Enterprise Data Architecture Blueprint for FashionMart

(Lambda-like Architecture)

1. Identification and definition of key architectural layers for FashionMart

1.1. List of all critical data sources.

Key data resources	Description
Point-of-sale (POS) systems	Capture in-store transactions, inventory, returns, customer purchases as a real-time streaming data.
Web-site databases	Store customer profiles, clickstream data, shopping cart activity, purchase history, transactional data.
Supplier database/APIs	Supplier catalogs, stock levels, order status, shipping updates
ERP/CRM systems	Loyalty program data, financial data, and operational data.
Logistics/IMS systems data	Transportation, warehouse management, delivery tracking, etc
Third Party feeds	Marketing platforms, social media engagement, campaign data

1.2. Definition of practical applications for the data

Critical use cases	Description
Inventory forecasting	Predict future stock needs based on sales trends and seasonality
Demand and supply matching / S&OP Planning	Align supply chain with predicted demand to optimize stock levels
Transportation optimization	Optimize routes, delivery schedules, and reduce logistics costs
Supplier performance analysis	Track supplier reliability, lead times, and quality metrics
Customer Analytics	Track customer behavior, lifetime value, retention, segmentation
Recommender Systems	Personalized product recommendations for in-store (eg. on the tickets) and online shoppers (as a website feature).
Financial Analysis	Revenue, profit margins, operational cost reporting

1.3. Outline of data compliance standards and regulations.

Data compliance requirements	Tasks
GDPR (compliant)	- Apply if the company handles the - personal data of EU citizens - Ensure data minimization, lawful processing, and user consent - Provide mechanisms for data access, rectification, and deletion

California Consumer Privacy Act (CCPA)	- Protects data privacy of California residents - Enables users to opt out of data sales and request data access or deletion
Environmental, Social, and Governance (ESG) Regulations	- Monitor and report sustainability data in supply chain operations
ISO 27001	- Implements an Information Security Management System (ISMS) to protect sensitive data
PCI DSS (Payment Card Industry Data Security Standard)	- Build and Maintain a Secure Network - Protect Cardholder Data from unauthorized access, mask and encrypt at rest and in transit. - Maintain a Vulnerability Management Program through - Implement Strong Access Control Measures - Regularly Monitor and Test Networks - Maintain and update Information Security Policies regularly
Other local laws that apply if the customer base extends to those geographic regions.	- Brazil LGPD, UK Data Protection Act, etc.
Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH chemicals)	- Ensure that all sourced products comply, especially if imported from non-EU countries. - Require laboratory testing of fabrics and accessories, as needed, to confirm compliance.

2. Identification and definition of the core components of the data architecture

2.1. Data sources: identification and categorization.

Data source type	Examples
Internal	ERP/CRM systems, WMS/TMS, POS systems, Online Store data, Order Management System
External	SupplierDB/ APIs, Payment gateways, Social Media platforms APIs, Logistics service providers.

2.2. Data ingestion: determine methods.

Ingestion method	Description	Examples	Tools
Batch ingestion	Processes data at scheduled intervals. Micro-batch processing may apply to data warehouse reporting, campaign analysis, model training etc.	Daily supplier reports, historical customer purchase records, campaign effectiveness reports, quarterly supply chain cost analysis.	Apache Nifi, SSIS, Talend, Python scripts etc.

File-based ingestion	Upload or transfer structured files periodically	Legacy and partner systems data, bulk data transfer, warehouse data loading.	FTP/SFTP, Bash ETL scripts
Semi-automated/manual ingestion	Manual entry or low-frequency data capture for legacy systems	Manual customer surveys, in-store adjustments, offline promotional data.	Excel imports, Google Sheets integrations, custom scripts, data entry
API ingestion (limited)	Pull data from external partners or systems	Supplier inventory APIs, loyalty program integrations, online store orders	REST APIs, Mulesoft, Postman, Python scripts
Real-time ingestion (selective)	Near-real-time updates through streaming where needed	Online store transactions, real-time stock updates etc.	Kafka, Spark Structured Streaming

2.3. Data storage: define the data storage types.

Storage type	Purpose	Examples
Data Warehouses	Stores structured, analytical data	On-prem SQL Server, Amazon Redshift etc.
Databases	Stores structures and semi-structured data, on-premise.	Storage system for managing product data of POS systems and website data.
Data Lake (cloud storage)	Cost-effective and scalable cloud storage that serves as a staging area or central repository for ingested data.	Amazon s3 buckets, MongoDB etc.

2.4. Data processing: define methods.

Processing method	Description	Examples
ETL/ELT pipelines	Enable streaming and batch processing and transform raw data for further analysis.	Spark and dbt, Talend, Kafka, or Python scripts
Manual export/import	Move data from one system to another manually	External Disks Storage

2.5. Analytics: Identify and report the business intelligence capabilities.

Analytics type	Description	Examples/Use cases	Tools
Descriptive Analytics	Explore, analyze and summarize historical data for reporting	Customer and product segmentation, dashboarding, data analysis and visualization.	Power BI or Tableau dashboards
Predictive analytics	Forecast future trends using statistical models	Demand forecasting, supplier lead time prediction, calculate	Google Analytics and PowerBI, CRM

		LTV, churn prediction, Personalized marketing, loyalty program optimization	analytics tools, Python, R etc.
Prescriptive Analytics	Recommend actions based on data	inventory replenishment strategies, transportation optimization, procurement strategy	Pyomo, R, Excel

2.6. Data governance: define governance tasks.

Governance task	Description	Examples/Tools
Data ownership & stewardship	Define roles and responsibilities for data management	Alation, SAP master Data Governance
Access policies	Establish guidelines for who can access the data at rest and in transit.	RBAC, encryption and Microsoft Active Directory, physical access control
Compliance & audit	Ensure data usage complies with regulations and maintain audit trails	EDPB website auditing tool, internal and external periodic audits.
Governance & lineage	Use tools to track data flow and ensure data integrity	Oracle Enterprise Data Management

Appendix

FashionMart EDA Blueprint Diagram