

# Homomorphic Encryption Overview Page

## Introduction to Homomorphic Encryption

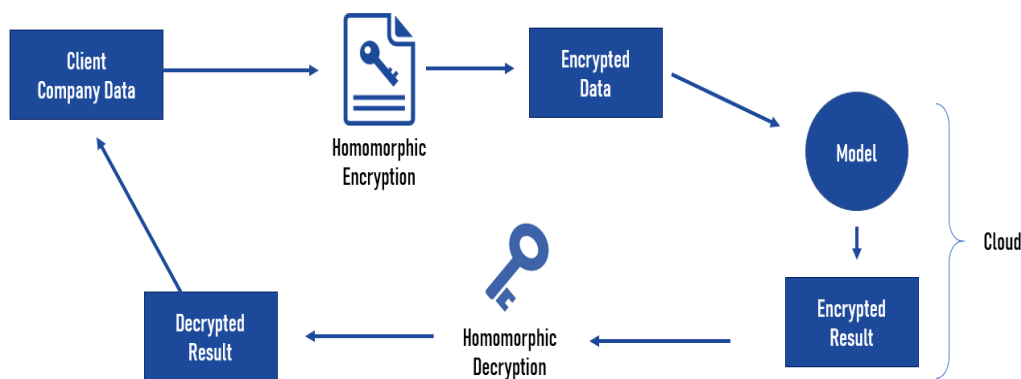
Welcome to the Homomorphic Encryption Overview Page. Here, you'll learn what Homomorphic Encryption (HE) is, how it works, and why it's essential for the financial sector. Discover how HE protects sensitive data while enabling secure analysis and see why leading companies are adopting this technology to enhance privacy and compliance.

## What is Homomorphic Encryption (HE)?

Homomorphic Encryption (HE) allows computations to be performed on encrypted data without the need to decrypt it first. The results are the same as if the operations were performed on raw data.

HE is essential in finance, where privacy and data security are critical, as it enables institutions to securely analyse sensitive data without exposing it.

### How Encryption Works Diagram



This visual explains how encrypted data flows through the system, remaining secure throughout the process.

## How Homomorphic Encryption Works

Homomorphic Encryption ensures data remains encrypted throughout the entire process.

Here's how it works:

- **Step 1:** Data is encrypted locally (on a device or server).
- **Step 2:** The encrypted data is sent to a server or cloud for processing.
- **Step 3:** Operations are performed directly on the encrypted data, without ever decrypting it.
- **Step 4:** The encrypted result is sent back and decrypted to reveal the outcome.

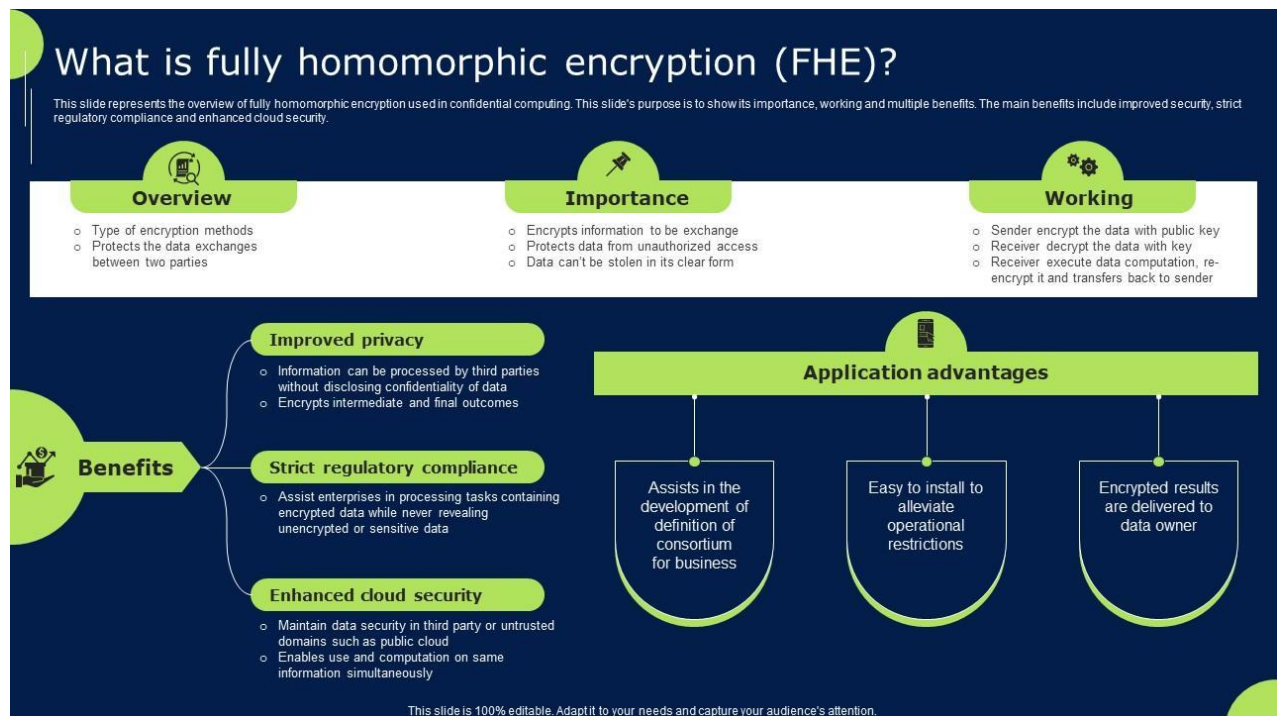
This workflow guarantees that sensitive data stays private throughout the entire process, making it ideal for finance, where security is paramount.

