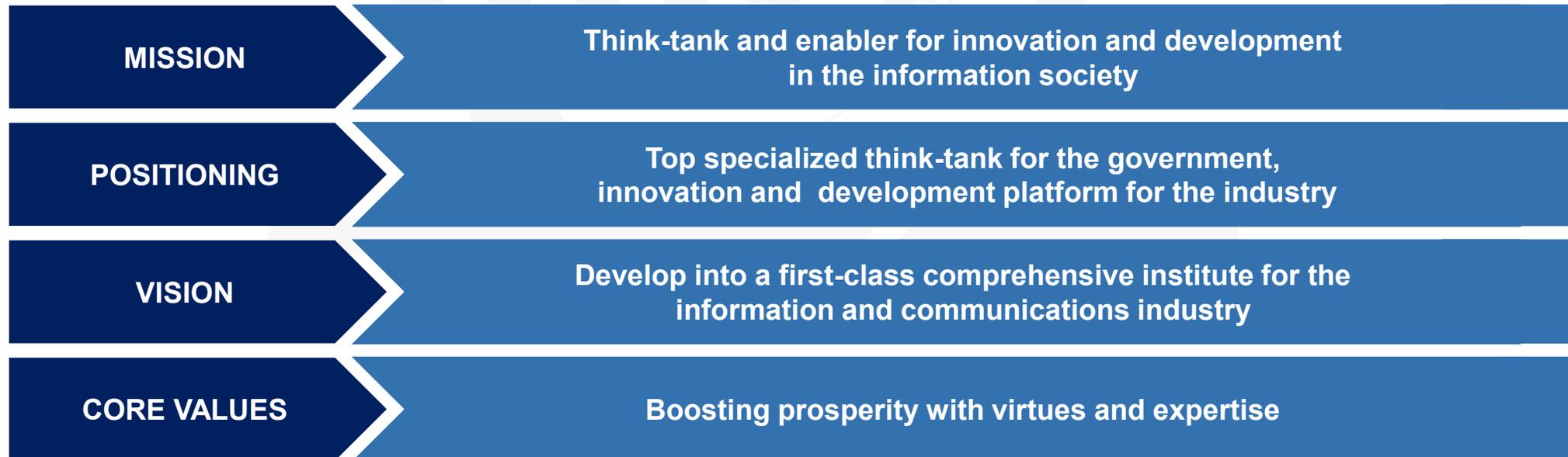
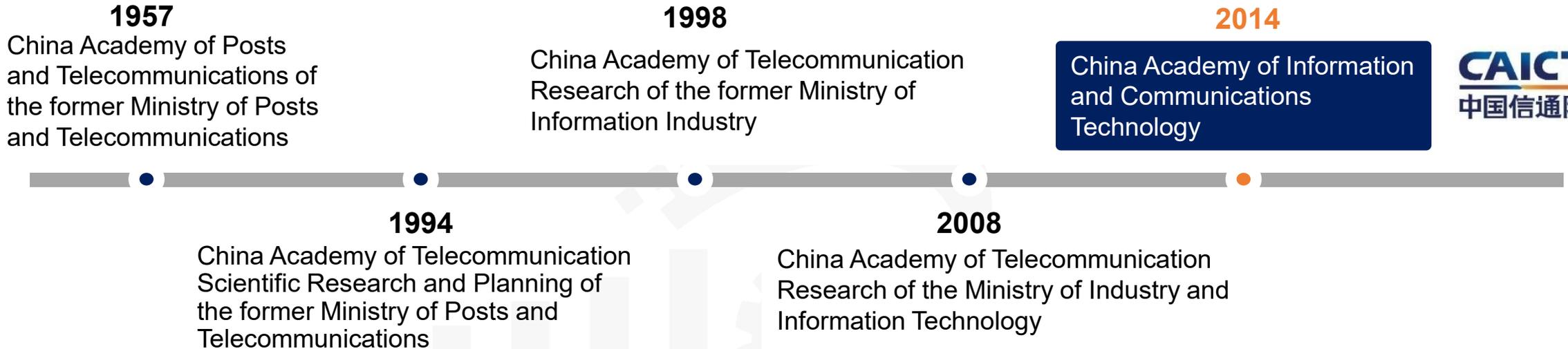


Digital Identity Development in China

Landscape, Cross-border Practices & Outlook

Xiaoyu You | China Academy of Information and Communications Technology(CAICT)

2026.3.30



- CAICT's R&D and business layout focus on the key, strategic and cutting-edge technical and frontier areas.
- **17** research institutes and business units, **3** Domestic Branches in Shenzhen, Shanghai Chongqing, and an overseas office in Seoul, Korea.





