An introduction of the Trusted Web

- Trust For Social Communication: Building the Trusted Web -

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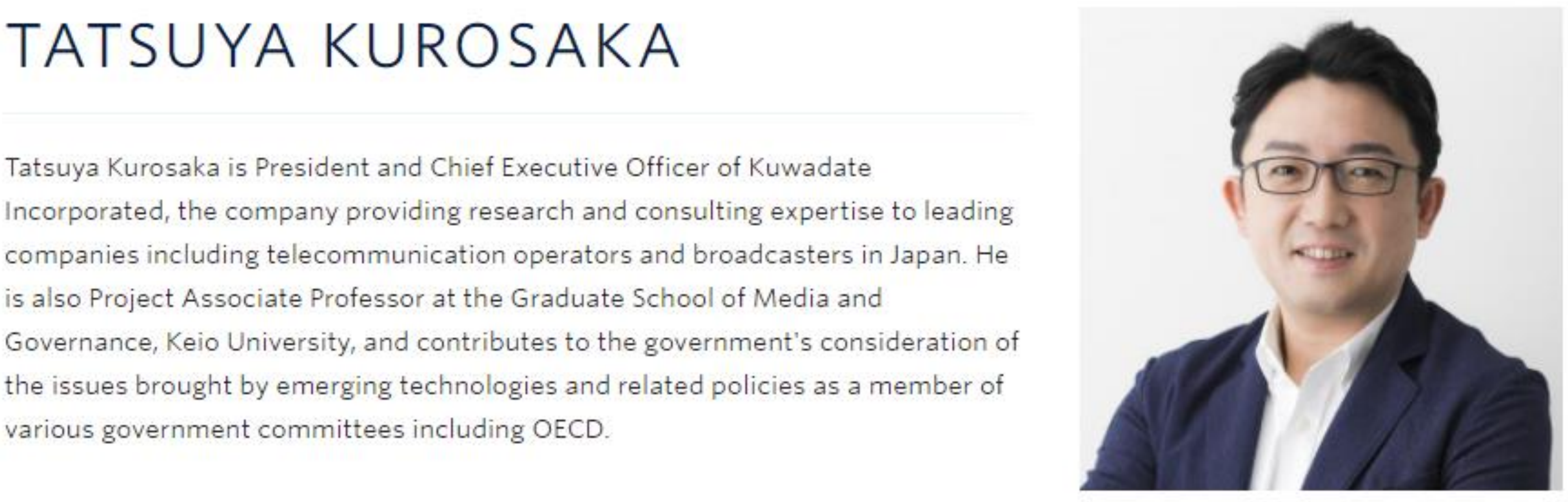
Speaker bio



TATSUYA KUROSAKA

Tatsuya Kurosaka is President and Chief Executive Officer of Kuwadate Incorporated, the company providing research and consulting expertise to leading companies including telecommunication operators and broadcasters in Japan. He is also Project Associate Professor at the Graduate School of Media and Governance, Keio University, and contributes to the government's consideration of the issues brought by emerging technologies and related policies as a member of various government committees including OECD.

Background

- The digital transformation (DX) of society as a whole is accelerating with the outbreak of COVID-19. As the cyber and the physical spaces are converting, the society is moving to the **"Digital Society" where various activities are carried out.**

- However, **various issues have surfaced**. It is necessary to **search for a 3rd way** that is neither "Dependence on a handful of giant companies", nor "Surveillance society".

- Under these circumstances, on **Internet and the Web** that has developed as an infrastructure of the digital society, **most data management, including identity management, depends on the respective service such as platform operators. Information is siloed and possibility of verifying from outside is low.** "There is no option but to trust" is the situation.

- In response to the proposal of the "Report on the Medium-Term Vision on Competition in the Digital Market" released in June 2020, with a view to realizing DFFT, **the "Trusted Web Promotion Council" was launched** in October 2020. Based on the results of the examination conducted so far, the council has issued a first whitepaper in April which has been compiled as the **starting point for cooperating and collaborating with various parties inside and outside the country** in the future.

Current issues and their causes

- Possible pain points of the Internet and the Web
  - Concerns about data being exchange such as fake news and false device control data
  - Privacy risk due to aggregation and consolidation of data including biological information
  - Balance between privacy and public interest that is discussed due to the outbreak of COVID-19 etc.
  - Many of wasted industrial data in silo
  - Concerns about sustainability of the ecosystem due to the winner-take-it-all approach etc.
  - Dysfunction of governance due to social norms applicable when conducting social activities

Current issues and their causes

- What causes Pain?

