DEMYSTIFYING DATA INGESTION CHALLENGES WITH APACHE NIFI

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WHO AM I?

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I LOVE CROSSFIT !

AGENDA

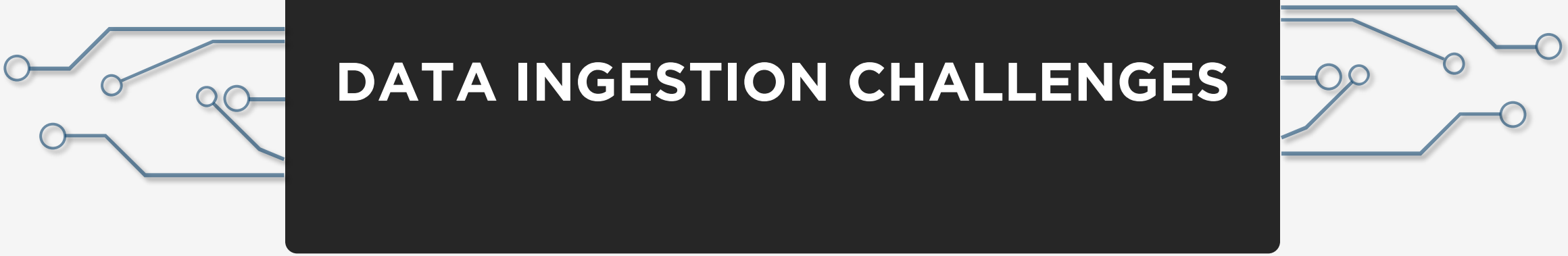
- Introduction
- Data Ingestion Challenges
- Need For Speed in Data Ingestion
- Influence of Open File Formats
- Apache NiFi Demo
- Question and Answers


INTRODUCTION

FACTS

- There are nearly as many pieces of digital information as there are stars in the universe.
- Less than 0.5% of all data we create is ever used or analyzed.
- According to PragmaticWorks, global businesses lose about 20-35% of their operating revenue from poor-quality data.
- Poor data can cost the US government about $3.1 trillion a year.
- If you burned all the data created in 1 day into DVDs, you could stack them on top of each other to reach the moon twice.

TRAFFIC JAM !


