# Cloud meets Security - Public Cloud Use Without Risks

1 Short Version

Fully Homomorphic Encryption (FHE) enables computations on quantum-secure encrypted data—without ever lifting the encryption! This means that, for example, machine learning analyses can now be securely performed in the competitive cloud. Cost-effective and risk-free.

2 The Public Cloud is Insecure

Current encryption techniques do not allow computations on encrypted data. Therefore, when using Software as a Service (SaaS) applications in the cloud, the data must be in plaintext in the cloud. This exposes unencrypted data to hackers!
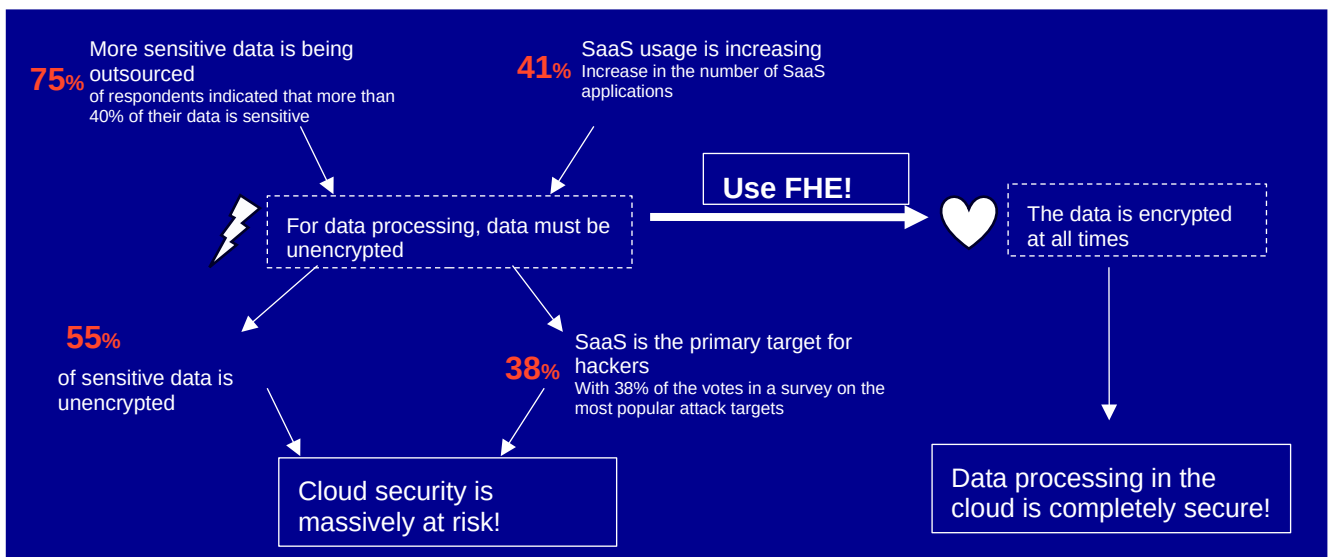
Fully Homomorphic Encryption introduces revolutionary applications for encrypted data in the public cloud with encryption at processing. Sensitive data no longer needs to be decrypted for computation in the cloud. Instead, data is transferred encrypted, processed encrypted, and returned encrypted. This ensures that the data is secure from attackers at all times.

4   How Will the Technology Develop in the Future?

Although Fully Homomorphic Encryption currently requires high computational power and storage, development is ongoing. Intensive research and continuous hardware improvements indicate promising progress in the future. FHE opens the door to diverse applications, including evaluating machine learning models on encrypted data in the cloud. This is becoming increasingly important as cloud providers compete fiercely to offer efficient and cost-effective solutions.

Future developments in Multi-Key FHE will enable secure data analyses between untrusted parties, facilitating cross-customer data analyses without exposing one customer's data to another.

5   How Can the Technology Be Used Today?

Data analyses using machine learning can now be outsourced to the cost-effective public cloud without privacy concerns. This allows users to leverage the extreme flexibility and scalability of the market while taking full advantage of the competitive pricing.

6   Our Website as the First Point of Contact

Feel free to visit our [Website](#) on this topic. There you will find lectures, code examples, and detailed studies.