“On the Internet, nobody knows you're a dog”
—The New Yorker, July 5, 1993



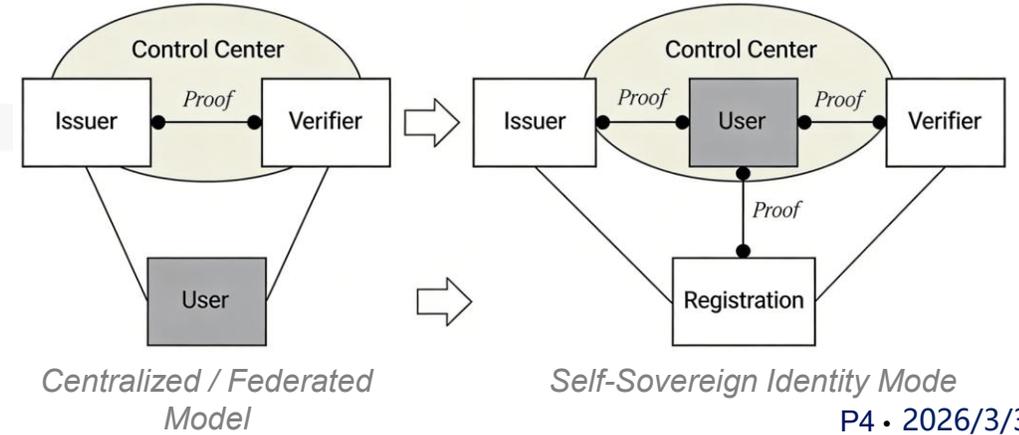
the TCP/IP protocol stack lacks an identity layer
The TCP/IP stack is designed for data transmission, routing and connectivity, where IP identifies host locations and domain names improve usability, but neither can identify or verify user identities.

If communicating parties cannot verify each other's identity, it will lead to various security issues.

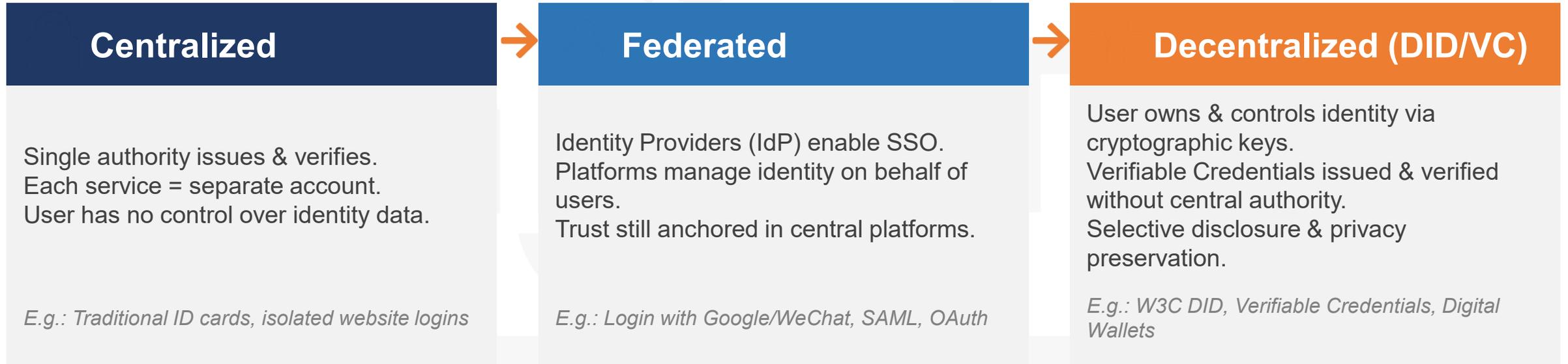
Requester untrustworthy; responder unable to verify.
fake IP

Responder untrustworthy; requester unable to verify.
Domain Hijacking

Addressing the Internet's lack of an identity layer — Self-Sovereign Identity (SSI)
represents a shift of control: identity authority must move from the Internet's centers, namely issuers and verifiers, to its edge — the users.



