

ClickHouse Database Administration

Day 1 - ClickHouse Database Fundamentals

Topics

- ClickHouse overview and use cases
- OLTP vs OLAP
- Column-oriented database concepts
- ClickHouse architecture overview
- ClickHouse Server and Client
- Databases and tables
- System database introduction
- Basic SQL in ClickHouse

Day 2 - Data Types and Schema Design

Topics

- Integer and floating-point data types
- Decimal
- String and FixedString
- Date and DateTime
- Nullable
- Array, Tuple and Map
- LowCardinality introduction
- Choosing efficient data types
- Basic schema-design considerations

Day 3 - Table Engines and MergeTree

Topics

- Table engine concepts
- MergeTree overview
- ReplacingMergeTree
- SummingMergeTree
- AggregatingMergeTree overview
- Data parts and background merges
- Choosing an appropriate table engine
- Compare behavior of different MergeTree engines

Day 4 - Sorting Keys, Primary Keys and Partitioning

Topics

- ORDER BY and sorting keys
- Primary-key concepts
- Sparse primary indexes

- Granules
- PARTITION BY
- Partition pruning
- Choosing sorting and partition keys
- Avoiding excessive partitioning

Day 5 - Data Loading and Ingestion

Topics

- INSERT operations
- Batch loading
- CSV
- TSV
- JSON
- Parquet
- File-based ingestion
- Data validation
- Common import errors

Day 6 - Views and Materialized Views

Topics

- Standard views
- Materialized views
- Aggregation patterns
- Summary tables
- Transformation during ingestion
- Common analytical use cases

Day 7 - Updates, Deletes, Mutations and TTL

Topics

- UPDATE concepts
- DELETE concepts
- Mutations
- Monitoring mutations
- Lightweight delete overview
- TTL concepts
- Row TTL
- Data-retention policies
- Partition cleanup

Day 8 - Query Performance and Optimization

Topics

- Query execution overview
- EXPLAIN
- Query plans
- Primary-index usage
- Partition pruning
- Data skipping indexes
- LowCardinality
- Efficient filters
- Basic JOIN considerations
- Query-log analysis

Day 9 - PostgreSQL to ClickHouse Migration

Topics

- Migration use cases
- PostgreSQL vs ClickHouse architecture
- Source assessment
- Schema and data-type mapping
- Designing ClickHouse target tables
- Bulk migration
- Validation
- Row-count and aggregate comparison
- Basic incremental-load concepts
- Common migration issues

Day 10 - DBA Maintenance and Capstone

Topics

- Database health checks
- Table-size monitoring
- Parts and merges
- Mutation monitoring
- Query failures
- Routine DBA checklist
- Backup awareness
- Post-migration validation
- Basic troubleshooting workflow