可信区块链推进计划
TRUSTED BLOCKCHAIN INITIATIVES

工业互联网产业联盟
Alliance of Industrial Internet

Industrial Blockchain Application Guide

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CATALOG

Chapter 1 Blockchain Overview

Blockchain has decentralized, tamper-proof and traceable features. As a very important part of the "new infrastructure" , it is constantly combining, colliding and integrating with various industries. As part of the trusted infrastructure, blockchain is slowly integrating into daily life by combining with application scenarios in the real economy.

Blockchain Concept

Based on cryptography, distributed technology, game theory and other theories.

Combining consensus algorithms, smart contracts and other technologies.

Maintain multiple copies of a multi-party, collaboratively created, tamper- and forgery-proof distributed ledger.

The opportunities presented by blockchain

Blockchain is gradually gaining attention, while the development of Internet and mobile Internet has greatly improved the speed and efficiency of information transmission.

However, trust issues related to information transfer and the privacy and security of data are becoming increasingly prominent, especially among various enterprises and organizations.

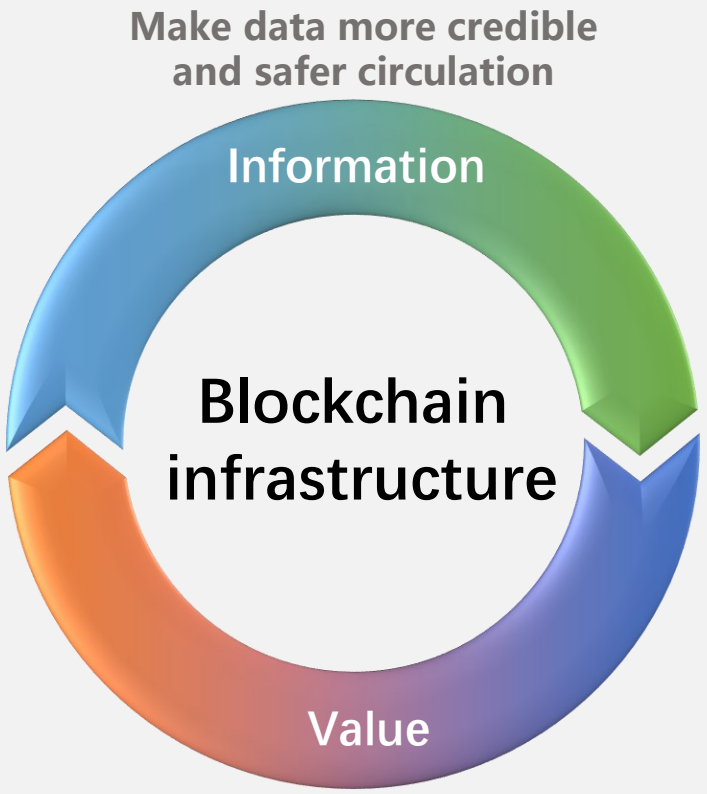
Blockchain has great potential to improve and solve trust issues

Chapter 1 Blockchain brings new opportunities for high-quality industrial development

Blockchain has decentralized, tamper-proof and traceable features. As a very important part of the "new infrastructure" , it is constantly combining, colliding and integrating with various industries. As part of the trusted infrastructure, blockchain is slowly integrating into daily life by combining with application scenarios in the real economy.

Industrial Internet development faces pain points

Data element	Difficult to realize interconnection and sharing
privacy protection	The situation is still grim
Equipment safety	Reliability issues are highlighted
Industry chain	Outstanding financing difficulties



Blockchain brings new ideas to the industrial Internet

- Transparent and traceable, not easy to tamper to ensure the authenticity of data
- Decentralized, encrypted authorization to return data ownership to users
- Consensus mechanism balances the interests of all parties and promotes industrial collaboration
- Encryption algorithm and privacy protection help data security
- Smart contracts realize intelligent and customized services

Chapter 2 Review of Industrial Internet

Industrial Internet Background

- Relying on "data + computing power + algorithm" capability, it optimizes the allocation of manufacturing resources and enhances the intelligence and value from data to decision making.
- As one of the main construction contents of the "new infrastructure", it promotes the industry from "lean production and digital factory" to "smart factory".

