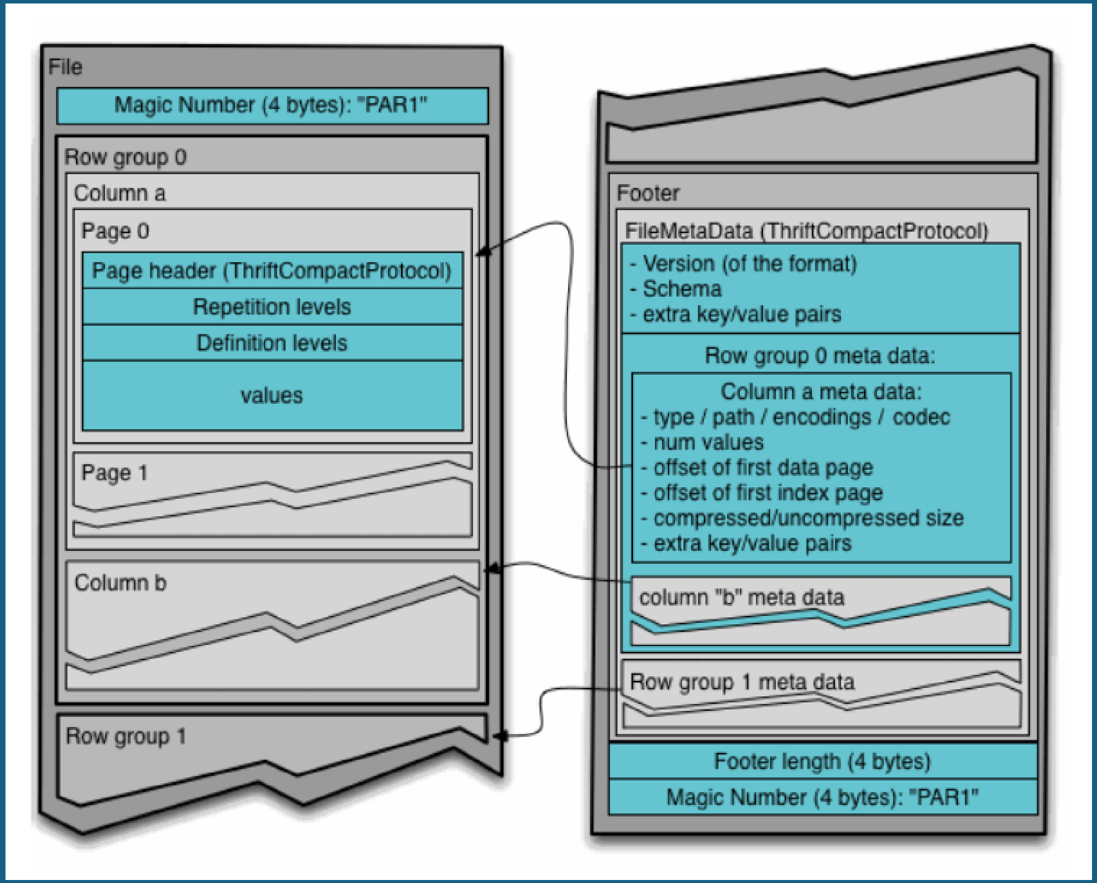
LOAD BIG DATA EFFICIENTLY

PART 6: DISOVER PARQUETS STATISTICS USED BY SPARK

DATA WITH NIKK
THE GREEK

- Row Groups are a logical division on row level of a parquet defaulting to 128 MB
- Column part relates to column chunk of row groups
- Pages are invisible units where the encoding and compression happens
- Footer containing file metadata which can be used for predicate pushdown:
  - File level: num rows/ columns, schema
  - Row group: num rows/ columns
  - Column level: min, max, null count, distinct values, page indexes etc.