DATA INGESTION CHALLENGES

DATA QUALITY ISSUES

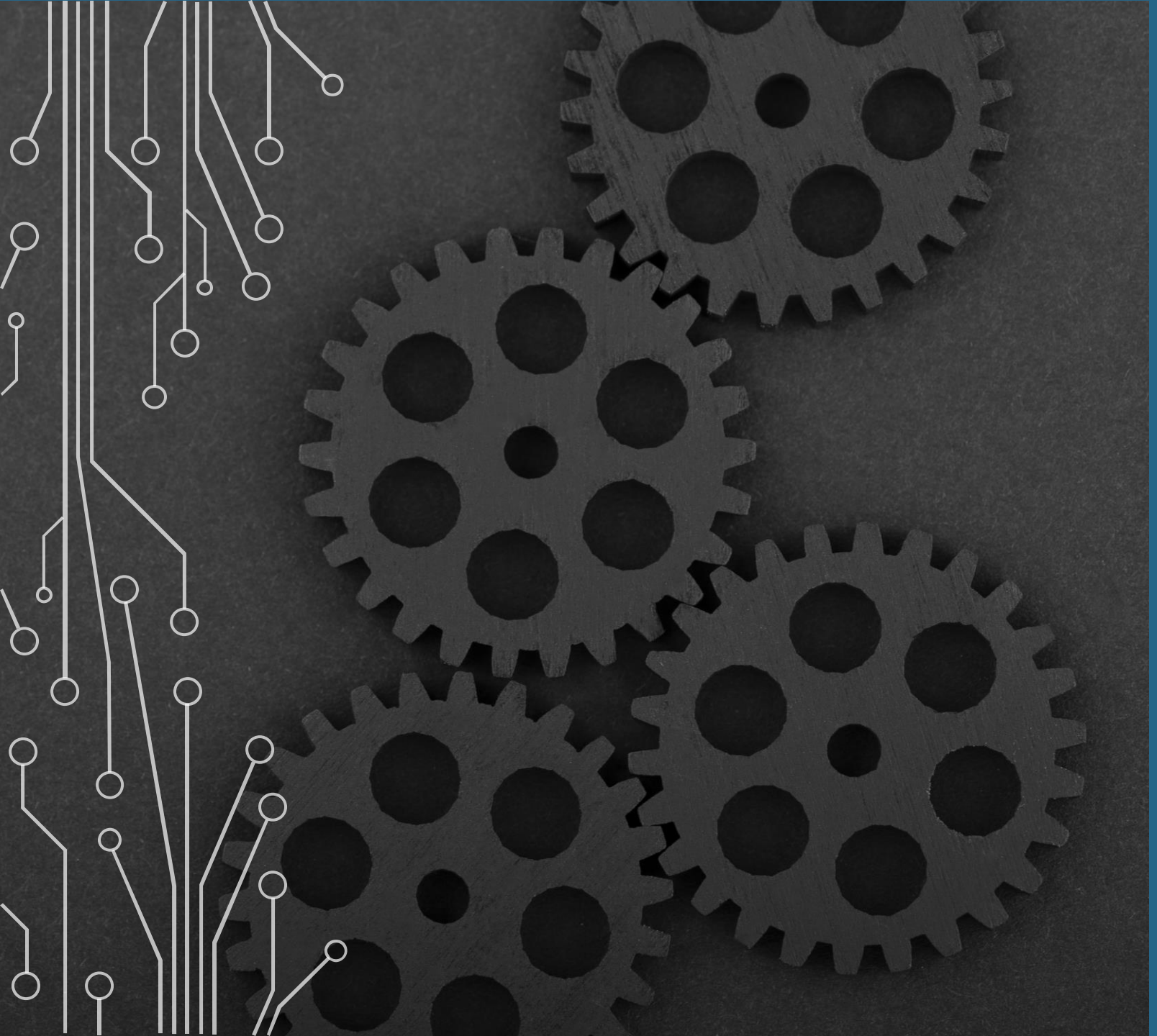
- Inconsistency and Incompleteness
- Data Validation

DATA VOLUME AND VELOCITY

- Large Volumes of Data
- High Velocity

DATA INTEGRATION ACROSS SOURCES

- Diverse Data Sources
- Schema Evolution



RELIABILITY AND FAULT TOLERANCE

- Data Loss and Duplicates
- Fault Tolerance

SECURITY AND COMPLIANCE

- Data Security
- Compliance Requirements

ADDITIONAL CHALLENGES IN DATA INGESTION

- Scalability
- Data Governance
- Data Lineage and Traceability
- Data Transformation and Enrichment
- Data Synchronization
- Cost Management
- Metadata Management
- Handling Unstructured Data

SUMMARY

- Data Quality Issues
- Data Volume and Volume
- Data Integration Across Sources
- Reliability and Fault Tolerance
- Security and Compliance


