Digital Transformation and Technology for Cross-border Data Sharing

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The Opportunity of Data Collaboration between China-EU

➢ **Digital economy continues to boom during Covid-19**

- 2019: digital economy global nominal growth at 5.4%(global GDP nominal growth at 2.3%) [1]
- With the pandemic, digital economy becomes *the new hope* for growth

➢ **With the new digital infrastructure, digital economy integrates much deeper into the traditional economy**

- Big data, AI and other info tech: serving traditional business -> redefining the business
- eCommerce, Sharing economy, Fintech, Smart cities, Smart health …

➢ **Everything becomes data-driven, and data become essential assets**

- Internet giants: user data as an entry barrier => data monopoly
- Allowing data sharing helps fight the digital superpowers, essential for both China and EU
- China: viewing data as a "factor of production"

➢ **Data accelerate international collaboration, even beyond digital economy**

- Cross border data flows contributes to economy growth.
- Sharing data is the foundation of sharing market and technology
- The key is how can we build an infrastructure allowing efficient and secure data integration

1、A New Vision of the Global Digital Economy (2020) from China Academy of Information and Communications Technology.

Challenges for Cross-border Data Sharing

- **The unique property of data makes it hard to share**
  - Seeing the data = being able to make a copy = can do anything = owning the data
  - Big concern on whether I should share the data – answer is often NO
- **Cross-border data sharing is even harder**
  - Each country has different data regulations – considering different dimensions
  - GDPR is a regulation that chooses personal privacy over economic growth
  - China – data security law, and personal information protection law
  - No hope to get a global consensus on what data is, leave along how to share them
- **Data regulations hurts SME the most**
  - Increases the compliance cost of cross-border business
  - Slowing down international trade
  - Large multi-nationals has their own technical and legal infrastructure to maneuver through the regulation, but difficult for SMEs
  - Especially challenging for none-IT industry in their digital transformation (GDPR fine is based on revenue)

We probably will never see legal "cross-border data sharing" of original raw data, but really, we only want to "**share specific application of data**" cross-border.

A Technology Solution for Cross-border Data Sharing

➢ **Multi-Party Computation (MPC) is an 40-year old cryptography technology, but revived on the data sharing demand and recent advancement on distributed system engineering**

- Enables computation directly on encrypted data, without decryption
- Data are never decrypted during the entire computation, except for the final results
- Order of magnitudes performance improvement over the past few years, making it real

