Stock Market Price Analysis

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I. Executive Summary

As cyber threats grow more sophisticated and pervasive, the business landscape is witnessing an increase in the frequency and severity of data breaches. These security incidents not only jeopardize customer trust and corporate reputation but also invite regulatory scrutiny and financial repercussions. This software project delves into the financial implications of data breaches on publicly traded companies by rigorously analyzing stock market data before and after the public disclosure of data breaches. In an era where digital information is a critical asset, cybersecurity breaches can trigger significant volatility in a company's stock price, affecting its market valuation and investor confidence.

Objectives

- To Quantify the Stock Market Reaction to data breach disclosures across different industries.
- To Identify Patterns in stock performance following breaches, determining factors that may mitigate or exacerbate market reactions.
- To Provide Insightful Data to stakeholders on potential long-term financial risks associated with data breaches.

Data and Methodology

- **Data Collection:** Utilizes a structured database comprising details from publicly disclosed data breaches, company information, and corresponding stock market performance, supplemented by market indices like the Dow Jones Industrial Average for context.
- **Analytical Techniques:** Applies statistical analysis methods, including event study methodology, to assess the impact of data breaches. This involves comparing stock performance against market benchmarks to isolate the effects of breach announcements.

Key Components

- **Database Design:** A robust relational database capturing essential data points such as company details, breach specifics, and daily stock metrics.
- **Data Processing and Analysis:** Scripts and processes developed to cleanse, transform, and analyze the data effectively, using Python and SQL.
- **Visualization and Reporting:** Interactive dashboards and detailed reports that visualize the trends and provide actionable insights

II. Architecture Description

IV. Database Design

3.1 Table Documentation

company_info

Purpose: Stores essential information about companies, including identifiers, names, and locations, necessary for linking with stock and breach data.

data_breach_disclosures

Purpose: Records detailed information about data breaches that companies have experienced, including the dates of these breaches and their impacts.

dow_jones

Purpose: Contains daily market data for the Dow Jones Industrial Average, used to provide context for the stock market performance on dates surrounding data breaches.

stock_data

Purpose: Stores daily stock price information for the companies, including open, high, low, and close prices, which is crucial for analyzing the financial impact of data breaches.

3.2 Entity-Relationship Diagram (ERD)

The ERD visually represents the entities in the database and their relationships. Here's a high-level overview of the entities (tables) and their key relationships:

Entities (Tables):

- **company_info**
- **data_breach_disclosures**
- **dow_jones**
- **stock_data**

Relationships:

- **company_info** to **data_breach_disclosures**: One-to-Many (One company can have multiple data breaches).
- **company_info** to **stock_data**: One-to-Many (One company has multiple stock data entries).

3.3 Contextual Integration

This model allows you to integrate data from various sources:

- **Company Data**: Basic information and stock performance over time.
- **Breach Data**: Specific incidents of data breaches and their characteristics.
- **Market Data**: Overall market performance indicators from the Dow Jones index.

3.4 Usage Scenarios

Impact Analysis:

Correlate **data_breach_disclosures** with **stock_data** to evaluate stock price impacts before and after breach dates.

Market Comparison:

Use **dow_jones** data to compare general market behavior against company-specific stock performance on and around the dates of data breaches.

Historical Performance Analysis:

Analyze long-term stock performance trends from **stock_data** in relation to company health and breach impacts revealed in **data_breach_disclosures**.

V. Testing Documentation