NEED FOR SPEED IN DATA INGESTION

INDUSTRIES AND USE CASES WHERE SPEED IS CRITICAL

FINANCE AND TRADING

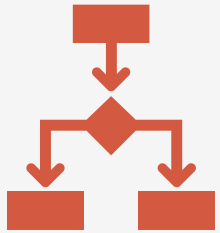
HEALTHCARE

RETAIL

TELECOMMUNICATIONS

IMPACT OF LATENCY IN REAL-TIME DATA SCENARIOS

Operational Efficiency



Decision-Making

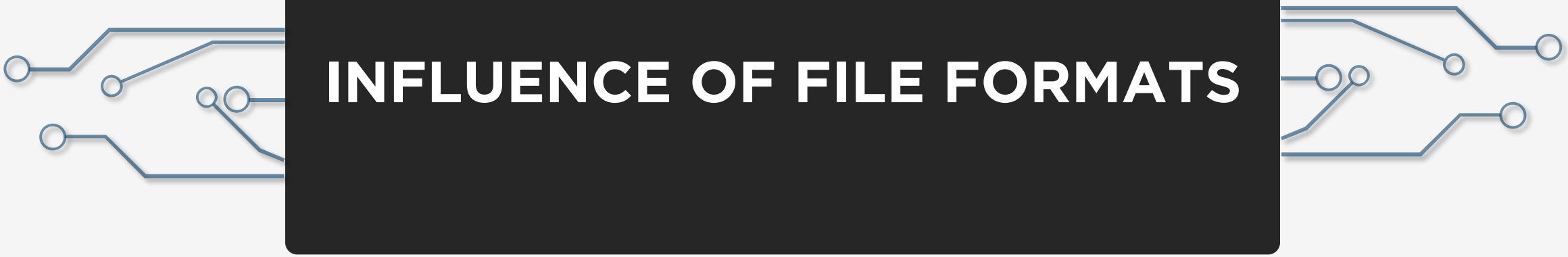
Customer Experience

COST IMPLICATIONS BEYOND INFRASTRUCTURE

MISSED OPPORTUNITIES

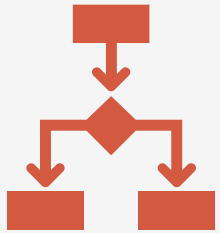
RESOURCE UTILIZATION

MAINTENANCE AND SUPPORT


INFLUENCE OF FILE FORMATS

ROLE OF COLUMNAR STORAGE IN IMPROVING QUERY PERFORMANCE

