

# JPX WORKING PAPER

## **Study on Applicability of DLT in Trade Matching Processes, Phase 2**

**- Result of further examination following the JPX working paper Vol.22 and its future prospects -**

February 19, 2019

Daiwa Securities Group Project Team

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[Note] This document outlines the result of further examination conducted by the authors following the JPX working paper Vol.22(\*).

(\*) [https://www.jpx.co.jp/corporate/research-study/working-paper/tvdivq000008q5y-att/JPX\\_working\\_paper\\_Vol22.pdf](https://www.jpx.co.jp/corporate/research-study/working-paper/tvdivq000008q5y-att/JPX_working_paper_Vol22.pdf)

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**[Industry-wide Technology Evaluation of DLT supported by Japan Exchange Group]**

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**Daiwa Securities Group Inc.**

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# I . Summary

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# Summary

- At present, business rules and procedures of trade matching such as methods of calculation (e.g. unit price, settlement amount, commission), means of notification, and various codes are not standardized. **From the industry-wide point of view, these methods and codes have not been optimized much.**
- **DLT\* can be a good solution** to achieve the industry-wide optimization of trade matching processes.
- This plan attempts to improve the efficiency by migrating a part of the functions of the existing systems provided by the service providers (hereafter “SP”) which commonly used by the financial institutions **to the shared functions as Smart-Contract run on the DLT.**
- The functions provided by DLT can be categorized as: **standardization of data & codes, linkage (Function 1), process of matching (Function 2), and standardization of calculation logic (Function 3).**
- The DLT requires **advanced information security** and **timely update of its functions** to follow the changes in the business environment and user needs.
- For realizing this plan, roles such as **sales/marketing** or **administration** must be also necessary in addition to the development/operation of the system. To serve those functions entirely, **an establishing of a corporation** who is responsible to run the DLT maybe required.
- The DLT infrastructure **can be expanded its business area beyond trade matching** (e.g. securities settlement, data business) through **increase of the participation and enhancement of its functions.**

\* Distributed Ledger Technology (DLT) is the technological foundation for the mutual authentication of rights transfer among participants and ledger sharing, which cannot be falsified via encryption technology.

## II . Project Overview

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# Background and Purpose

- “Study on Applicability of DLT Trade Matching Processes, Phase 2” (hereafter “this project”) departs from examination results of Phase 1\*. Aims to solidify the details and to define the path to its realization through an industry-wide discussion.

## ● Background

- ▶ DLT has the potential to be the main component technology for problem solving.
- ▶ An industry-wide discussion involving institutional investors, SPs, and financial institutions is necessary as well as the further improvement of technology.

※ For details of Phase 1, see JPX Working Paper Vol. 22 “Examination of blockchain (DLT) application on trade matching.” (2018.1.18)  
[https://www.jpx.co.jp/corporate/research-study/working-paper/tvdivq0000008q5y-att/JPX\\_working\\_paper\\_Vol22.pdf](https://www.jpx.co.jp/corporate/research-study/working-paper/tvdivq0000008q5y-att/JPX_working_paper_Vol22.pdf)

## ● Purpose

- ▶ Solidification of the DLT application plan as a system solution through an industry-wide discussion.
- ▶ To clarify the issues and tasks, necessary functions, systems, and frameworks, and to create the path toward its realization.





# List of companies participating

- A team comprising 26 companies—including institutional investors, SPs, and financial institutions along with the Daiwa Securities Group—conducted this project using the framework of “Industry-wide Technology Evaluation of DLT” supported by Japan Exchange Group.

- List of participating companies, observers, and other stakeholders in the Daiwa Securities Group project team

HSBC Securities	Nomura Securities
XNET	Nomura Research Institute
OGIS-RI Co., Ltd.	BNP Paribas Securities
Okasan Securities	Marusan Securities
QUICK Corp	Mizuho Securities
Goldman Sachs Japan	Sumitomo Mitsui Asset Management
DTCC Japan KK	Sumitomo Mitsui Trust Asset Management
Tokai Tokyo Financial Holdings	Sumitomo Mitsui Trust Bank
Naito Securities	Mitsubishi UFJ Kokusai Asset Management
Nikko Asset Management	Mitsubishi UFJ Morgan Stanley Securities
Nissay Asset Management	Merrill Lynch Japan Securities
The Master Trust Bank of Japan	Refinitiv※
Nomura Asset Management	and the other one company

**Observer**

Japan Securities Depository Center

**Supported by**

Japan Exchange Group

**Daiwa Securities Group Project Team**

Daiwa Securities

Daiwa Asset Management

Fintertech

Daiwa Institute of Research

※Refinitiv is the new name for the Financial & Risk (F&R) business within Thomson Reuters (since October 1, 2018).