■ The Internet was built without an identity layer — TCP/IP handles addressing and connectivity, not identity verification. **Self-Sovereign Identity (SSI)** represents a paradigm shift: transferring identity control from centralized authorities to users, solving the trust deficit of the digital world.



The Trust Triangle: DID + Verifiable Credentials (VC)

Issuer → issues VC → **Holder** → presents VP → **Verifier**

Key Standards: W3C DID Core v1.0 (2022) | W3C VC Data Model | DIF Universal Resolver | ToIP Architecture V1.0 | 66+ global DID-related standards (IEEE, ISO, IETF)

Core Capabilities: Distributed verification | Decentralized key management | Selective disclosure | Zero-knowledge proof

Key Insight: Digitalization is at a high level. Trust paradigm remains fundamentally centralized. Most credentials rely on centralized trust anchors (MPS, MOHRSS, NHC, etc.).

Form Factor Evolution Timeline



Current Reality: Centralized Trust Model

- Massive credential digitization: ID, driver's license, social security, health card, disability card, veterans card — all available as mobile apps
- All rely on centralized trust anchors: Ministry of Public Security (MPS), MOHRSS, National Health Commission, etc.
- Unified platform: National Government Services Platform enables "one-stop" access, but authentication remains centralized
- 14+ billion credential issuances across all categories, covering all provinces

Emerging Exploration: Towards Decentralization

- DID/VC pilots in early stage — cross-border driver's license recognition, eBL verification
- DPKI design: building decentralized PKI on top of existing national PKI infrastructure
- SSI book Chinese translation completed — spreading decentralized identity concepts domestically. DIDA and DIF China SIG are organized.
- Growing government attention: policy signals for decentralized identity as strategic direction

■ China has digitized a wide spectrum of person identity credentials, moving from "one card per service" to "**multi-credential convergence on a single device**". Core credentials include:

Citizen ID — CTID / eID



- CTID: **680 million users**. Online functional credential of Resident ID Card, issued by MPS.
- eID: Loaded onto secure chips (phone SE, SIM, financial IC cards).

Electronic Driver's License



- Valid for traffic law enforcement scenarios.
- Integrated into National Gov't Services Platform.

Electronic Social Security Card



- Multi-function: social security + healthcare + finance + transit.
- Biometric storage (fingerprint/face) for future verification.
- Electronic Social Security Card Available.

Electronic Health Card



- Cross-province, cross-hospital "one code for all" standard.
- Available via WeChat, Alipay — mobile-first design.

Disability Card (3rd Gen)



- The 3rd Generation Disability Card has multiple functions such as identity identification, business management, social services, and financial applications.
- Gradual digitalization.

Veterans Preferential Card



- Entitles the holder to various discounts and priorities, including transportation\cultural & tourism\medical services.
- Electronic version available.

Unified Portal: National Government Services Platform— "One-Stop" Access for All Credentials

Correlation Comparison

Use the "correlation comparison" method, transmitting personal information such as the "name + citizen ID number" entered by the user to the backend.

Privacy and Security

- Correct matching of personal information does not reflect the user's true intent, nor can it prevent the risk of identity impersonation or theft.
- It is prone to personal information leakage. Service providers of online applications vary greatly in their security capabilities, leading to a rising risk of large-scale personal data breaches.

Upgraded Privacy Protection

	CTID	eID
Crypto	Asymmetric	Asymmetric
Auth	CA + biometric	PKI + ZKP
Privacy	No behavior tracking	Anonymization
Carrier	IC chip + app	SE/SIM/IC card

*CTID is piloting on DID solution

CTID: Privacy Protection via Desensitization & De-identification.



eID: Privacy Protection via Secure Chip & AppIDCode Isolation



Emerging Trends

DPKI Exploration

Designing Decentralized PKI on top of existing national PKI infrastructure, leveraging SM-series algorithms as foundation

SSI ecosystem

- Chinese translation of the book <Self-Sovereign Identity>, completed by the CAICT.
- DIDA and DIF China SIG are organized.