Industrial Internet System Architecture

- The business view includes four layers: industry layer, business layer, application layer, and capability layer.
- The functional view is sub-functionalized in three dimensions: network, platform, and security.
- The implementation framework proposes to build the system at four levels: "device, edge, enterprise, and industry".

Pain points in industrial Internet development

- Cybersecurity threats exist
- Data silos still exist
- Data cannot be self-trusted
- Inability to perform highly fine-grained collaboration

Chapter 3 Connotation of Industrial Blockchain

Industrial blockchain is the application of blockchain to the industrial Internet field. It injects new security capabilities for data exchange and sharing, identification of rights and responsibilities, and authentication and security control of massive equipment access on the industrial Internet. It establishes "machine consensus" and "algorithmic transparency" for mutual trust at low cost.

The value blockchain brings to industrial internet development

- Blockchain has its own characteristics such as immutability, traceability, and transparency to the participants, thus creating trust and delivering value.
- Smart contracts can be executed automatically without human intervention, and blockchain as a "trust machine", may become the credit infrastructure of a "trust society" under wide application.
- The flexible use of each technical feature of blockchain in its own business can help industrial enterprises to obtain different business benefits in different scenarios.

01 Multi-party sharing traceability, solidifying the foundation of trust

02 Transparent monitoring of the whole process, keeping safety and promoting production

03 Supply chain process upgrade, overall efficiency improvement

04 Trusted synergy between industry and finance, facilitate manufacturing service innovation

05 Codification of rules, creating a network of trust

06 Regional collaboration platform to cultivate a new ecosystem

Chapter 3 Connotation of Industrial Blockchain | Application Objectives

Figure Industrial blockchain application mapping

01 Strengthening industrial supply chain synergy capabilities

02 Deepen the industrial enterprises to reduce costs and increase efficiency

03 Improve the level of industrial product quality

04 Promote secure data sharing among industrial enterprises

05 Building Industrial Internet Infrastructure

Chapter 3 Connotation of Industrial Blockchain

In industrial applications, it is necessary to ensure that the whole process from device side generation, edge-side computing, data connection, cloud storage and analysis, and design and production operation is trusted. It triggers the upper layer of trusted industrial Internet applications, trusted data exchange, and compliance regulation.