Data Organization

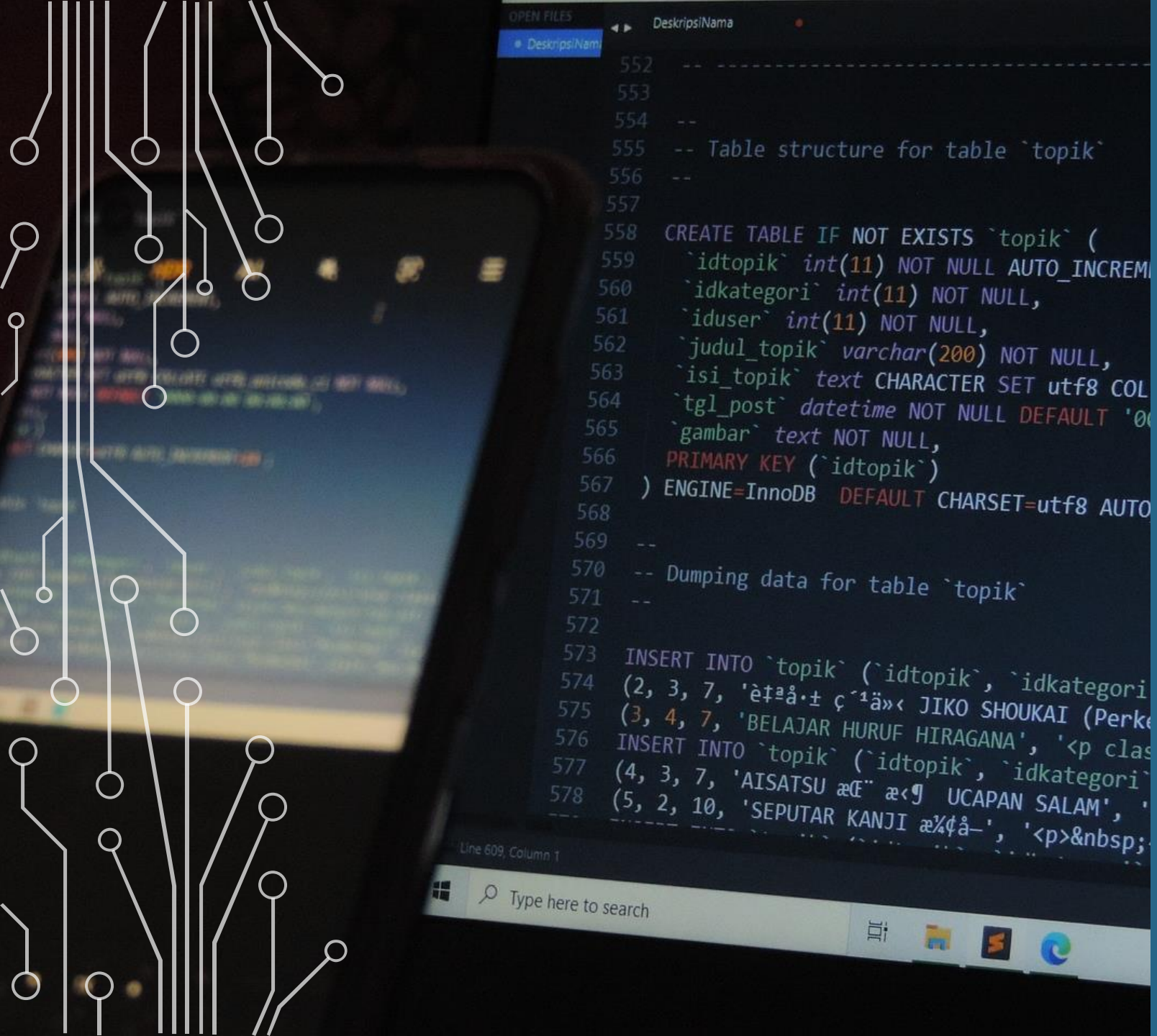


Query Performance

Parallel Processing

DATA ORGANIZATION

- Row-Based Storage
- Columnar Storage



QUERY PERFORMANCE

- Selective Column Retrieval
- Compression

PARALLEL PROCESSING

- Parallelism
- Vectorized Processing

ADVANTAGES/DISADVANTAGES BETWEEN FILE FORMATS

- Avro
- Parquet

AVRO

Advantages

1. Schema Evolution
2. Compactness

Disadvantages

1. No Compression
2. Slow Query Performance

PARQUET

Advantages

1. Columnar Storage
2. Compression

