# Measuring the Pulse of Prosperity

## Economic Freedom Index – Solution Architecture

## 1. Objective

Build a scalable analytics platform to aggregate global economic indicators, compute an Economic Freedom Index, analyze correlations with prosperity metrics, and provide dashboards and APIs for policymakers and researchers.

## 2. Core Architecture Components

- Data Sources: World Bank, IMF, Heritage Foundation, UNDP, OECD, Transparency International
- Data Ingestion Layer: Python ETL, Airflow scheduling, API connectors
- Data Lake: Cloud storage (AWS S3 / Azure Blob / GCS)
- Data Processing: Pandas, PySpark, dbt transformations
- Index Calculation Engine: Normalization, weighting, composite scoring
- Analytical Engine: Correlation, regression, forecasting models
- Data Warehouse: Snowflake / BigQuery / PostgreSQL
- Visualization: Power BI / Tableau / Streamlit dashboards
- API Layer: REST endpoints for country, ranking, trend, simulation

## 3. Solution Architecture Flow Chart

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| External Data Sources |
| ↓ |
| Data Ingestion Layer (ETL & APIs) |
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| Raw Data Storage (Data Lake) |
| ↓ |
| Data Processing & Transformation |
| ↓ |
| Economic Freedom Index Engine |
| ↓ |
| Analytical & ML Models |

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| ↓ |
| Data Warehouse |
| ↓ |
| Visualization & Reporting Dashboards |
| ↓ |
| Public / Research API Access |

## 4. Index Calculation Methodology

Step 1: Normalize indicators using Min-Max scaling. Step 2: Apply weights (equal, PCA-based, or expert-driven). Step 3: Compute composite Economic Freedom Index as weighted sum of indicators.

## 5. Deployment Architecture (Cloud Example)

S3 → Glue ETL → Redshift Warehouse → SageMaker ML → QuickSight Dashboards → API Gateway