Gov't Attention Rising

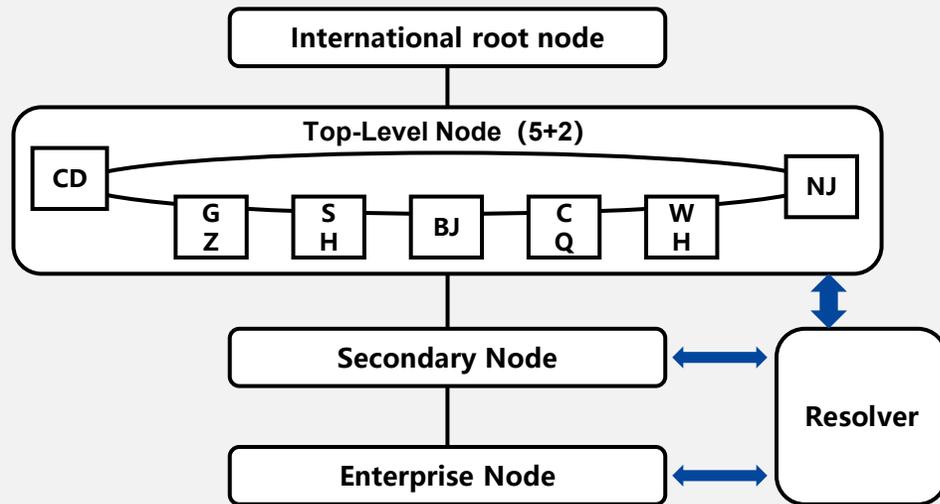
Increasing government recognition of decentralized identity as strategic direction; policy signals from MIIT, MPS, CAC

- China's digital identity ecosystem extends beyond persons to **things (IoT/industrial assets)** and **organizations (legal entities)**, forming a multi-dimensional identity framework spanning diverse objects, forms, and purposes.

Thing (IoT / Industrial)

Industrial Internet Identifier Resolution System

- 400 Secondary Node with over 500,000 enterprises connected with 70 billion unique identifiers issued.**
- Device identity & lifecycle management, Supply chain traceability, Smart manufacturing & quality control.



Guided by MIIT, built by CAICT as national infrastructure

Organization (Legal Entity)

Unified Social Credit Code System

(18-digit unique code for all legal entities)

Position	code	Description
1	x	Registration Authority
2	x	Organization Type
3~8	x	Administrative Division Code of Registration Authority
9~17	x	Subject Identifier
18	x	Check Digit

