

Course 3 resources and citations

Module 1: Introduction to data transformation in the cloud

Resources

Helpful resources and tips

- Common problems with labs/lab troubleshooting
- Google Docs Help Center
- Google Sheets Help Center
- How to use Google Slides

The data journey is a flexible path

• 7 data collection methods in business analytics

Impacts of the data journey on decision making

• Business analytics in action: Real-world examples and use cases

Techniques Used to Transform Data, Part 2

• Importance of proper formatting in data collection

Storage options for transformed data

• BigQuery overview

Citations

Stages of the data journey

• Statistics Canada. (2021, October 22). Data journey.



The data journey is a flexible path

- Cymetrix. (2023, January 11). <u>Business analytics in action: Real-world examples and use cases</u>. Linkedin.
- Statistics Canada. (2021, October 22). Data journey.
- Weinmeister, K. (2020, April 13). <u>From raw data to machine learning model, no coding required</u>. Google Cloud Blog.

Impacts of the data journey on decision making

- Cymetrix. (2023, January 11). <u>Business analytics in action: Real-world examples and use cases</u>. Linkedin.
- Statistics Canada. (2021, October 22). <u>Data journey</u>.
- Weinmeister, K. (2020, April 13). <u>From raw data to machine learning model, no coding required</u>. Google Cloud Blog.

Steps for effective data collection

- Chowdhury, S. (2022, June 17). <u>Concepts of data staging: Interview prep guide</u>.
 Linkedin.
- Cote, C. (2021, December 2). <u>7 data collection methods in business analytics</u>. Business Insights Blog.

The process stage ensures clean and consistent data

- Aziza, B. (2021, December 2). <u>Unlocking opportunities with data transformation</u>.
 Google Cloud Blog.
- Choudhury, A. (2021, January 22). <u>Top 8 data transformation methods</u>. Analytics India Magazine.
- Linkedin. (n.d.). What are some common data transformation techniques and when to use them?



[Supplemental] Process and summarize data

- Purdue University. (n.d.). <u>Descriptive statistics</u>. Purdue Online Writing Lab.
- The University of Utah. (n.d.). <u>Central tendency & variability</u>.

Techniques Used to Transform Data, Part 2

- Hamilton, T. (2020, March 31). What are Data Unions? How do they work? Which ones can I use? Streamr.
- W3 schools. (n.d.). <u>SQL joins</u>.

Manual and automated transformation

- Aziza, B. (2021, December 2). <u>Unlocking opportunities with data transformation</u>.
 Google Cloud Blog.
- Google Cloud. (n.d.). What is ETL? Retrieved July 20, 2023.

Storage options for transformed data

• Enagandula, R. (2023, May 17). <u>Database vs data warehouse vs data lake</u>. Linkedin.

Module 2: Handle raw data with data pipelines

Resources

Overview of data pipeline stages and benefits

- Data Pipelines: An Overview
- What Data Pipeline Architecture should I use?

Strategies and tools for efficient data ingestion

Big data ingestion



Data transformation steps to ensure reliable data

• What are the most common data cleaning techniques?

Transformation approaches for securing data

- FBI Tech Tuesday: Protecting Against Personally Identifiable Information (PII) Theft
- How to safeguard personally identifiable information

Data dictionaries and monitoring help maintain data integrity

- <u>Definitive Guide to Data Monitoring</u>
- What Is a Data Dictionary?

Analysis and visualization after the data pipeline

- How to Meet WCAG (Quick Reference)
- Introduction to SQL
- Top data visualization tools for business professionals

Citations

Data pipelines in the cloud

- Dowsett, C. (2022, December 22). What is a data pipeline? Built In.
- Google Cloud. (n.d.). <u>What is ETL?</u> Retrieved July 20, 2023.

Overview of data pipeline stages and benefits

• Knight, M. (2023, March 2). <u>Data pipelines: An overview</u>. *DATAVERSITY*.

The difference between ELT and ETL

- Google Cloud. (n.d.). What is ETL? Retrieved July 20, 2023.
- Jameel, M. Y. (2022, August 26). <u>ETL vs ELT?</u> Linkedin.



Data ingestion methods that suit your needs

- Gomede, E. (2023, August 2). <u>Batch vs. streaming data ingestion: Choosing the right</u> approach for efficient data processing. *Medium*.
- Rajan, V. (2023, July 25). What is data ingestion and why it is important. Linkedin.
- Thallam, R. (2020, September 16). <u>BigQuery explained: How to ingest data into BigQuery so you can analyze it</u>. *Google Cloud Blog*.

Strategies and tools for efficient data ingestion

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- Rajan, V. (2023, July 25). What is data ingestion and why it is important. Linkedin.

Data mapping helps ensure consistent data

• Google Cloud. (2024, January 4). <u>Data mapping overview</u>.

