"Trusted Web"

Overview of the Whitepaper ver. 1.0

Secretariat of the Headquarters for Digital Market Competition

Cabinet Secretariat, Japan

May 2022

Trusted Web White Paper Ver 1.0 Overview ① Trusted Web Promotion Council (Secretariat of the Headquarters for Digital Market Competition CabinetSecretariat) 1

Tentative translation

1. Background of the whitepaper

- 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 "Too much 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. Data is siloed and it is difficult to verify from outside how data is used.** "There is no option but to rely on platform operators" 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.

- In March 2021, this whitepaper was compiled as the **starting point for cooperating and collaborating with various parties inside and outside the country** in the future.

2. Current issues and their causes

- **The Internet and the Web** have developed as a **globally common infrastructure, making it possible to widely access information and various services have been created** on the top.

- However, **there is no adequate mechanism for ensuring trust relationship and safeness required in various social activities** carried out in the digital society. **While users rely on platform operators for most of their trust, this distortion** has created **several pain points**.

Examples of pain points

- ✓ **Concerns about data being exchange** such as fake news and false data controlling devices
- ✓ **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.

- ✓ **The siloed industrial data** is not fully utilized
- ✓ Concerns about **sustainability** of the ecosystem **due to the winner-take-it-all** approach etc.
- ✓ **Dysfunction of governance** by social norms which should be applicable when conducting social activities

Underlying causes

- Can we **trust data itself**?
- Can we **trust a receiver of the data**?
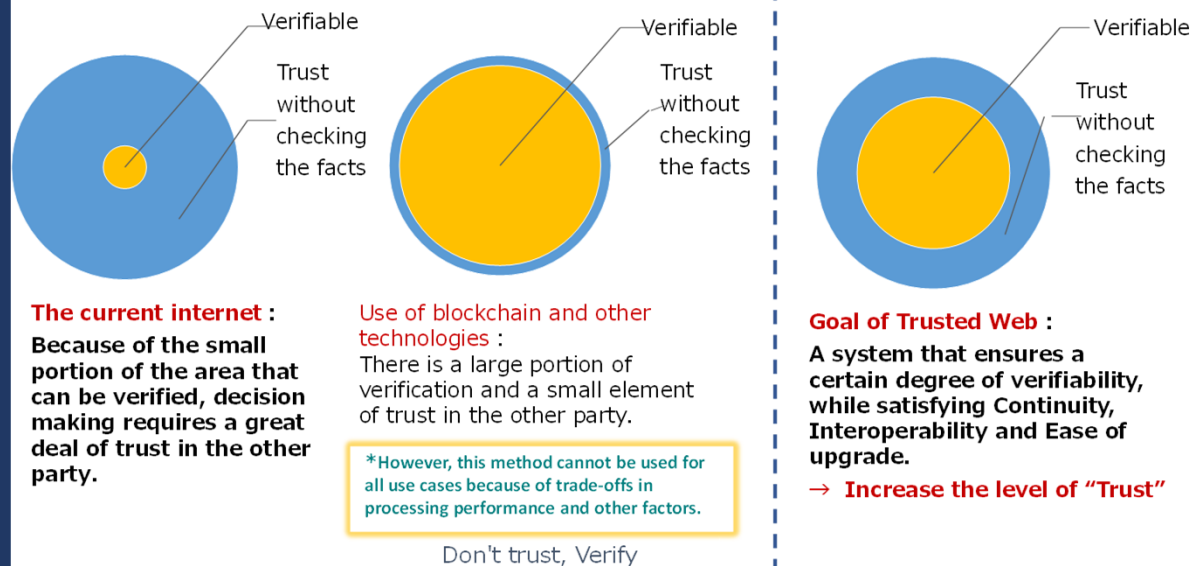- Can we **trust how the data will be treated**?