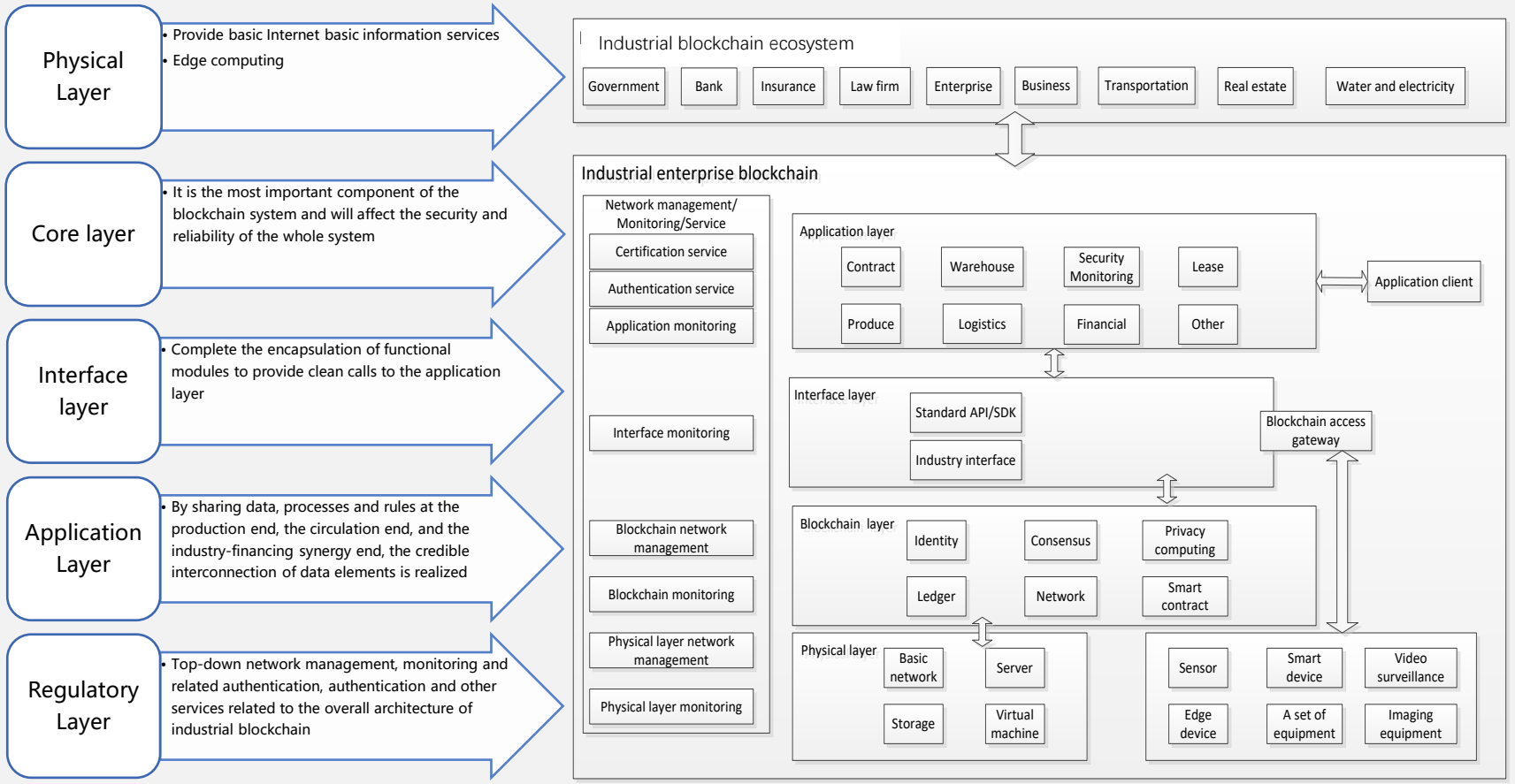


Figure2 Industrial blockchain application architecture diagram

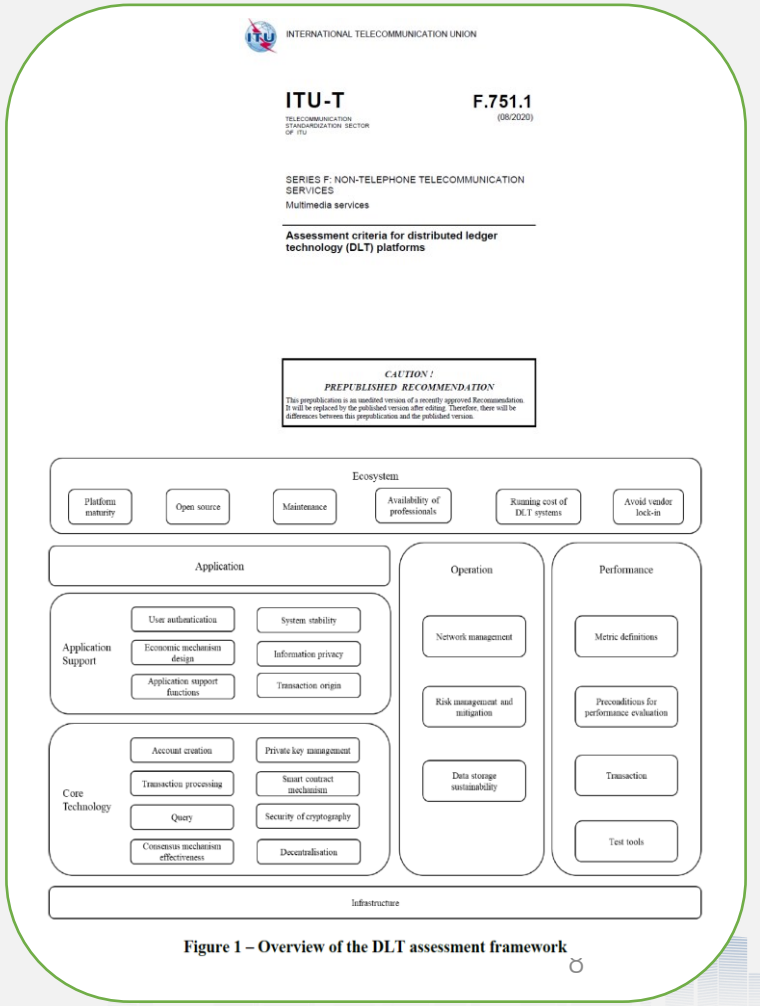


Figure 1 – Overview of the DLT assessment framework

Chapter 4 Application implementation Method and Path | Scene selection

Blockchain scenario selection is a user-centered scenario design for real business, starting from the articulation point of real valuable relationship reconstruction and scenario mining in order to play the real value of blockchain in scenario application.

01

Scene selection preparation

- Business Preliminary Selection
- Personnel preparation

Brainstorming

- Review retrospective
- Categorization Grouping

02

03

Scene Selection

- Screening Scenarios
- Integration Screening

Sorting and positioning

- Scene sequencing
- Orientation

04

Chapter 4 Application implementation Method and Path | Implementation Basis

antecedent condition → Basic elements → Strong Protection → Safety and security

01

- Establish alliance chain between enterprises and upstream and downstream suppliers, and build trust and cooperation through the alliance chain.
- Reduce the "transaction cost" between the nodes in the alliance chain, so as to improve the profit of each node.

02

- Blockchain promotes the synergy of multiple forms of resources and various participating parties, which helps to realize the diversification and low cost of transactions.
- It realizes partial privacy data sharing of each participant, and facilitates transactions and value transfer among multiple participants.

03

- Leading enterprises lead the formation of alliance chain, which can effectively gather upstream and downstream enterprises and build a complete industry chain cooperation ecology.
- It can obtain the profit of industry integration above super enterprises and enhance the competitiveness of industry chain.

04

- Blockchain + industry is the trend of industrial development.
- Guaranteeing the compliance and legality of blockchain projects can ensure the interests of all participants.