Data transformation steps to ensure reliable data

Aziza, B. (2021, December 2). <u>Unlocking opportunities with data transformation</u>.
 Google Cloud Blog.

Introduction to profiling and cleaning data

- Elgabry, O. (2019, March 2). <u>The ultimate guide to data cleaning</u>. *Towards Data Science*.
- Google for Developers. (2022, July 18). <u>Representation: Cleaning data</u>. Machine Learning. Retrieved July 25, 2023.
- Indeed Editorial Team. (2022, October 12). What is data profiling? (Definition, techniques and types). Indeed.



Common ways to manipulate data

- CESSDA ERIC. (n.d.). <u>File formats and data conversion</u>. Data Management Expert Guide.
- Kline, L. (2021, October 7). <u>Understanding data enrichment: A comprehensive guide I</u>
 <u>Hightouch</u>. The Data Activation Blog.
- Linkedin. (n.d.). What are the benefits and challenges of data standardization and normalization?
- Linkedin. (2024, January 13). What are the best tools and methods for data conversion and loading?

Data transformation techniques that achieve different business needs

- Kulshrestha, A. (Ace), & Ellis, S. (2019, June 26). <u>Take charge of your data: How tokenization makes data usable without sacrificing privacy</u>. *Google Cloud Blog*.
- Linkedin. (n.d.). What are the benefits and challenges of data standardization and normalization?
- Linkedin. (2023, December 8). What are some effective strategies for data deduplication in the ETL process?

Transformation approaches for securing data

Brennan, B., & Smith, K. (2022, May 24). FBI Tech Tuesday: Protecting against
personally identifiable information (PII) theft. Federal Bureau of Investigation.

Different approaches to loading data

- Chetry, N. (2023, August 12). <u>Incremental data load approach and implementation</u> <u>strategy</u>. *Medium*.
- Google Cloud. (2024, January 12). Introduction to loading data.



Overview of data validation strategies and rules

- Metwalli, S. A. (2023, March 7). What is data validation? Built In.
- Nene, N., & Fu, J. (2021, July 21). <u>Introducing the data validation tool for EDW</u> migrations. *Google Cloud Blog*.

Data dictionaries and monitoring can help you maintain data integrity

- Indeed Editorial Team. (2022, September 30). <u>Definitive guide to data monitoring</u>.

 Indeed.
- UC Merced Library. (n.d.). What is a data dictionary?

Analysis and visualization after the data pipeline

- Stobierski, T. (2021, January 12). <u>Top data visualization tools for business professionals</u>.
 Business Insights Blog.
- W3 schools. (n.d.). Introduction to SQL.

Module 3: Cloud data optimization strategies

Resources

Interview tip: Explain impact

Interview Warmup

Citations

Challenges of data transformation

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- Google Cloud. (n.d.). What is big data? Retrieved May 4, 2023.



• Google Cloud. (n.d.). What is ETL? Retrieved May 3, 2023.

Analyze a data transformation plan

LeBlanc, D. (2019, June 27). <u>Creating actionable customer segmentation models</u>.
 Google Cloud Blog.

Data aggregation can make it easier to extract meaningful insights

- Google Career Certificates. (2021, June 18). <u>Aggregating data for analysis</u> [Video].
 YouTube.
- Visiers, I. S. J. (2019, June 11). How to efficiently process both real-time and aggregate data with Cloud Dataflow. Google Cloud Blog.

Consequences of duplicate data and how to eliminate it

- Google Cloud. (2024, January 4). <u>Use the legacy streaming API</u>.
- Khan, Z. (2021, August 23). <u>Handling duplicate data in streaming pipeline using</u>
 <u>Pub/Sub & Dataflow</u>. Google Cloud Blog.
- Statistics and Data. (n.d.). <u>How duplicate data can damage the credibility of your statistics!</u>.

Overview of how joins combine data from different tables

- Looker Studio Help. (n.d.). <u>How blends work</u>. Retrieved May 10, 2023.
- Tai, E. (2022, February 7). <u>Tips for joining data—Prevent unwanted data loss and data duplication</u>. *The Data School*.
- Thallam, R. (2020, September 30). <u>BigQuery explained: Working with joins, nested & repeated data</u>. Google Cloud Blog.



SQL strategies to join data effectively

- Banhudo, G. (2020, November 27). <u>SQL performance tips #1</u>. Towards Data Science.
- Google Cloud. (2024, January 4). Optimize query computation.
- W3 schools. (n.d.). <u>SQL joins</u>.

Data derivation to combine data and obtain new insights

Ahmad, I., Stepin, N., & Suliman, S. (2021, October 18). Where data meets IP –
 Protecting business data in a commercial context. Data Protection Report.