# Schedule and Meetings

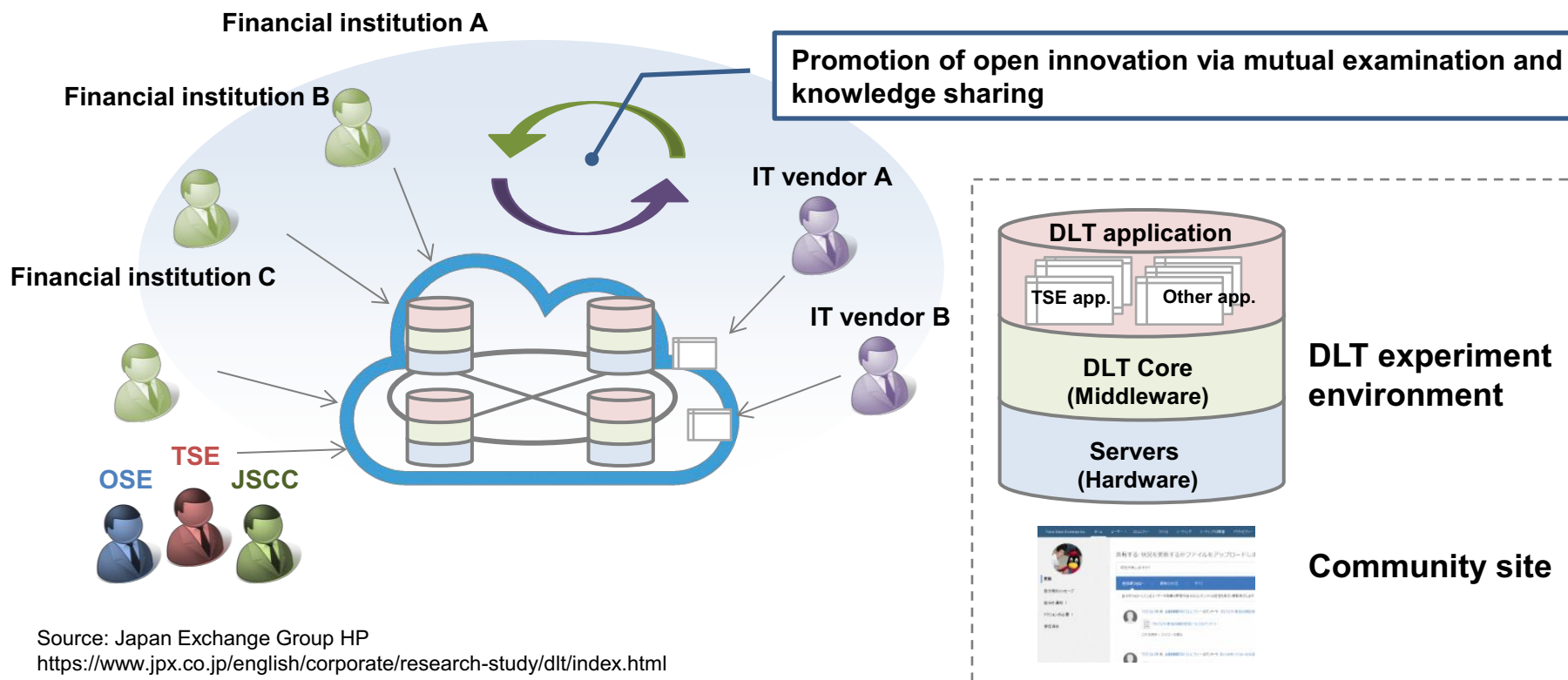
- **Project duration was four months (September–December 2018).**
- **Six general meetings and two SP subcommittee project meetings were held.**