Chapter 4 Application implementation Method and Path | Alliance Win-Win

- **Enterprise competition towards ecological competition**

- Form an ecological alliance to reshape an ecology to achieve trust and collaboration and a new model of ecological win-win.
- Open the private data barriers between ecological collaboration enterprises, and form a platform for multi-party collaboration by trust links of multiple blockchain systems.

Affiliate Chain Foundation

- **Alliance chain enables trust interconnection**

- Affiliate chain is a blockchain with several organizations or institutions participating in the management together.
- It can better allow blockchain to be applied on the ground in combination with existing business models, with multiple parties collaborating and alliances winning together.

- **Alliance chain helps supply chain collaborate and win together**

- Data independence and authority independence are achieved under the premise of ensuring collaboration, mobilizing the independent initiative of enterprises.
- Establish order-centered information sharing channels between enterprises through partnerships.

Chapter 4 Application implementation Method and Path | Technical Specifications

Blockchain network and business network matching	• The institutions participating in the consortium join the blockchain network separately as permitted authorized nodes and maintain the distributed ledger together to form a federated chain.
Deployment method	• Distributed Deployment. • First-time and non-first-time deployments
Security and privacy	• Solve the trust problem among members through encryption technology. • Ensure the access and exit mechanism of alliance members through authority control.
expansion expansion	• Physical expansion to expand disk capacity. • Data archiving. • Data compression. • Sharding technology.
System integration access	• Unified SDK access method. • BaaS platform.
Interoperability	• Application layer interoperability. • Inter-chain interoperability. • Out-of-chain data interoperability.