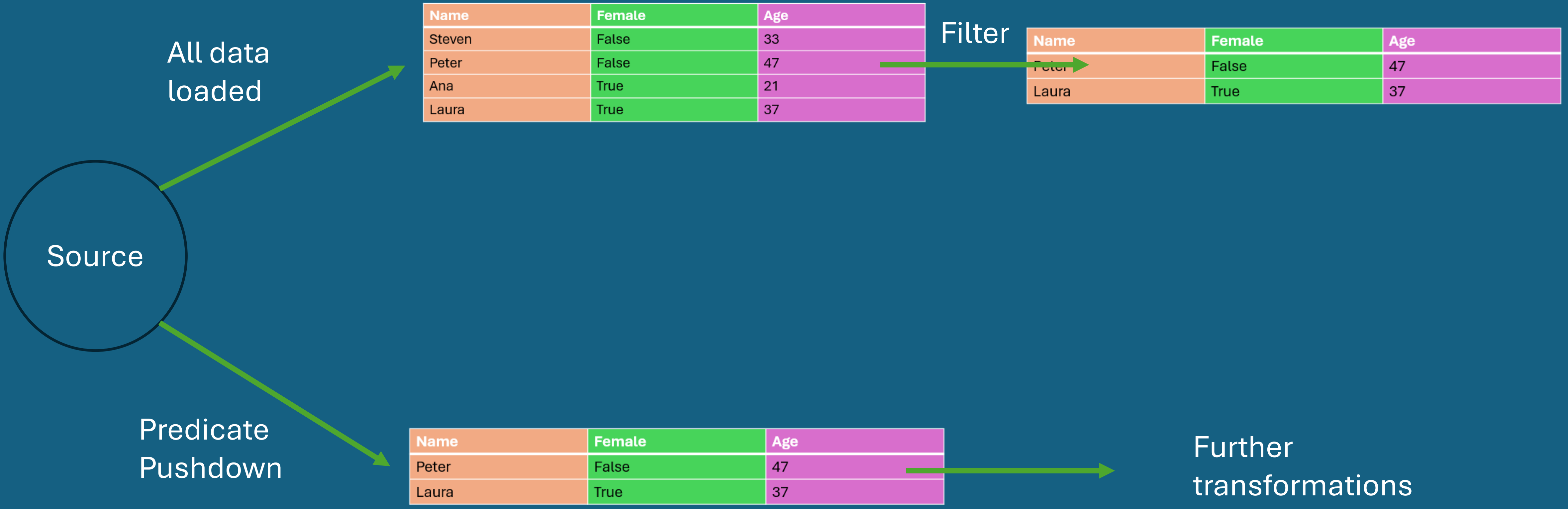


File
Magic Number (4 bytes): "PAR1"
Row group 0
Column a
Page 0
Page header (ThriftCompactProtocol)
Repetition levels
Definition levels
values
Page 1
Column b
Row group 1

Footer
FileMetaData (ThriftCompactProtocol)
- Version (of the format)
- Schema
- extra key/value pairs
Row group 0 meta data:
Column a meta data:
- type / path / encodings / codec
- num values
- offset of first data page
- offset of first index page
- compressed/uncompressed size
- extra key/value pairs
column "b" meta data
Row group 1 meta data
Footer length (4 bytes)
Magic Number (4 bytes): "PAR1"

Parquet format: Documentation | Parquet (apache.org)
Parquet Page Indexes: Speeding Up SELECT Queries with Parquet Page Indexes - Cloudera Blog

Predicate and Aggregate Pushdown



Source

All data loaded

Name	Female	Age
Steven	False	33
Peter	False	47
Ana	True	21
Laura	True	37

Filter

Name	Female	Age
Peter	False	47
Laura	True	37

Predicate Pushdown

Name	Female	Age
Peter	False	47
Laura	True	37

Further transformations

Predicate and Aggregate Pushdown

- **Predicate Pushdown is an optimization technique filtering data at the source and often relies on statistics**

- **Benefits:**
  - Less I/O meaning less data to load
  - Less memory usage
  - Faster queries

- **Parquet supports Predicate Pushdown using statistics saved in meta data footer**
- **Since Spark 3.1.0 also possible on Avro, CSV, JSON**
- **Parquet supports since Spark 3.3.0 also Pushed Aggregates**