**1. Data Ingestion**

* **Input sources**:
  + ERP systems (SAP, Oracle, Dynamics 365)
  + Vendor emails (PDF, Excel, JSON)
  + EDI (Electronic Data Interchange) feeds
* **Ingestion method**:
  + Databricks **Auto Loader** for streaming & batch ingestion from Azure Data Lake / Blob Storage.
  + APIs for ERP integration (REST/ODBC connectors).

**2. Data Processing & Standardization**

* **ETL on Databricks (Spark)**:
  + Extract vendor details, PO number, line items, amounts, delivery dates.
  + Standardize multiple formats into **Delta Lake unified schema**.
  + Use **Databricks APIs** for programmatic ingestion, schema evolution, and Delta transactions.

**3. Data Validation & Enrichment**

* **Business rules validation**:
  + Duplicate PO detection
  + Vendor master cross-check (Azure SQL, Cosmos DB)
  + Budget compliance & approval checks
* **Enrichment**:
  + Currency conversion (via FX API)
  + Delivery timelines (via logistics API)
  + Risk score for vendor (AI/ML model hosted in Databricks MLflow)

**4. ML-driven Fraud & Anomaly Detection**

* Train anomaly detection models in Databricks (Isolation Forest, Autoencoder, etc.).
* Detect:
  + Abnormally high PO values
  + Unauthorized vendors
  + Unusual frequency of PO requests
* **API endpoint (Databricks Model Serving / MLflow)** → real-time fraud scoring.

**5. Automated Approval Workflow**

* Validated POs are sent via **Databricks Jobs API** to approval pipeline.
* Integration with:
  + **Power Automate / ServiceNow / SAP APIs** for workflow routing.
* Smart routing:
  + Auto-approve low-risk POs
  + Escalate high-value POs to senior management

**6. PO Execution & Tracking**

* Approved POs pushed back to ERP through **REST/Graph APIs**.
* Track delivery, invoice, and payment status with streaming updates in Databricks.

**7. Analytics & Dashboards**

* Store PO lifecycle events in **Delta Lakehouse**.
* Expose datasets via **Databricks SQL APIs**.
* Build dashboards in **Power BI/Tableau** for:
  + Vendor performance
  + Spend analysis
  + Compliance reporting

**8. Governance & Compliance**

* **Databricks Unity Catalog** for fine-grained access control.
* **Lineage tracking** for audit compliance (SOX, ISO, HIPAA if in healthcare).
* **Key Vault + ADLS encryption** for secure storage of sensitive PO data.