Chapter 4 Application implementation Method and Path | Review and Expansion

Test results

- Business Level
- Data Level
- Technology

Regular review

In order to guarantee that the implemented industrial blockchain applications can operate healthily and stably, the corresponding blockchain federation network can be operated continuously.

- Horizontal expansion
- Vertical expansion

Expansion Plan

The replay also provides the basis for the development of the blockchain federation network expansion plan.

Application Misconceptions

7

Blockchain can only be used to issue digital assets

Blockchain is equivalent to a database

All data can be stored on the blockchain

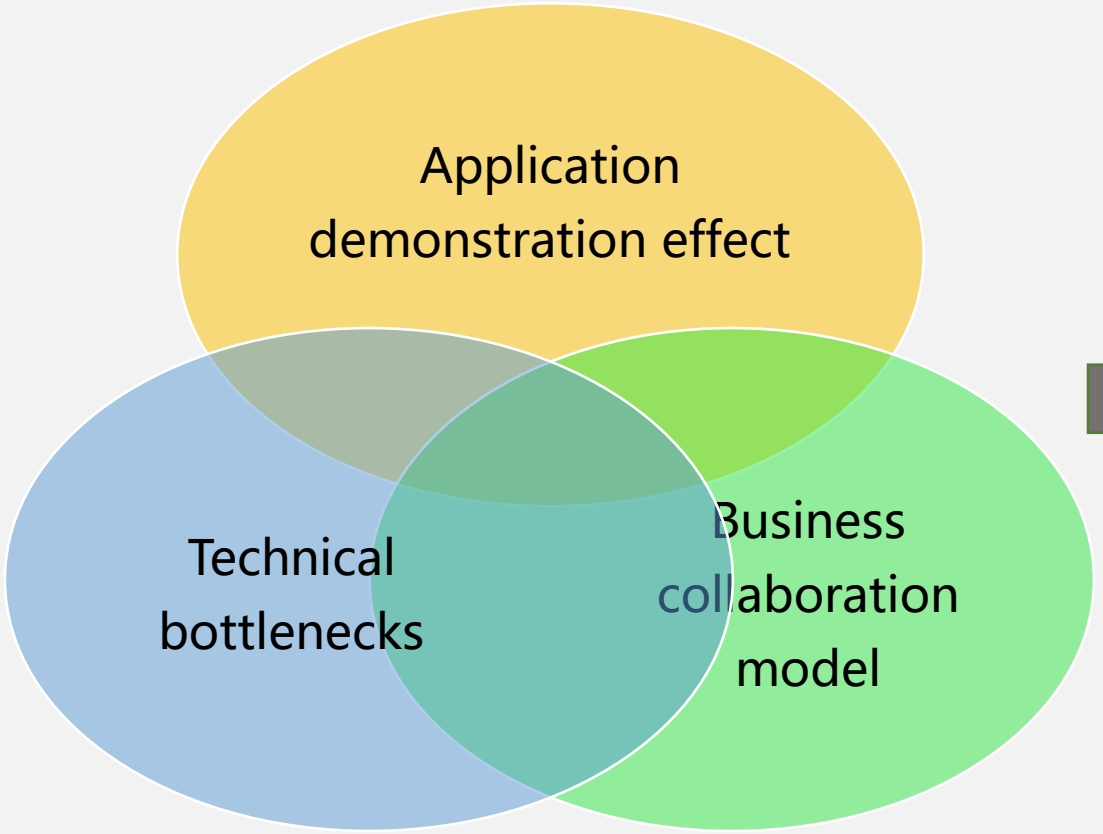
Blockchain must be decentralized

Relying on blockchain alone can solve the data authenticity problem

Each institution or organization needs to deploy independent nodes

Technical consensus is not the same as business consensus

Chapter 5 Conclusion and Prospect



Government

Policies and funds to promote the coordinated development of industrial blockchain regions