Day	Date (provisional)	Times	Venue	Title	Goal
①	9/12 (Wed)	17:00 –18:45	JPX Main Conference Room	Kickoff	To close the gap in understanding of Phase 1, the basis of the discussion must be developed and issues facing trade matchings must be identified (and how they are perceived)
②	9/25 (Tue)	17:00 –18:30	"	Understanding the current situation	Clarification of differences and finding a common solution for the issues faced by the buyer and seller Assessment of perspectives for reform in the industry (overall optimization)
③	10/9 (Tues)	"	"	Examination of overall optimization plan	Organization of methods for finding solutions for improving speed and information exchange; identifying mismatches; and deciding on issues to be tackled as a consortium and prioritizing them.
–	10/16 (Tue)	16:00 –18:00	Fintertech	SP meeting	Examination of ①–③ from the RFP perspective (system perspective).
④	10/30 (Tue)	17:00 –18:30	JPX Main Conference Room	Plan examination	Sharing of the SP meeting's results Examining the details of the DLT application plan
⑤	11/13 (Tue)	"	"	Feasibility examination ①	Examination toward realization ① (system side and operation side)
⑥	11/27 (Tue)	"	"	Feasibility examination ②	Moving from examination to realization ② (system side and operation side)
–	12/4 (Tues)	"	"	SP meeting	Examination of ④–⑥ from the RFP perspective (system perspective).
–	12/19 (Wed)	"	"	Summary	Summary of examination results

# About the framework of “Industry-wide Technology Evaluation of DLT”

- This framework is the industry-coordination platform for conducting verification test, research, and examination of the DLT application’s potential to be the financial infrastructure offered by the Japan Exchange Group.

## ■ Platform

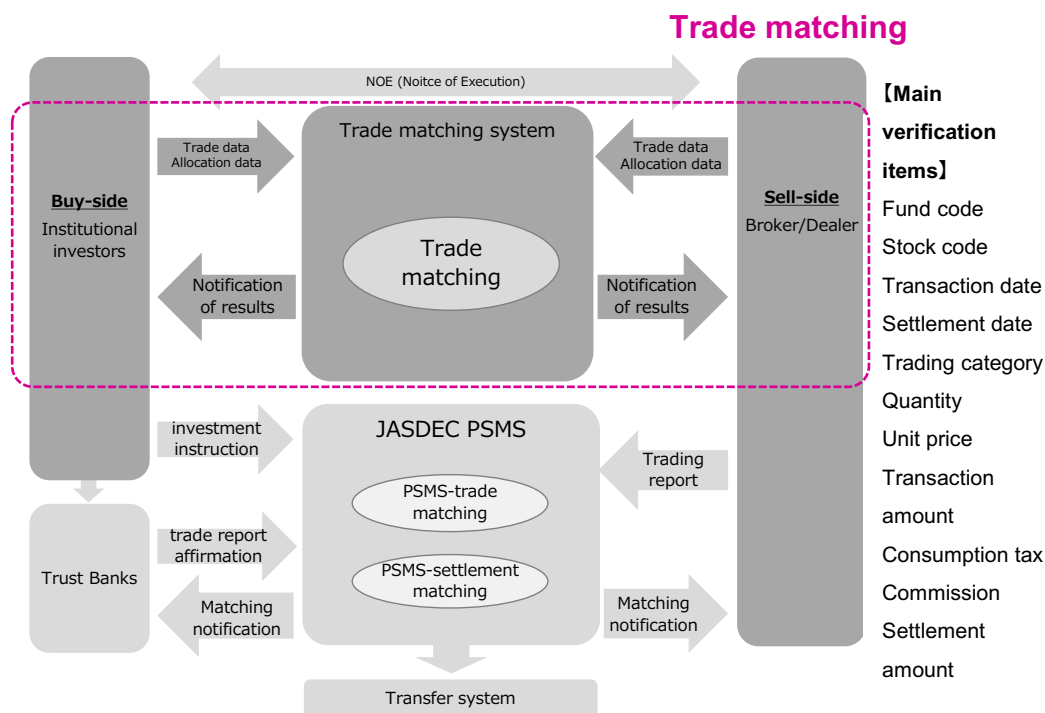


Source: Japan Exchange Group HP  
<https://www.jpx.co.jp/english/corporate/research-study/dlt/index.html>

# What is trade matching?

- After an order is executed, the sell-side and buy-side reconcile the transactions and their allocation result to ensure that there is no discrepancy between them. This is called “trade matching.”