Lack of control access to data

Grumble of consensus building

CONSENSUS AHEAD
buckle up
rough road

Source: Knight Foundation

Difficulty to verify reliability of information

Embarrassed governance by/for multi-stakeholders

KICK BIG POLLUTER
OUT OF CLIMATE POLIC
DISMANTLE CORPORATE POWER

Limitation of technologies to ensure trust avoiding SPOF

Current issues and their causes

- What relieves Pain?

PARTNERSHIP
TRUTHFUL
CONFIDENT
FAITHFUL
CONFIDENT
BUILDING
BUILDING
PARTNERS
CONFIDENT
GROUP
TRUTHFUL
ENSURE
BUILDING
ENSURE
ENSURE
BUILD TRUST
TRUTHFUL
BUILD TRUST
PARTNERS
SUPPORT
CONFIDENT
PARTNERSHIP
BUILD TRUST
BELIEF
TRUST
ENSURE
FAITHFUL
FAITHFUL
BELIEF
SUPPORT
TRUST
PARTNERSHIP
GROUP
PROMISE
PROMISE
FAITHFUL
GROUP
BELIEF
PARTNERSHIP
TRUTHFUL
TRUST
GROUP
GROUP
LOYAL
TRUTHFUL
ENSURE
PROMISE
LOYAL
BELIEF
PROMISE
TRUST
LOYAL
PARTNERS
SUPPORT
LOYAL
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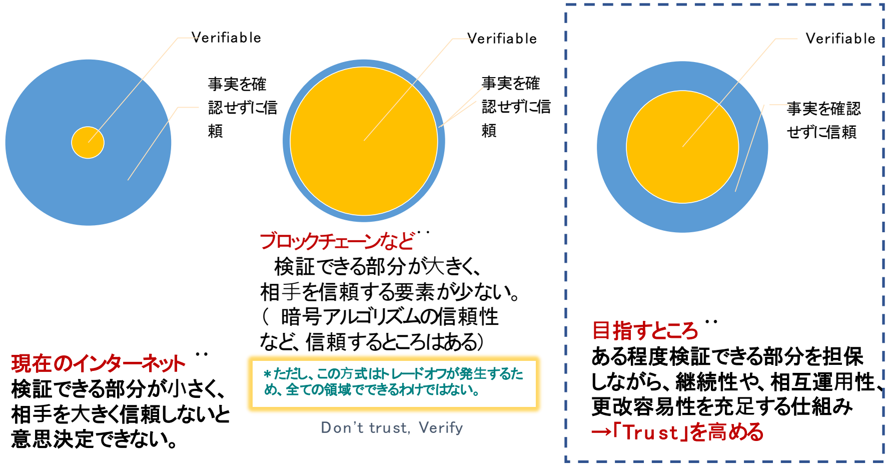
SUPPORT
ENSURE
SUPPORT
BUILDING
PARTNERSHIP
CONFIDENT
PARTNERS
BUILD TRUST
PROMISE
TRUST
BUILDING
FAITHFUL
BUILD TRUST
TRUTHFUL
BUILD TRUST
BUILD TRUST
CONFIDENT

Direction that the Trusted Web should take

- Purpose
  - Build the mechanism of trust for various social activities in the digital society, and create new values by diverse entities.
- Mechanism of Trust:

  Without replying on a specific service,
  - By making it possible to control the data disclosed to the other party,
  - and while incorporating the mechanism of consensus building in data exchange,
  - expanding the areas that can be verified, and reducing the areas that had to be trusted without checking the facts so far, thereby increasing the Trust (the degree to which one believes that the other party behaves as expected).
- Approach
  - Overlay approach where good points of the Internet and the Web are leveraged and functions are added on the top

仕組みによりVerifiable（検証可能）な部分が変わる



現在のインターネット‥
検証できる部分が小さく、相手を大きく信頼しないと意思決定できない。

ブロックチェーンなど‥
検証できる部分が大きく、
相手を信頼する要素が少ない。
（ 暗号アルゴリズムの信頼性など、信頼するところはある）

＊ただし、この方式はトレードオフが発生するため、全ての領域でできるわけではない。

Don’t trust, Verify

目指すところ‥
ある程度検証できる部分を担保しながら、継続性や、相互運用性、更改容易性を充足する仕組み
→「Trust」を高める

Principles in design and operation

- Specific direction

Sender of Data

Receiver of Data

Scheme of exchanging data

Stakeholders involved

- Principles in design and operation

Supporting mechanism

1. Sustainable ecosystem
2. Governance by multi-stakeholder
3. Openness and transparency

User’s standpoint

4. Control by data entity
5. Universality
6. User Viewpoint

System’s standpoint

7. Continuity
8. Flexibility
9. Interoperability
10. Ease of upgrade and Scalability

Possible Architecture

4. Four main functions and governance that form the Trusted Web architecture

Management and verification of digital identity

① Identifier management function

✔□ Management of DIDs (DIDs:Decentralized Identifiers)

Users can issue identifiers by themselves and link them to various attributes (Identity).

