Homomorphic Encryption

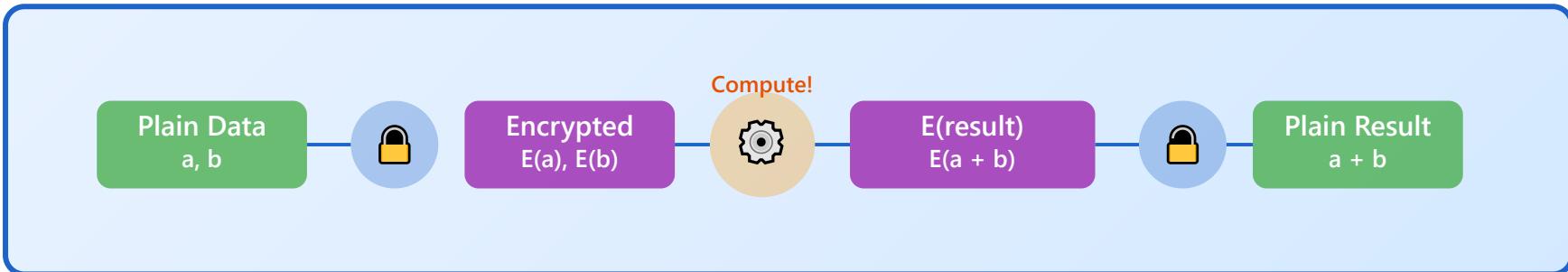| Plain Data
a, b | 🔒 | Encrypted
E(a), E(b) | Compute!
⚙️ | E(result)
E(a + b) | 🔒 | Plain Result
a + b |

How It Works

Mathematical Property:

E(3) + E(5) = E(8) $E(a) \oplus E(b) = E(a \oplus b)$

Operation on encrypted data = Encryption of operated data

Types

Partial HE	Somewhat HE	Fully HE ⭐
Only addition OR multiplication	Limited number of operations	Arbitrary computations

🔒 **Security** ⚖️ **Performance**⚡

100-1000x slowdown