Industry organization

Industry cooperation platform, standardization

Enterprise

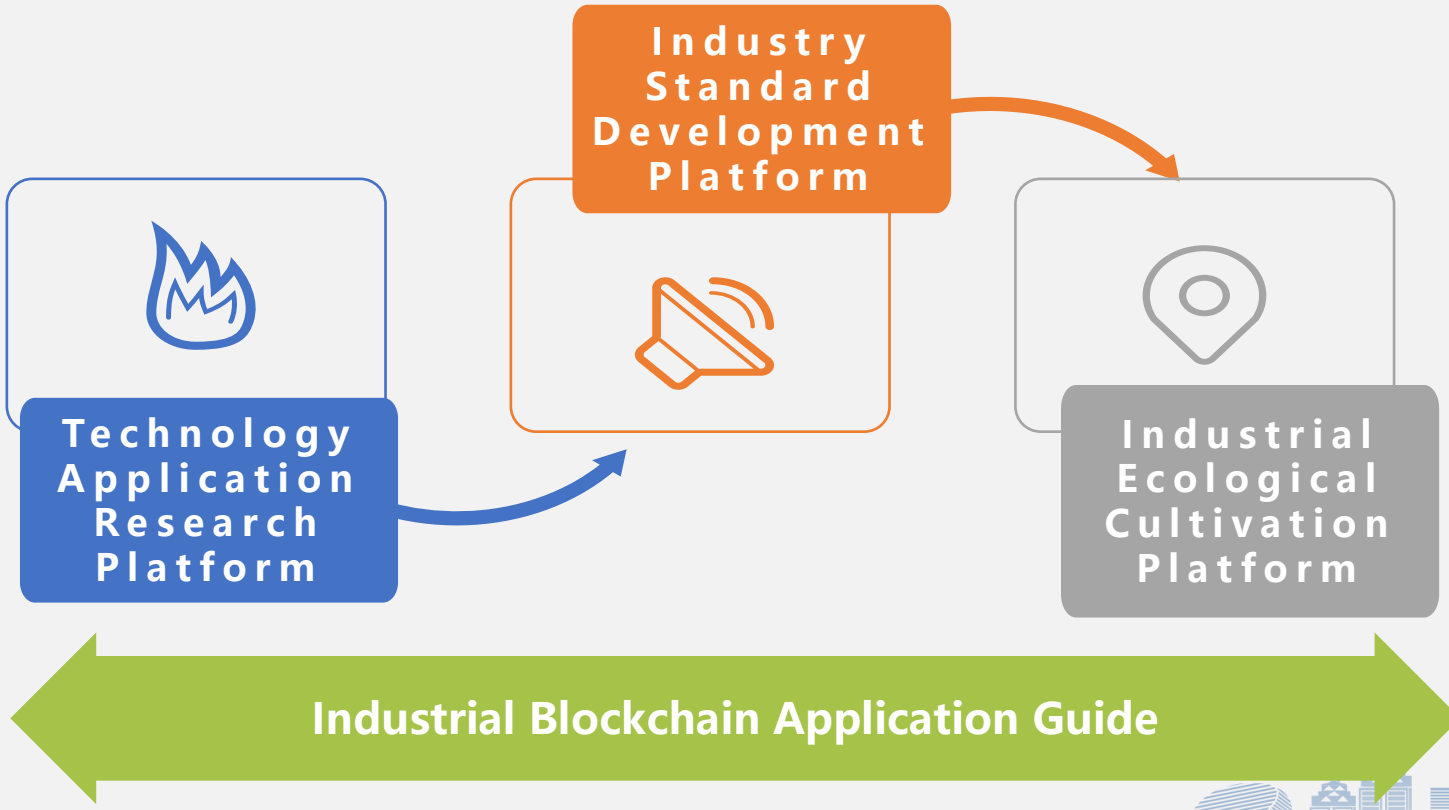
Core technology research, new business models