While leveraging the benefits afforded by **the Internet and the Web**, it is necessary **to add a certain governance and operational mechanism and the functions** that enable such mechanism on the top.   →   **The key is "Trust"**

3. Goal of Trusted Web

Goal of Trusted Web

- **Goal**: Build **the new trust framework** for various social activities in the digital society **to enable various parties to create new value**.
- **New Trust Framework**:　**Without relying on a specific service**,
  - **While making it possible to control the data disclosed to the other party**,
  - **and incorporating the mechanism of consensus building** in data exchange,
  - **expand the areas that can be verified**, and **reducing the areas that had to be trusted without checking the facts**, thereby **increasing the level of Trust** (the degree to which one believes that the other party behaves as expected).
- **Approach: Overlay approach** where benefits of the Internet and the Web are leveraged and **functions are added on the top**

*Trust:　The degree to which one believes that the other party behaves as expected without confirming facts

The verifiable areas change depending on the mechanism

Verifiable

Trust without checking the facts

The current internet :
Because of the small portion of the area that can be verified, decision making requires a great deal of trust in the other party.

Verifiable

Trust without checking the facts

Use of blockchain and other technologies :
There is a large portion of verification and a small element of trust in the other party.

*However, this method cannot be used for all use cases because of trade-offs in processing performance and other factors.

Don't trust, Verify

Verifiable

Trust without checking the facts

Goal of Trusted Web :
A system that ensures a certain degree of verifiability, while satisfying Continuity, Interoperability and Ease of upgrade.

→ **Increase the level of "Trust"**

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

Management and verification of digital identity

① Identifier Management function

✓ *Management of Identifiers*

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

→   So far, users were **locked in with an identifier issued by each service provider**, and **their attributes** (age, contract details, etc.) **were linked to the identifier and managed by the service provider. However, users should be able to control the scope of disclosure of attributes by themselves** and **avoid being identified**.

② Trustable Communication function

✓ *Reliable management and verification of identities*

Users can manage their attributes (Graduation certificate, test results, reliability, etc.) **endorsed or reviewed by a third party**, and **disclose them to the other party to the extent necessary**, and **the other party can verify the attributes without inquiring with the issuers** etc. **each time**.

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

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

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 **manage the results of the agreement.**

→　This allows users to **control 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**.

Governance

- **Governance by multiple stakeholders** (Support the **chains underlying the Trust** in a decentralized collaboration. **Consensus building** on rules and operations)
- **Role of the government** (Function as a **trust anchor.** Development and operation of **supporting institutional 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)

5. Economic values expected to be created by Trusted Web

(1) Economic values expected to be created by Trusted Web

"Application layer"

- **Reliable data becomes more valuable** (Example: news contents)
- Once it becomes possible to verify the attributes of the other party, **it facilitates data sharing without even knowing each other, enabling collaboration that was previously difficult** (Example: Data sharing in the supply chain and value creation through it)
- **Value creation in synchronization with data flow and value flow** (Example: Precisely tracing the environmental load in the supply chain digitally and converting contribution made to social issues for SDGs into value)

"Middle layer"

- **Digital value creation by participating in a chain of trust as an institution giving "endorsement"** (Examples: Financial institutions, testing/auditing institutions, human resources education institutions, etc.）

"Infrastructure layer"