## Overview of trade matching



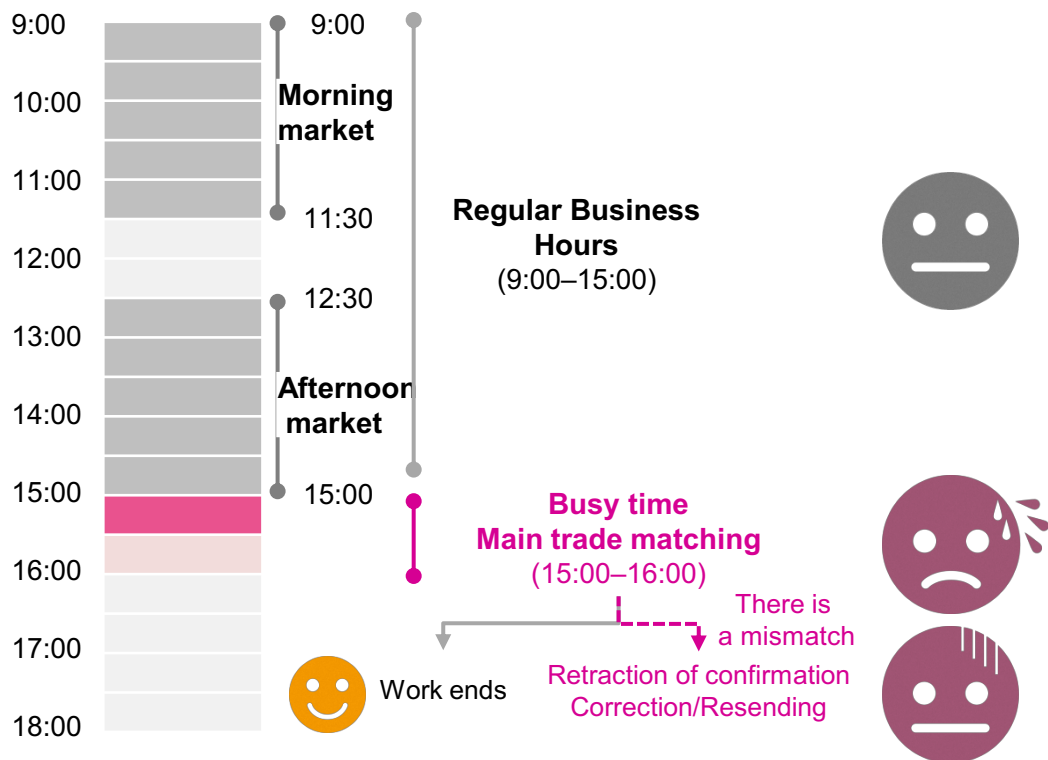
- The sell-side (broker) receives an order from the buy-side (institutional investor), executes that order at the exchange, and notifies the buy-side about the result.
- After notification, the buy-side conducts an allocation to multiple funds and shares the allocation information with the sell-side.
- The sell-side and buy-side check for any discrepancies in understanding the transaction and allocation information. This process is **known as “trade matching.”**

Source: Prepared by the Daiwa Securities Group project team

# Diagram (Timeline) of the transaction-verification work

- Both the buyer and seller begin the trade matching immediately after closing to publish the reference price each day.
- For a quick completion of this task, the trading room is extremely busy between 15:00 and 15:30 JST.

## ■ Diagram of the transaction-verification work ※



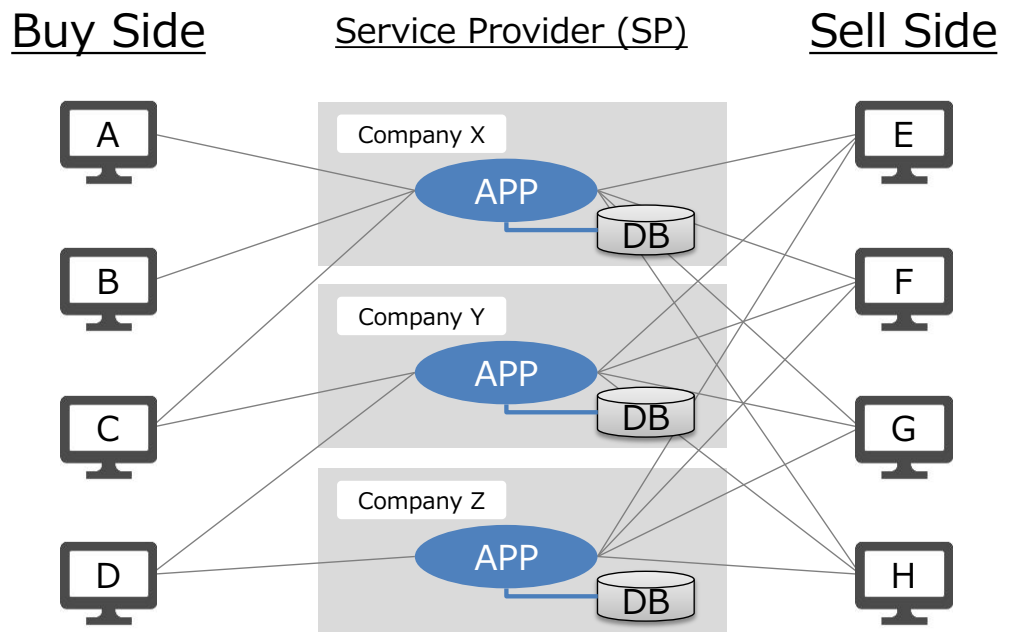
- ▶ trade matching starts in earnest in the trading room **after closing at 15:00.**
- ▶ As a rule, the verification must be completed by 15:30. Thus, the **duration from 15:00 to 15:30 is considered extremely busy.**
- ▶ If there is an **unmatch (for instance, discrepancy in amount)**, an urgent response is required to resolve the discrepancy.
- ▶ After the trade matching, the buyer must send the verified data to organizations such as trust banks.
- ▶ Unless the data are confirmed by around 16:30, the **reference price of the investment trust cannot be published on the website of the sales company or in newspapers.**