Disadvantages

1. Schema Evolution
2. Write Performance

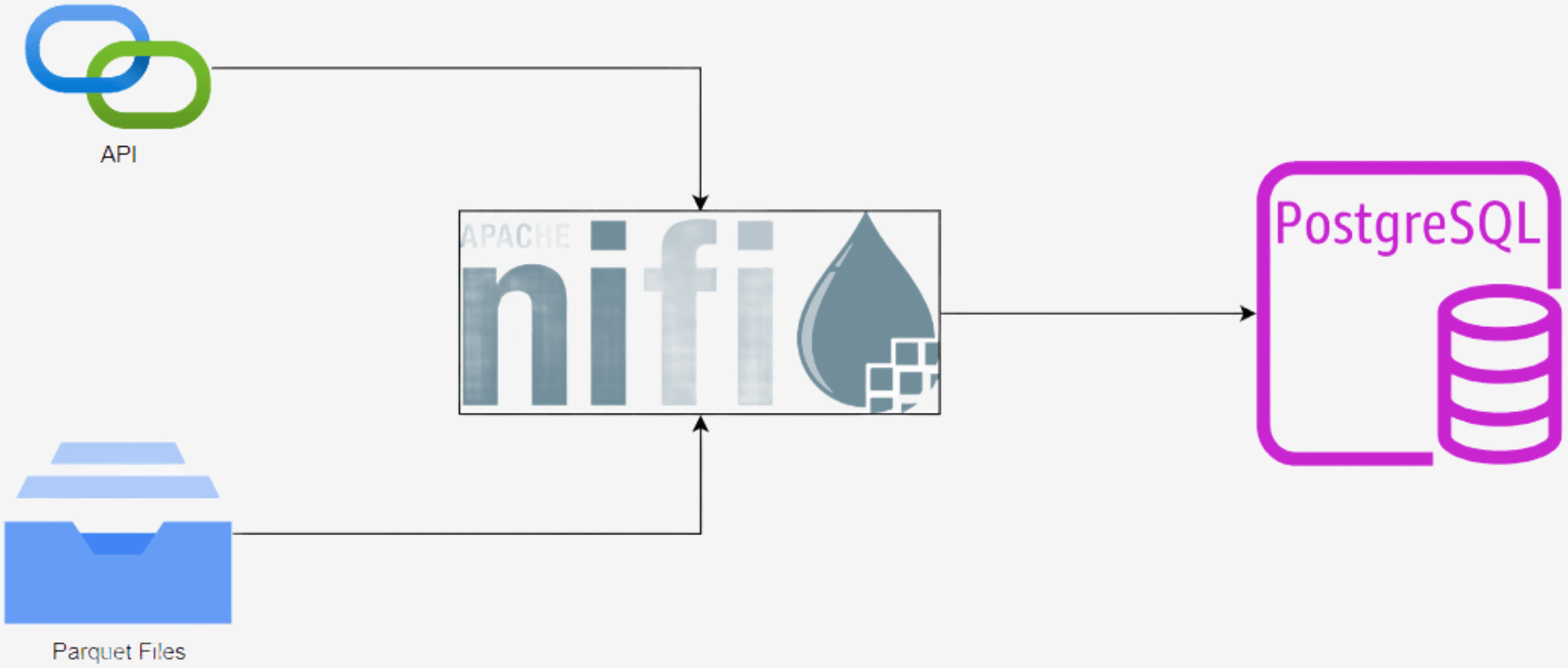

APACHE NIFI DEMO

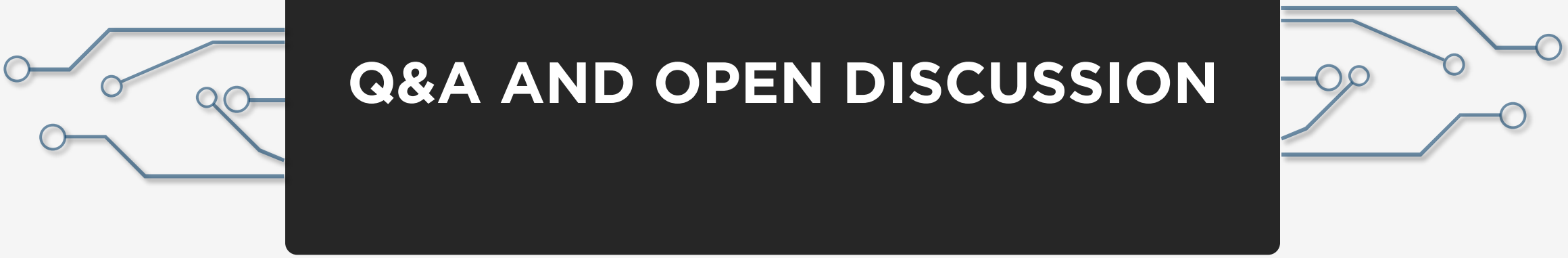
INTRODUCTION TO APACHE NIFI

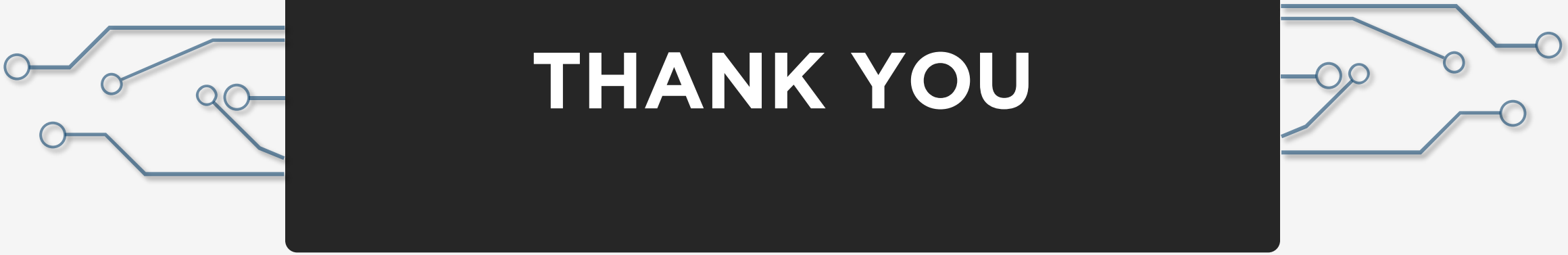
WHY APACHE NIFI

Web-Based User Interface	Data Ingestion	Data Transformation	Flow Control
Security	Extensibility	Data Provenance	Scalability

ARCHITECTURE




Q&A AND OPEN DISCUSSION


THANK YOU

SOURCES

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- Devonjenn/DemistifyingDataIngestionChallengesWithApacheNifi