- **Provision of services through companies including startups for unbundled four functions** of Trusted Web (Identifier Management function, Trustable Communication function, Dynamic Consent function, Trace function)
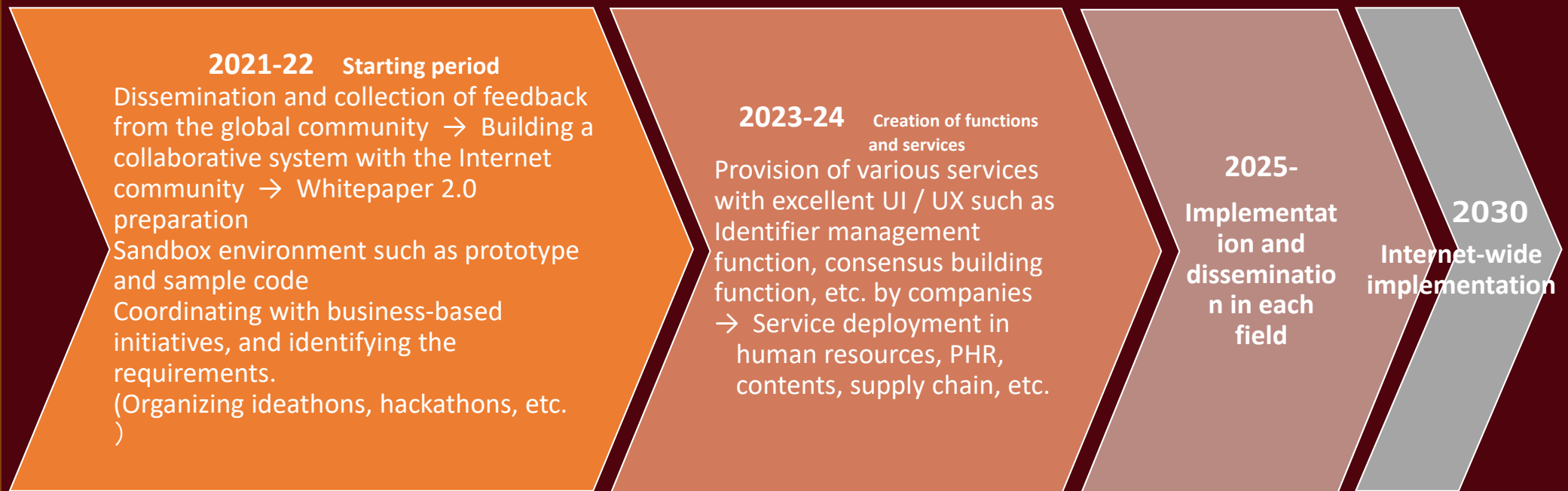
(2) Examples of use case analysis

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

6. Road to implementation

(1) Future issues to be examined

- Such as specific mechanism of functions, interoperable framework, specific architecture based on use case and verification of its implementation, implementation options on the Internet, governance, concrete incentives etc. **We will conduct examination in collaboration with domestic and foreign communities by using the white paper as a starting point**.

(2)Road (image)

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 companies → Service deployment in human resources, PHR, contents, supply chain, etc.

2025-
Implementation and dissemination in each field

2030
Internet-wide implementation

(3) Roles expected from each stakeholder

- Engineers (reference models, etc.), universities (prototypes), industry (new business models), users (active participation), international standard organizations (collaboration)
- The council will form a community in which engineers, universities, industry, etc. participate, revitalize the activities of related parties, collect feedback on various efforts made, and facilitate the entire initiative.

Published "Whitepaper 1.0", the basic concept, in March, 2021

Writing minimal functions with simple use cases in mind

①Prototype development ⟷ **②Use case-based study**

- Exchange of attributes of "individuals" by them
- Exchange of data from "corporations" to the government
- Exchange of data of "products" in the supply chain

- **More detailed identification of functions and issues**
- **Preparatory steps for standardization and diffusion**

③Visualization of potential industry needs

④Revision of the Whitepaper 1.0

⑤Laying the groundwork for international standardization in venues

Use case-based study of FY2021

● **【Use case 1】Exchange of attributes of "individuals" by them ⇒ Prototype**
→ Situation: Exchange of the data (skills and achievements of applicants) among job applicants, reference providers, and future employers in changing career

● **【Use case 2】Exchange of data from "corporations" to government agencies**
→ Situation: Exchange of the data from SMEs and related stakeholders to the government in applying for the subsidies

● **【Use case 3】Exchange of data of "products" in the supply chain**
→ Situation: Data exchange among upstream/downstream companies in the supply chains to comply with the regulations for managing the usage of the chemical substances

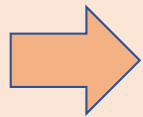## Next Step in FY2022

Call for Use Cases from companies
(→ selecting around 10 cases from various industrial areas)
based on supplementary budget of FY2021

Revise and Publish the Whitepaper 2.0
in June 2022 (expected)

Any comments or questions?

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Thank you for your attention!