## Benefits of Homomorphic Encryption in Financial Services

HE offers several key advantages for financial institutions:

1. **Enhanced Data Privacy:** Sensitive data remains encrypted, minimizing the risk of breaches.
2. **Regulatory Compliance:** Helps meet strict data privacy laws by ensuring data stays protected.
3. **Secure Outsourcing:** Enables financial institutions to securely outsource data processing without sharing raw data.
4. **Fraud Detection & Risk Management:** HE allows secure analysis of financial data to detect fraud and manage risks effectively.

### HE Advantages Infographic

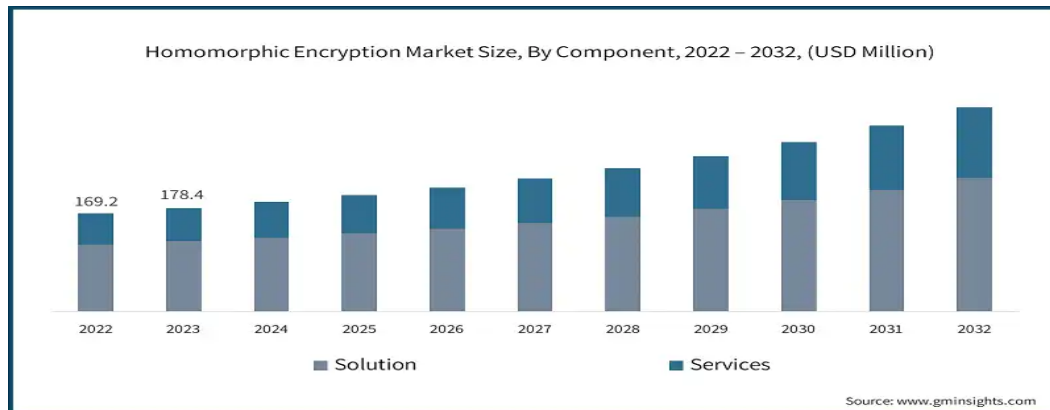


This visual highlight key benefits of Homomorphic Encryption, such as improved privacy, compliance with regulations, and enhanced cloud security.

## Market Trends and Adoption of Homomorphic Encryption

As privacy concerns grow, financial institutions are increasingly adopting HE to ensure secure data processing. The market for HE is rapidly expanding, driven by advancements in encryption technology and the need for compliance with data privacy laws.

**Homomorphic Encryption Market Size Bar Graph**



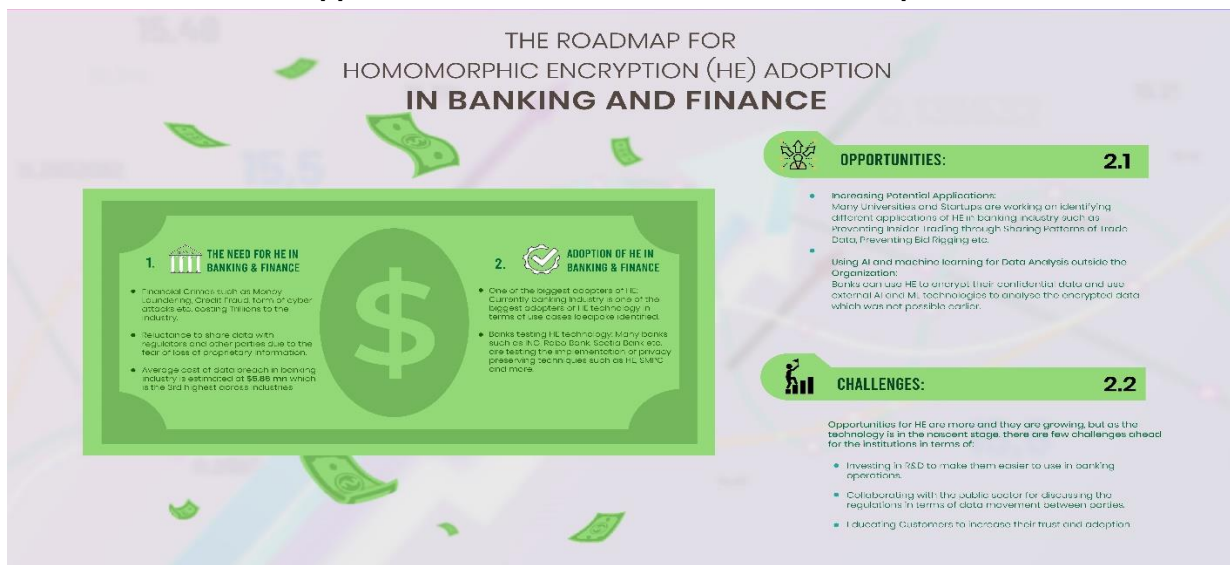
This visual shows the projected growth of HE in the financial sector, reflecting its rising significance.