→ So far, users **were locked in with an identifier issued for each service,** and **their attributes** (age, contract details, etc.) **were managed after linking them to such attributes. However, users can control the scope of disclosure of attributes by themselves** and **avoid individual identification**.

② Trustable Communication communication

✔Reliable management and verification of attributes

Managing the attributes (Graduation certificate, test results, reliability, etc.) **endorsed or reviewed by a third party by oneself, disclosing them to the other party to the extent necessary, and the other party can verify the attributes without inquiring with the** issuer etc. **every time**.

→ **Judging by the certainty of the data sender,** it is possible to **estimate the correctness of the contents of the message**.

Reflection and verification of intentions digitally

③ Dynamic Consent function

✔Dynamic consensus building

For exchanging data, both sides can go through the **process of arriving at agreement after setting various conditions and managing the results**.

→ This allows **controlling the conditions when exchanging data. It is not a uniform rule, but reflects the intentions of both parties, and if there is a discrepancy, it can be dynamically corrected.**

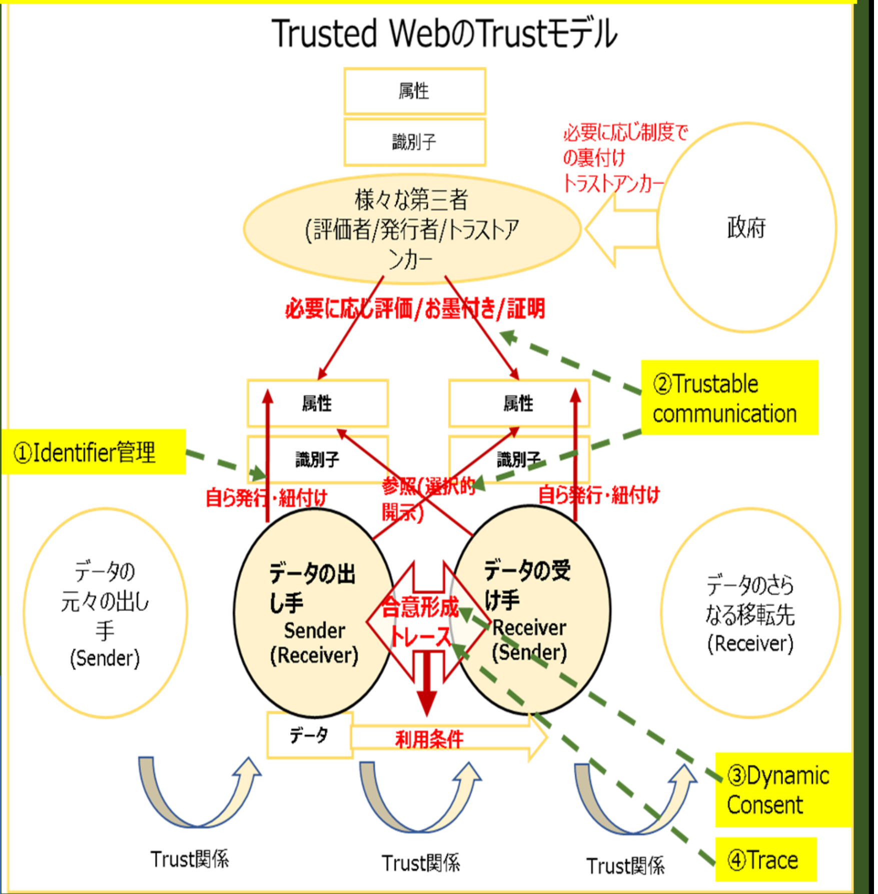
④ Trace function

✔ Verification of fulfillment of conditions

By setting conditions at the time of agreement, it is possible **to monitor** the process of agreement formation and fulfillment of agreement, and verify whether they are **appropriate or not**.

→ **Removing the concerns that once data is transferred, use of data becomes a complete black box**.

Technically, **when assuming P2P**(Peer to Peer. Computers communicate with each other on the equal basis)**,** it is a frame for conducting **"Authentication"** in terms of authentication of entities, authentication of contents, and authentication of attributes**.**


Trusted WebのTrustモデル
属性
識別子
様々な第三者
(評価者/発行者/トラストアンカー
必要に応じ制度での裏付け
トラストアンカー
政府
必要に応じ評価/お墨付き/証明
②Trustable communication
属性
識別子
属性
識別子
①Identifier管理
自ら発行・紐付け
参照(選択的開示)
自ら発行・紐付け
データの元々の出し手
(Sender)
データの出し手
Sender
(Receiver)
合意形成
トレース
データの受け手
Receiver
(Sender)
データのさらなる移転先
(Receiver)
データ
利用条件
Trust関係
Trust関係
Trust関係
③Dynamic Consent
④Trace