Chapter 5 AII&TBI actively explores blockchain to empower industrial Internet

Target setting

The leader of industrial blockchain technology innovation, the promoter of application, and the cultivator of new business formats

The key point



Chapter 5 Results – White Papers

Industrial Blockchain Application Guide
2020.09

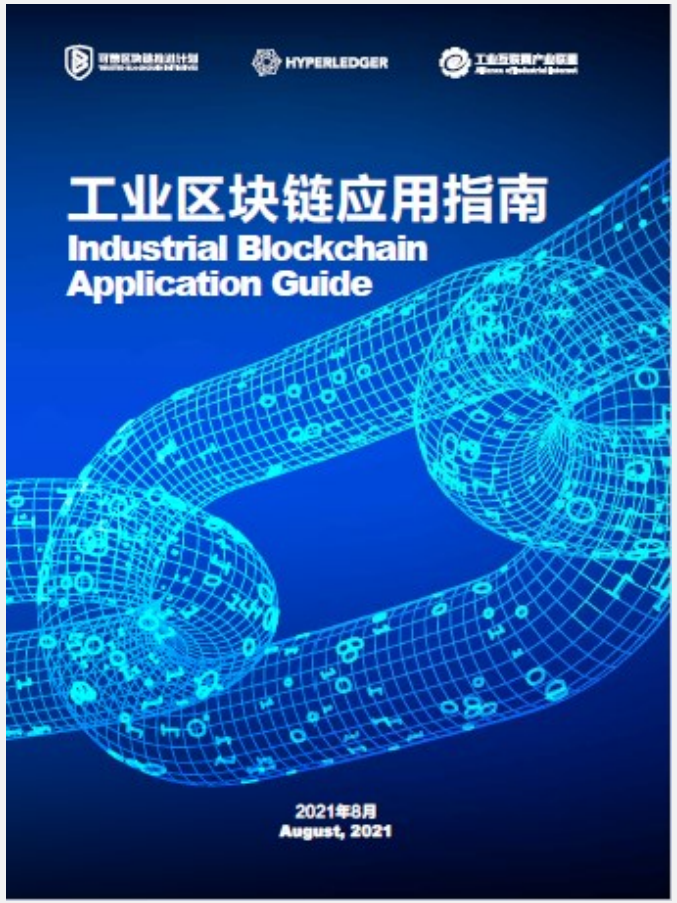
Supply Chain Collaborative Applications White Paper
2020.09 (English)

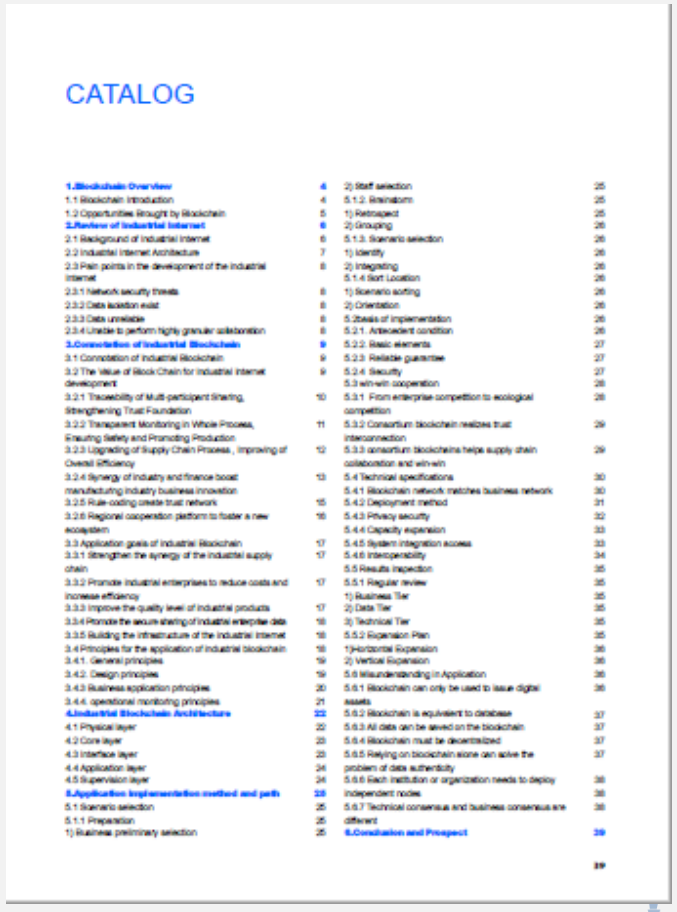
Industrial Blockchain Application White Paper
2020.08