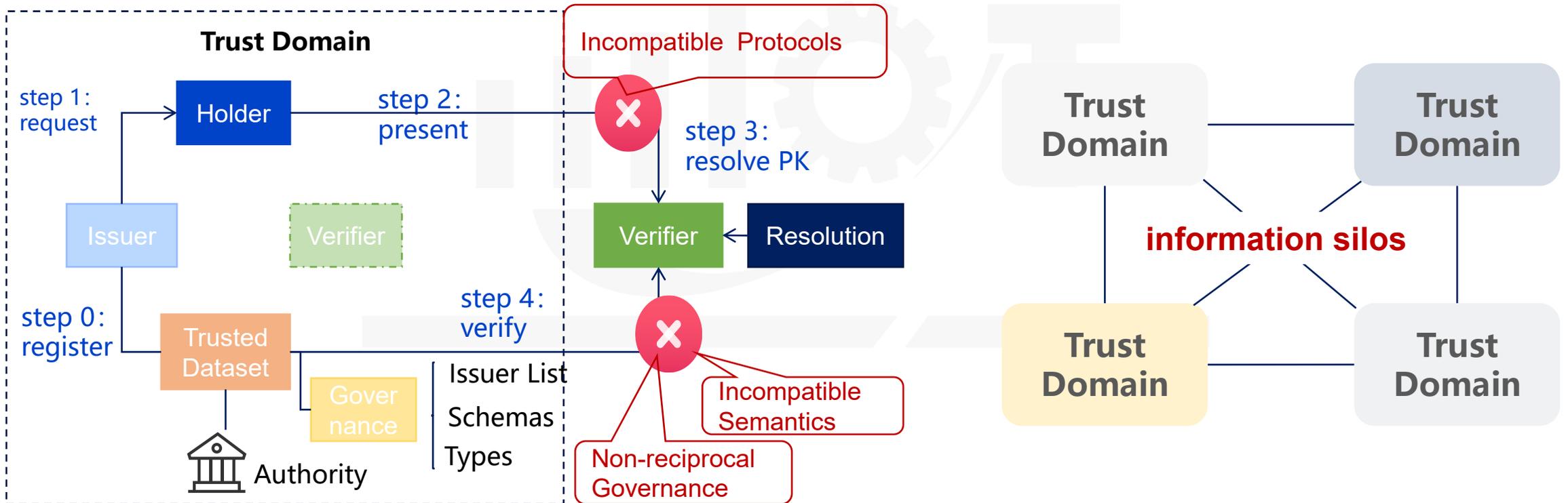


- Organizations: Use registration certificates with the Unified Social Credit Code (USCI) to verify identity and conduct business.
- Following <Measures for the Administration of Electronic Business Licenses (for Trial Implementation)>.
- The **dynamic QR code** is the primary and standard method for verifying an **Electronic Business License (EBL)**.
- LEI & vLEI system is also developing very fast in China for international business.

Core Argument: The true value of digital identity is realized only through **cross-border interoperability**. Today's global landscape is fragmented — countries build isolated "islands" of DID platforms with no interconnection. A **cross-border trust ecosystem** is urgently needed.

How credentials issued in one digital trust ecosystem can be accepted by another?

Different governance frameworks, diverse credential semantics, and technological heterogeneity.



Cross-trust-domain systems lack mutual recognition.

International Deployment

- International super nodes in **Malaysia, Macao, Hongkong and cities in mainland China like Xiamen, and Liuzhou** are already online, with Hong Kong's under construction. Expansion into Singapore, Indonesia and Mongolia is underway.
- Did:bid in the W3C DID Registry.

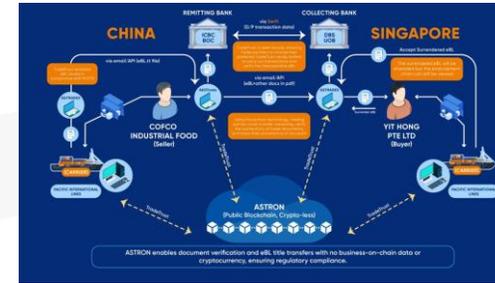


Voice in Multilateral Mechanisms

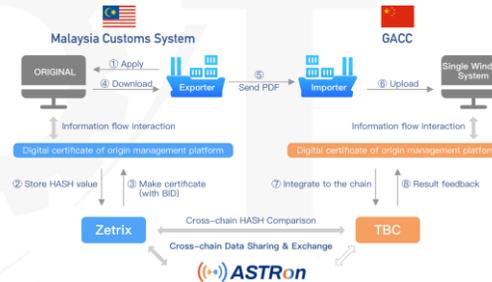
- ASTRON is involved in the G20 Digital Innovation Cooperation Action Plan Achievement list.
- ASTRON has been awarded as 12 Outstanding Cases in the 2025 World Internet Conference.
- ASTRON is the only China-led blockchain infrastructure supported by TradeTrust.
- ASTRON is involved in other Mechanisms like BRICS, etc..



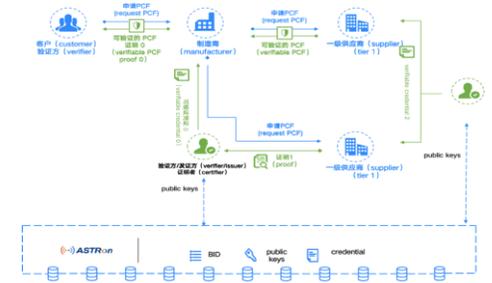
Cross-border Trade Practice



China-Singapore Cooperation: Electronic Bill of Lading Service



China-Malaysia Cooperation: Verification of Certificate of Origin, Drivers license.