Alice

Bob

Compute function f()
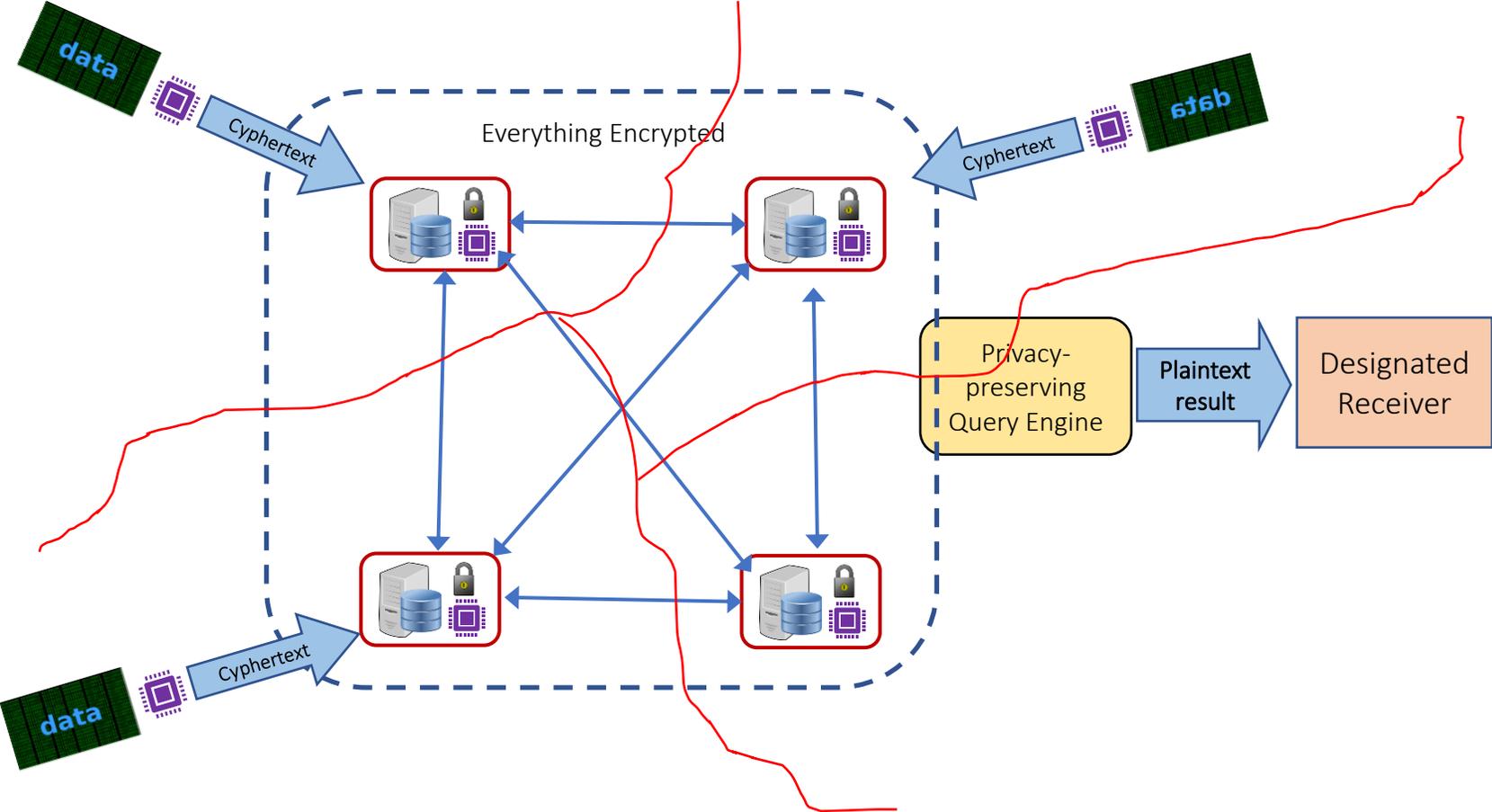
$$Z = f(x, y)$$
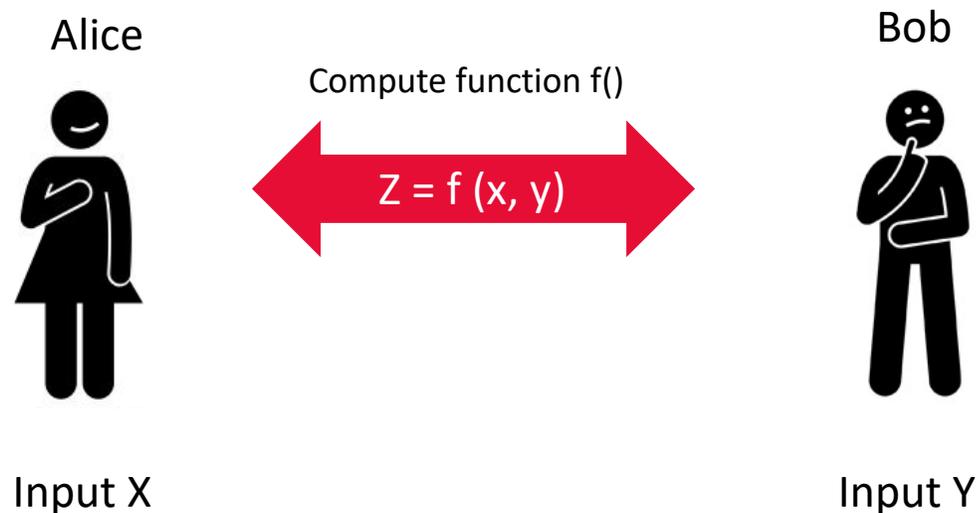
Input X

Input Y

<u>Key idea</u>
If we do not reveal the inputs to anyone else, including the data user, we do not risk leaking the data, and thus can maintain control over them.

Supports any kind of computation.

With MPC, we can achieve "using the data without seeing them", and thus controlling the how data is used.