## Real-World Applications of Homomorphic Encryption in Finance

HE is making a significant impact in the financial sector by enabling secure operations on sensitive data. Here are some key applications:

- **Credit Card Fraud Detection:** Allows financial institutions to analyse transactions for fraud without exposing personal data.
- **Secure Data Sharing:** HE enables encrypted data to be shared between institutions, ensuring privacy.
- **Risk Management:** Institutions can securely assess financial risks using encrypted datasets.

## Applications of HE in Finance Sector Roadmap

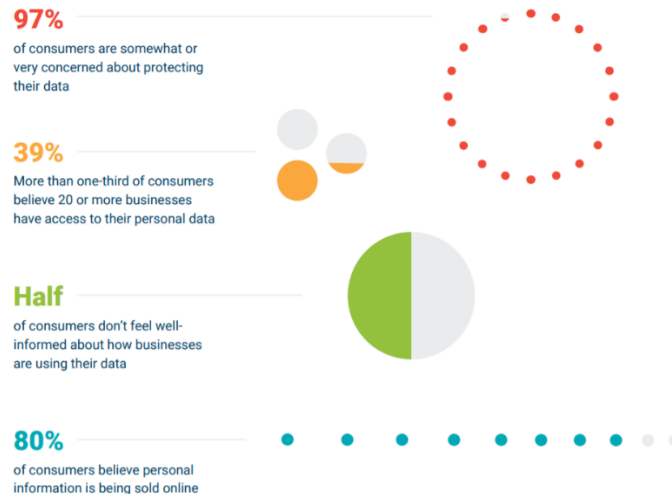


This roadmap provides insights into HE's role in fighting financial crimes and how financial institutions are adopting it.

## Consumer Trust and Data Privacy

Data privacy is a growing concern among consumers, with most people expecting companies to safeguard their information. HE meets this expectation by processing encrypted data, helping businesses maintain trust while complying with privacy regulations.

### Consumer concerns about data Privacy Infographic



This graphic highlights the growing importance of data privacy for consumers, reinforcing the need for privacy-preserving technologies like HE.

### Companies Adopting Homomorphic Encryption

Leading companies such as Microsoft, Google, IBM, and major banks are adopting HE to enhance data security. These organizations use HE to secure sensitive information while complying with regulatory requirements.

### Companies That Use Homomorphic Encryption



This visual shows major companies in finance and tech that have implemented HE to protect their data.

### Industry Attention on HE and FL

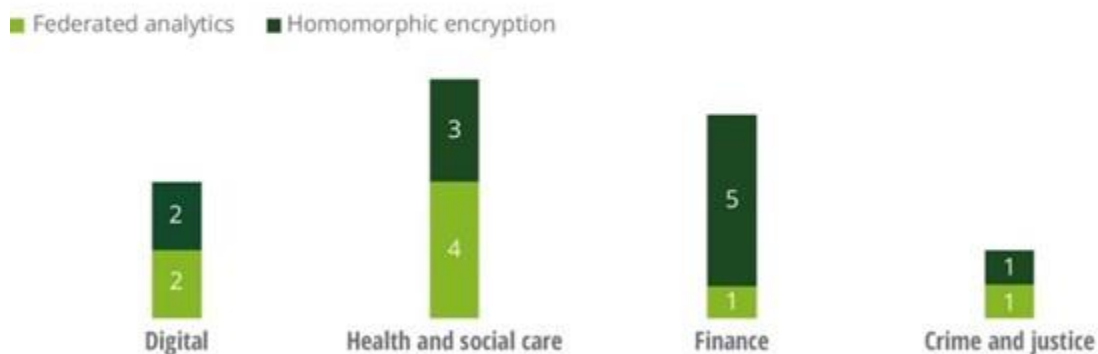
The finance sector leads in adopting privacy-preserving technologies like Homomorphic Encryption (HE) and Federated Learning (FL). The attention on these technologies in finance is due to their ability to secure sensitive financial data while ensuring compliance with privacy laws.

#### HE and FL Attention Based on Industry

FIGURE 1

#### HE and FL are attracting attention from some of the world's largest companies and industries

Distribution by sector of publicly announced pilots, products, and proofs of concept for homomorphic encryption and federated analytics



Source: Deloitte analysis of data from the Centre for Data Ethics and Innovation's "Repository of use cases," accessed September 30, 2021.

Deloitte Insights | [deloitte.com/insights](https://deloitte.com/insights)

This visual demonstrates how finance is leading the adoption of HE and FL compared to other industries.

### Summary

Homomorphic Encryption (HE) provides financial institutions with a powerful tool to secure data while performing meaningful analysis. As privacy concerns grow and regulatory frameworks become more demanding, HE offers a solution that ensures compliance, privacy, and trust in financial services.