China-EU Cooperation With Siemens: Product Carbon Footprint Traceability Platform



China-Portugal & BRICS Cooperation: Product Quality Certification

- ✓ **SGTradex, AEOTrade, TradeGo:** ASTRON supports the verification and confirmation of eBL based on the Tradetrust framework, facilitating the digitization of trade services;
- ✓ **SIEMENS:** To address the EU's CBAM new regulations, jointly build a product carbon footprint service platform.
- ✓ **SAP:** ASTRON supports the enterprise distributed digital identity system DIM is plugged to ASTRON;
- ✓ **Catena-X:** Auth. of Data Space in China.
- ✓ **KDDI & Mobicom:** promote new infrastructure cooperation between China and Mongolia

We believe Agent ID (especially DID for agents) is crucial. Anonymity is not the future.

New Trends



New Challenge: AI-Agent Trusted ID

As AI Agents act on behalf of humans and organizations, they also need to possess trusted digital identities.



Evolution: Ecosystem Coexistence

Evolving from a "human-centric" digital identity ecosystem to one of "human + AI Agent coexistence".



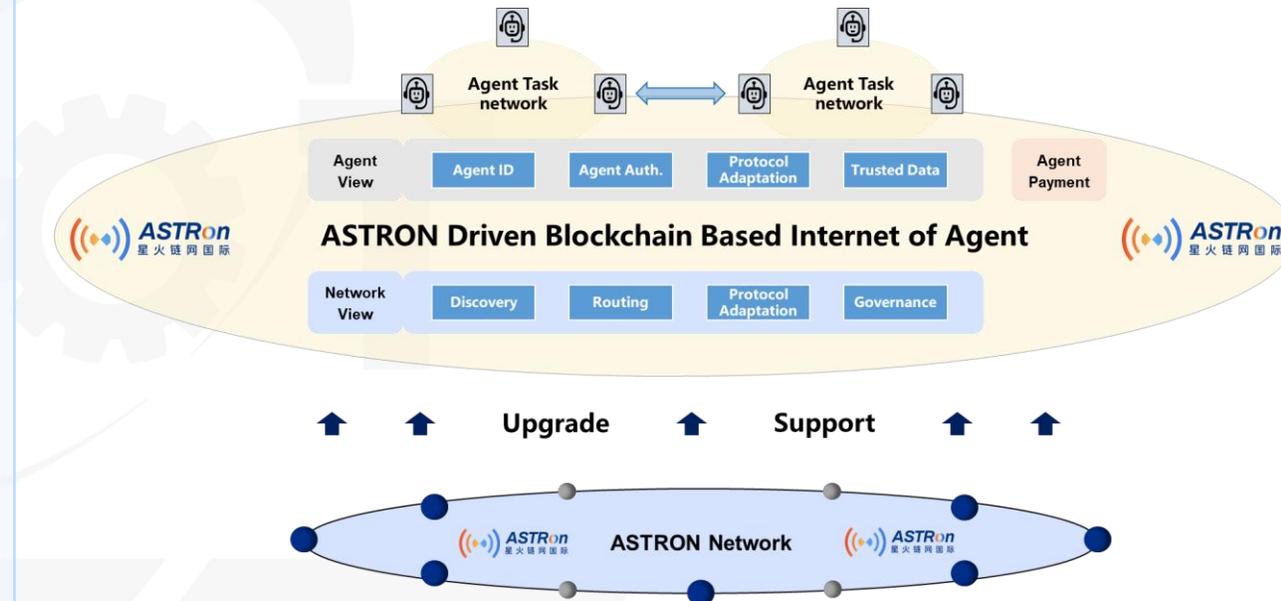
Key Directions

- Mechanism for delegating permissions from human DID to AI Agent DID
- Framework and attribution for liability determination in AI-driven transactions
- Standards for the interconnection between human and machine identity systems



We are at a turning point in digital trust, moving from "human-centric" to "human-machine collaboration". Through standard unification and technological innovation, to jointly build a more inclusive, intelligent, and interconnected trusted future.

Vision of ASTRON Network Towards a Blockchain Based Internet of Agent





*We welcome your participation in
ASTRON Ecosystem!*



Contact: youxiaoyu@caict.ac.cn



Node Construction



System Interoperability



Application Co-
construction



Enterprises
Going Global