Governance

- ○ **Governance by multiple stakeholders** (Consensus building on rules and operations that support the routes and chains underlying the Trust in a decentralized collaboration)
- ○**Role of the government** (**As a trust anchor, development and operation of supporting system**)
- ○**Ensuring transparency** (Various stakeholders will verify and put checks and balances)
- ○ Incentive design for making the ecosystem **sustainable** (Design for public roles such as contributing engineers and institutions that support the Trust)

Economic values expected to be created by the Trusted Web

- Expected economic values

"Application layer"

- **Reliable information becomes more valuable**
- Once it becomes possible to verify the attributes of the other party, **consensus building between unrelated parties becomes easier, enabling collaboration that was previously difficult**
- **Value creation in synchronization with data flow and value flow**

"Middle layer"

- **Digital value creation by participating in a chain of trust and by institution etc. giving “endorsement"**

"Infrastructure layer"

- **Provision of services through venture companies by unbundling** four functions of Trusted Web

- Example of use case analysis

- Distribution of content media
- Proof of test results when traveling during the outbreak of infectious diseases
- Proof of human resources qualifications
- Understanding the value in the life cycle of vehicles, etc.

Road to implementation (Tentative Roadmap)

2021-22 Starting period

Dissemination and collection of feedback from the global community -> Building a collaborative system with the Internet community -> Whitepaper 2.0 preparation
Sandbox environment such as prototype and sample code
Coordinating with business-based initiatives, and identifying the requirements.
(Organizing ideathons, hackathons, etc.）

2023-24 Creation of functions and services

Provision of various services with excellent UI / UX such as Identifier management function, consensus building function, etc. by venture companies
→Service deployment in human resources, PHR, contents, supply chain, etc. by utilizing these

2025- Implementation and dissemination in each field

2030- Internet-wide implementation

List of Members

Trusted Web Promotion Council – List of Members

（As of December 25, 2020)

Koki Uchiyama	Hotto Link Inc. Representative Director Group CEO
Shinichi Urakawa	Chairman, Planning Department, Digital Economy Promotion Committee, Japan Business Federation Sompo Japan Insurance Co., Ltd. Director and Senior Managing Executive Officer
Yuichi Ohta	DataSign Inc. Representative Director
Tatsuya Kurosaka	Kuwadate Inc. Representative Director
Natsuhiko Sakimura	Tokyo Digital Ideas Co., Ltd. Chief Researcher
Seiko Shirasaka	Professor, Graduate School of System Design and Management, Keio University
Haruo Takeda	Corporate Chief Engineer, Hitachi Ltd.
Hiroshi Tsuda	Head of Security Research Laboratory, Fujitsu Laboratories Ltd.
Yusuke Tomimoto	Group Vice President, Strategy Planning Division, Toyota Financial Services Corporation
Koichi Hashida	Professor, Graduate School of Information Science and Technology, The University of Tokyo
Takanori Fujita	Project Lead, Healthcare Data Project, World Economic Forum Centre for the Forth Industrial Revolution Japan
Masakazu Masujima	Partner Attorney, Mori Hamada & Matsumoto
Shinichiro Matsuo	Research Professor, Computer Science Department at Georgetown University / Head of blockchain research, NTT Research Inc.
Kazuyoshi Mishima	Co-founder Keychain Pte. Ltd.
Jun Murai	Distinguished Professor, Keio University **(Council Chair)**
Kristina Yasuda	Microsoft Corp. Identity Standards Architect

Observers: Cabinet Secretariat IT General Strategy Office, Ministry of Internal Affairs and Communication, Ministry of Economy, Trade, and Industry, National Institute of Information and Communications Technology (NICT), Information-technology Promotion Agency (IPA)

List of Members

Taskforce on architecture, Trusted Web Promotion Council – List of Members

（As of March 12, 2021)

Tomoya Asai	WebDINO Japan CTO
Hirochika Asai	Researcher, Preferred Networks Inc.
Daichi Iwata	Senior Director, Digital Integration Division, NEC Corporation
Koki Uchiyama	Hotto Link Inc. Representative Director Group CEO
Masakazu Kikuchi	Secured Finance CEO
Tatsuya Kurosaka	President and CEO, Kuwadate Inc. **(Taskforce Chair)**
Kazue Sako	Professor, School of Computer Science and Engineering, Waseda University
Shigeya Suzuki	Keio University Graduate School of Media and Governance Project Professor
Shigeru Fujimura	NTT Service Evolution Research Chief Researcher
Shinichiro Matsuo	Research Professor, Computer Science Department at Georgetown University / Head of blockchain research, NTT Research Inc.
Sota Watanabe	CEO, Stake Technologies Inc.

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