

EuroStyle Fashion Database Systems

European Fashion Retail Database Solutions

EuroStyle Operational Database

ClickHouse-powered operational database containing customer, product, order, and store data for European fashion retail operations. High-performance columnar database optimized for analytical workloads and real-time reporting.

Document Version:	v2.1
Publication Date:	October 2025
Document Type:	Technical Specification & Integration Guide
Intended Audience:	System Integrators, IT Architects, Developers
Classification:	Confidential - Customer Use Only

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1. Executive Summary

The EuroStyle Operational Database is a high-performance ClickHouse columnar database designed for European fashion retail operations. It contains comprehensive customer, product, order, and store data optimized for analytical queries and real-time business intelligence. **Database Characteristics:**

- ClickHouse columnar storage engine for ultra-fast queries
- ReplacingMergeTree tables for efficient data versioning
- Multi-country data support (Netherlands, Germany, France, Belgium, Luxembourg)
- GDPR-compliant customer data structures
- Fashion-specific product attributes and hierarchies
- Real-time order processing and inventory tracking
- Comprehensive store performance metrics
- Optimized for both transactional and analytical workloads
- Advanced indexing and partitioning strategies

2. System Architecture Overview

The EuroStyle Operational Database is built on ClickHouse, a high-performance columnar database management system optimized for online analytical processing (OLAP). The database schema is designed for European fashion retail operations with advanced data structures and optimizations. **Technical Architecture:**

- Engine: ClickHouse 24.x+ with ReplacingMergeTree storage
- Storage: Columnar compression with advanced codecs
- Partitioning: Date-based partitioning for optimal performance
- Indexing: Primary keys optimized for common query patterns
- Data Types: Advanced ClickHouse types including Maps, Arrays, Enums
- Materialized Views: Real-time aggregations for reporting
- Replication: Multi-master replication for high availability

2.1 Core Data Entities

3. Database Schema Overview

The EuroStyle Operational Database contains four primary tables optimized for fashion retail analytics. All tables use ClickHouse's ReplacingMergeTree engine for efficient updates and data versioning. **Database:** eurostyle_operational **Connection Details:**

- Host: localhost (or your ClickHouse server)
 - Port: 8123 (HTTP) / 9000 (Native)
 - Database: eurostyle_operational
 - Engine: ClickHouse with ReplacingMergeTree tables
- Core Database Tables:**

Table Name	Primary Key	Description
customers	customer_id	Customer master data with GDPR compliance
products	product_id	Fashion product catalog with sustainability metrics

orders	order_id	Multi-channel order transactions and fulfillment
order_lines	order_line_id	Individual order line items with product details
stores	store_id	Physical store locations and performance data
campaigns	campaign_id	Marketing campaign definitions and tracking

4. SQL Query Examples

Access the EuroStyle Operational Database using standard ClickHouse SQL queries. The database is optimized for analytical workloads with fast aggregations and filtering. **Sample Queries:**

Customer Analysis:

```
SELECT country_code, COUNT(*) as customers, AVG(total_spent) as avg_spend
FROM customers WHERE customer_status = 'active'
GROUP BY country_code ORDER BY customers DESC;
```

Product Performance:

```
SELECT category_l1, category_l2, COUNT(*) as products,
AVG(sustainability_score) as avg_sustainability
FROM products WHERE is_active = true
GROUP BY category_l1, category_l2;
```

Order Trends:

```
SELECT toYYYYMM(order_date) as month, COUNT(*) as orders,
SUM(total_amount_eur) as revenue
FROM orders WHERE order_status IN ('delivered', 'shipped')
GROUP BY month ORDER BY month DESC;
```

5. Performance & Advanced Features

The EuroStyle Operational Database delivers exceptional performance with ClickHouse's advanced columnar storage and proprietary optimization algorithms. **Performance Benchmarks:**

- Query Response Time: < 100ms for 99% of analytical queries
 - Data Ingestion: 1M+ records per second sustained throughput
 - Concurrent Users: Supports 10,000+ simultaneous analytical sessions
 - Data Compression: 90%+ compression ratio with LZ4/ZSTD codecs
 - Storage Efficiency: Petabyte-scale capability on commodity hardware
 - Memory Usage: Optimized columnar processing with vectorized execution
 - Network I/O: Intelligent query distribution and result caching
 - Uptime: 99.9% availability with automatic failover capabilities
- Advanced Features:**
- Real-time materialized views with automatic refresh
 - Advanced partitioning strategies for time-series optimization
 - Distributed query execution across multiple shards
 - Built-in data quality monitoring and validation
 - Automated index optimization and statistics collection