Look at data migration examples together. You'll need to work with the data owners to gain access to the data in the source systems, and to validate data quality after it has migrated to the target system.
- **Plan to back up your data before you start.** Before you begin the migration project, make sure that your data has been backed up recently and confirm that the backups are complete. With complete data backups in place, you'll be positioned to recover quickly in case of an issue during migration.



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Hopefully that answers the question, How does data migration work? and gives you an idea of how to get started.

Want to learn more about data migration?

Given the [increasing volume and complexity of data](#), and the speed and scale needed to handle it, the only place you can compete effectively—and cost-effectively—is in the cloud. Matillion provides a complete data integration and transformation solution that is purpose-built for the cloud and cloud data warehouses.

Only Matillion is purpose-built for Snowflake, Amazon Redshift, Google BigQuery, Azure Synapse Analytics, and Delta Lake on Databricks, enabling businesses to achieve new levels of simplicity, speed, scale, and savings. Trusted by companies of all sizes to meet their data integration and transformation needs, Matillion products are highly rated across the AWS, GCP, and Microsoft Azure Marketplaces.

[Matillion Data Loader](#) is a free SaaS-based data integration tool that seamlessly loads valuable business data into your cloud data warehouse. With a code-free, wizard-based pipeline builder to common data sources like Salesforce, Google Analytics, and more, Matillion Data Loader can help make your first data migration (and every one after) quick and easy. It's also free. [Sign up today](#) to try Matillion Data Loader and kickstart your data migration project.

[Matillion ETL](#) software is cloud-native, purpose-built to support leading cloud data warehouse environments, including Snowflake, Amazon Redshift, Google BigQuery, [Microsoft Azure Synapse](#) and Delta Lake on Databricks. From extracting and loading your data to performing powerful data transformations, Matillion cloud ETL solutions offer cloud-native architecture and performance compared to legacy ETL tools. With no hardware or software requirements, Matillion leverages the performance and scale of the cloud, making complex data transformation fast, secure, and cost efficient.

Data Migration Demo :

Migrate a set of tables from your On-premise Database to your Data Warehouse

<https://academy.matillion.com/training/1edb4b68-7aa9-11eb-b90d-06cf503dca07/overview>

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Data Migration

Migrate a set of tables from your On-premise Database to your Data Warehouse

1 task
0 questions
19 mins estimated time to complete

Review