Cross-border Data Sharing infrastructure using MPC

Everything Encrypted

Cyphertext

Cyphertext

Cyphertext

Privacy-preserving Query Engine

Plaintext result

Designated Receiver

Key ideas
- No plain text data cross the border
- No single country alone can decrypt / use the data without letting other countries know

Example Application Scenario: Cross Border Supply-chain Finance
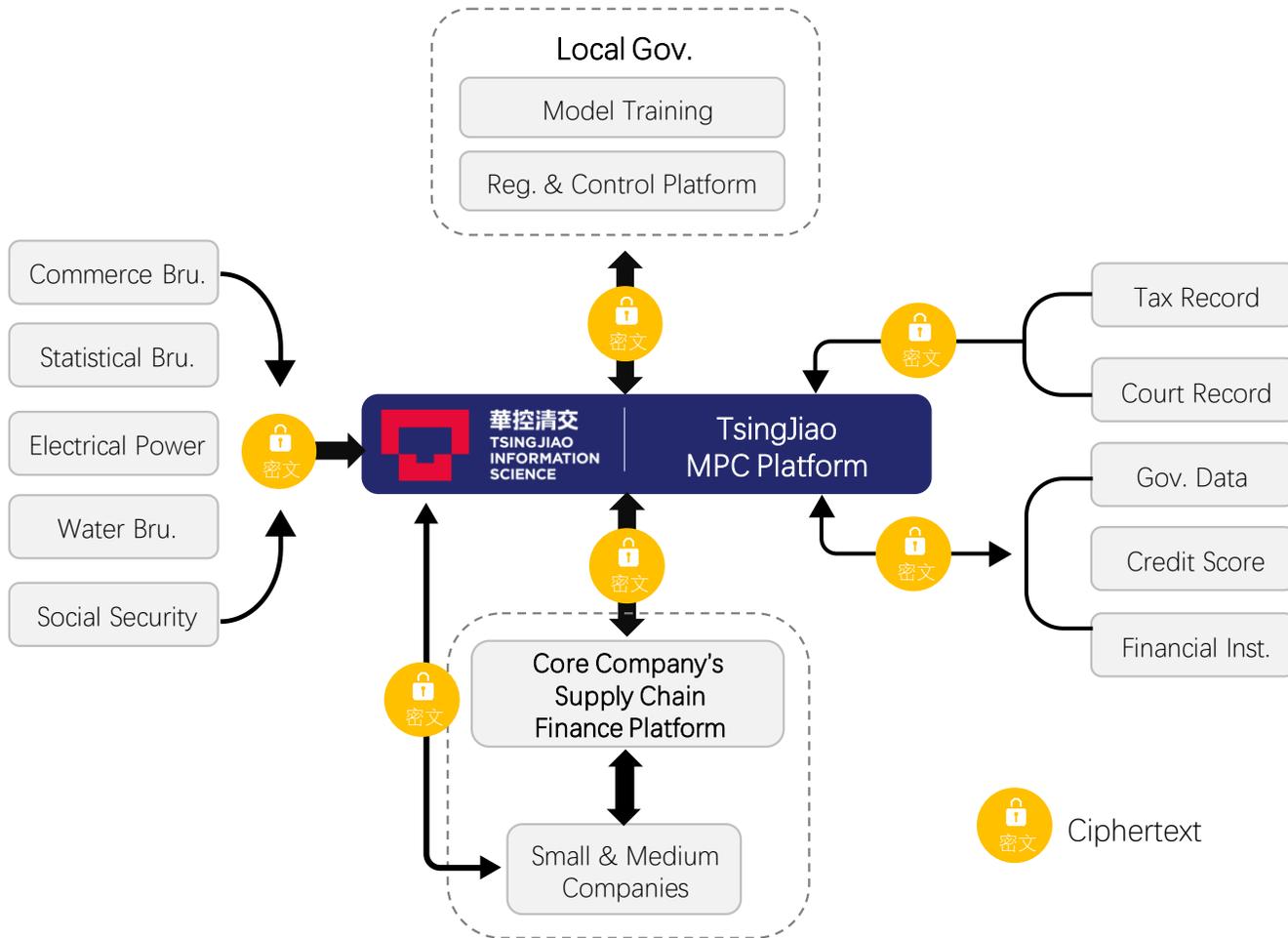
❑ Multi-national credit agencies and financial institutions can conduct risk assessments using their models without sending data across border;

❑ Stay compliant and expedite decision processes while safekeeping their proprietary models and references;

❑ Supply chain data centered around core companies is also channeled into the platform in ciphertext;

❑ All governments involved can monitor and regulate the relevant data and activities via ciphertext, but can not obtain unnecessary plaintext data.

Building a Technology-based Infrastructure for Cross-border Digital Collaboration

Accelerate China-EU Economy Collaboration

Secure and Compliant Cross-border Data Sharing

Serving Digital Transformation of Traditional Business

Cross-border Data Sharing Infrastructure

MPC enables Data protection

Smart Computation Contract

Blockchain for Transaction Processing

Computing Power

Data Communication Network

AI

Big Data

IoT