Supply Chain Collaborative Application White Paper
2019.11

国家电网 STATE GRID 国网区块链科技（北京）有限公司
Lenovo
CEC 中国电子 中电工联 CEC INDUSTRIAL INTERNET
航天云网科技发展有限责任公司 CASICloud-Tech Co.,Ltd.
ZTE中兴
趣链科技 HYPERCHAIN
远光软件
聚均科技 FUSION TECH+
万向集团 WANXIANG GROUP
金山云
益链科技
巴比特
上海市工业互联网协会 SHANGHAI INDUSTRIAL INTERNET ASSOCIATION

Chapter 5 Results – White Papers





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This guide will be published in August, 2021.

Chapter 5 Results – Use Cases

From July to November 2019, AII and TBI have Jointly carried out the collection of industrial blockchain cases. 26 cases were received in the first batch of solicitation. After review, 5 cases with typical demonstration effects were selected to demonstrate the application of blockchain in the industrial field.

No.	Case name	Unit/Company
1	New energy cloud based on trusted blockchain	State Grid Blockchain Technology (Beijing) Co., Ltd.
2	Yirong Yuncang Internet of Things + Blockchain Warehouse Control System	Shanghai Jujun Technology Co., Ltd.
3	Industrial waste process processing system based on blockchain	Hangzhou Time Stamp Information Technology Co., Ltd. (Babbit)
4	Blockchain-based digital retail industry service platform	China Power Industrial Internet Co., Ltd.
5	Shared energy storage application platform based on blockchain	Yilian Technology

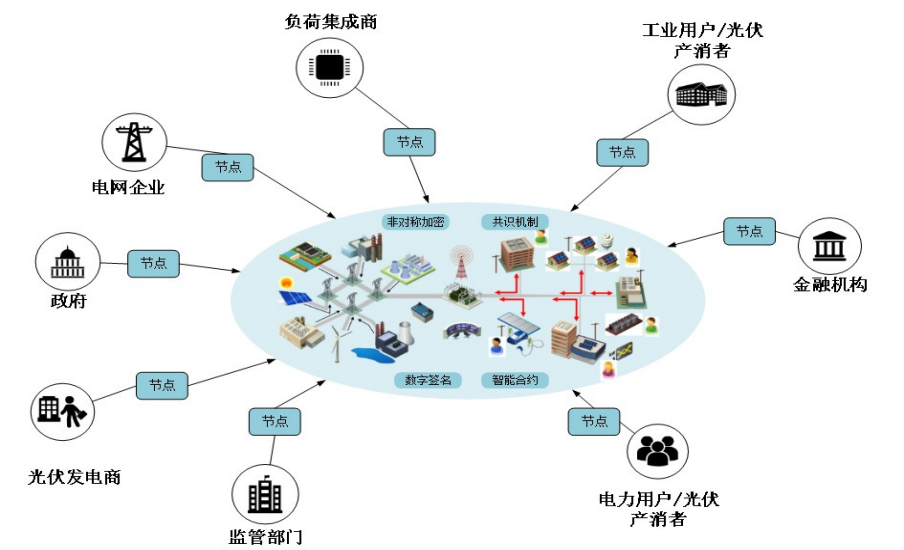

Figure. Blockchain helps photovoltaic production and sales, source: Yuanguang Software & State Grid Shanghai Electric Power Company

THANK YOU