1. Data Domains

- **Sales Data (ERP/CRM)** – Orders, Subscriptions, Revenue
- **Customer Data (CRM)** – Profiles, Segments, Support
- **IoT Device Data (Telemetry)** – Usage, Health, Errors

---

2. Bronze Layer (Raw Landing Zone)

💡 Store as-is, no transformations.

Tables / Files

- **bronze_sales_orders**
  - order_id (string)
  - customer_id (string)
  - product_id (string)
  - order_date (timestamp)
  - amount (decimal)
  - currency (string)
  - payment_status (string)
- **bronze_customers**
  - customer_id (string)
  - first_name (string)
  - last_name (string)
  - email (string)
  - region (string)
  - subscription_tier (string)
  - signup_date (timestamp)
- **bronze_devices**
  - device_id (string)

    - customer_id (string)
    - product_id (string)
    - purchase_date (timestamp)
- **bronze_device_events (IoT stream)**
    - event_id (string)
    - device_id (string)
    - event_time (timestamp)
    - temperature (double)
    - battery_level (int %)
    - error_code (string, nullable)
    - usage_hours (double)

---

3. Silver Layer (Cleaned & Standardized)

💡 Apply data quality rules: deduplication, standard formats, basic joins.

Tables

- **silver_sales_orders**
    - Standardized currency (USD).
    - Remove duplicates.
- **silver_customers**
    - Clean emails, unify region codes.
- **silver_devices**
    - One record per device (deduped).
- **silver_device_events**
    - Filter out corrupted sensor readings.
    - Replace null error_code with "NONE".
    - Convert battery % to integer 0–100.

---

4. Gold Layer (Analytics-Ready / Star Schema)

💡 Ready for Power BI + APIs.

Dimensions

- **dim_customer**
    - customer_id
    - name
    - email
    - region
    - subscription_tier
    - signup_date
    - lifetime_value (calculated: total sales per customer)
- **dim_product**
    - product_id
    - product_name
    - category
    - price
- **dim_device**
    - device_id
    - customer_id
    - product_id
    - purchase_date
    - last_event_time
    - status (derived: “Healthy”, “Needs Service”, “Offline”)

Facts

- **fact_sales**

    - order_id
    - customer_id
    - product_id
    - order_date
    - amount_usd
    - payment_status
- **fact_device_usage**
    - device_id
    - event_time
    - usage_hours
    - battery_level
    - error_code

---

5. Example KPIs (Power BI Dashboards)

- **Customer 360 Dashboard**
    - Total Sales by Customer & Region
    - Active Devices per Customer
    - Churn Risk → Customers with failing devices + low usage
- **Device Health Dashboard**
    - Device uptime (avg usage hours / day)
    - Battery health distribution
    - Top 10 error codes & affected customers
- **Revenue vs Device Health Dashboard**
    - Sales trends correlated with device errors
    - Renewal rate by subscription tier vs device status

---

6. API Endpoints (C# / .NET)

- GET /api/customers/{id} → returns profile + aggregated sales + device health summary
- GET /api/sales/daily?region={region} → daily sales aggregates
- GET /api/devices/{id}/status → latest device telemetry & derived health
- GET /api/devices/alerts → list of customers/devices needing support

---

7. Example Flow

1. CSV/JSON Sales & Customer data land in **Bronze (Blob Storage)**.
2. IoT events stream into **Bronze (IoT Hub → Databricks stream)**.
3. Databricks ETL jobs clean & enrich data into **Silver**.
4. Aggregations & star schema created in **Gold**.
5. **Power BI** connects to Gold layer.
6. **C# API** reads Gold tables and serves curated datasets.