※ Strictly speaking, the tasks, timeline, and workload differ depending on the company and staff.

# Issues of trade matching

- Unification of standards and linkage between SP systems have not been optimized much so far.

- Diagram of the current systems of trade matching



- ▶ Tasks around the trade matching were performed manually via E-mail and FAX before. However in recent years, various systems are being developed/installed to improve the efficiency.
- ▶ However, **rules, such calculation method, etc are discretely determined between buy-sides and sell-sides respectively. Industry-wide unification has not been discussed yet.**
- ▶ Moreover, **data linkage among the SP systems is not possible. No compatibility.**(See the diagram)
- ▶ **Further optimization of the work process is required.**

Source: Prepared by the Daiwa Securities Group project team

## **Ⅲ. Examination Results**

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**Ⅲ-1. Current situation and issues**

**Ⅲ-2. Problem solving through the DLT application plan**

**Ⅲ-3. Issues facing implementation of the DLT application plan**

### III-1. Current situation and issues ①

- Currently, calculation methods for unit price, settlement amount, commission, means of notification, and various codes are not standardized . Discretely determined.
- A standardization toward to the industry-wide optimization has not been discussed so far.

■ example

Categories	Current situation and challenges
<b>Unit-price calculation</b>	There are two unit prices such individual (traded) and average. The individual unit price was commonly used in the Japan market before. Average unit price is the current standard and common. However, some funds choose the individual unit price due to their unique circumstances.
<b>Commission calculation</b>	There is no standard rule for rounding off, cap, floor. However, exact match is strictly required for the settlement amount, a net proceed.
<b>Allocation notification</b>	There are various means to notify such email, FTP, SP systems, etc. Basically selection is at buy-side company's discretion.
<b>Transaction details (Pre-confirmation)</b>	When Excel or CSV files are chosen, the sell-side will generate the files based on the format specified by buy-side in advance. Sometimes use EUC. The respective SP system has their own interface and functionality, no compatibility.
<b>Various codes</b>	There are many type of the instrument codes used locally and globally, The trade matching is processed by the code which specified by each buy-side.
<b>Contingency Plan</b>	Due to the absence of the unified contingency plan, each company should have their own contingency plan to tackle problems.



## III-1. Current situation and issues ②

- Both the buy-side and sell-side want to eliminate the time-consuming procedures.
- By standardizing diverse specifications and procedures, cost reductions and solving of bottlenecks are expected.

### ■ Answers to the question “what do you want to abolish in the trade matching?”

#### What the Sell-side wants to abolish

- Various confirmation forms
- Various SP systems by company by product
- Matching criteria of each company
- Mixture of individual and average unit-price
- Correction process to the small differences
- Commission calculation by each company
- Many type of the instrument codes
- Not very sophisticated account opening
- Exception handling

#### What both sides want to abolish

- **Diverse requirements/specifications**
  - No compatibility between the SP systems
  - Different formats and codes for each client/SP system
  - Troublesome procedures when opening/updating accounts
  - No tolerance to tiny differences
  - Various calculation methods
  - Processing using individual unit prices
- **Email or FAX**
- **Situation wherein both sides cannot communicate by referring the same screen**
- **Diverse contingency plans**

#### What the Buy-side wants to abolish

- Delay in NAV calculation
- Time spent to resolve unmatcheds
- Time spent to recover from system trouble
- Abnormal procedure under trouble

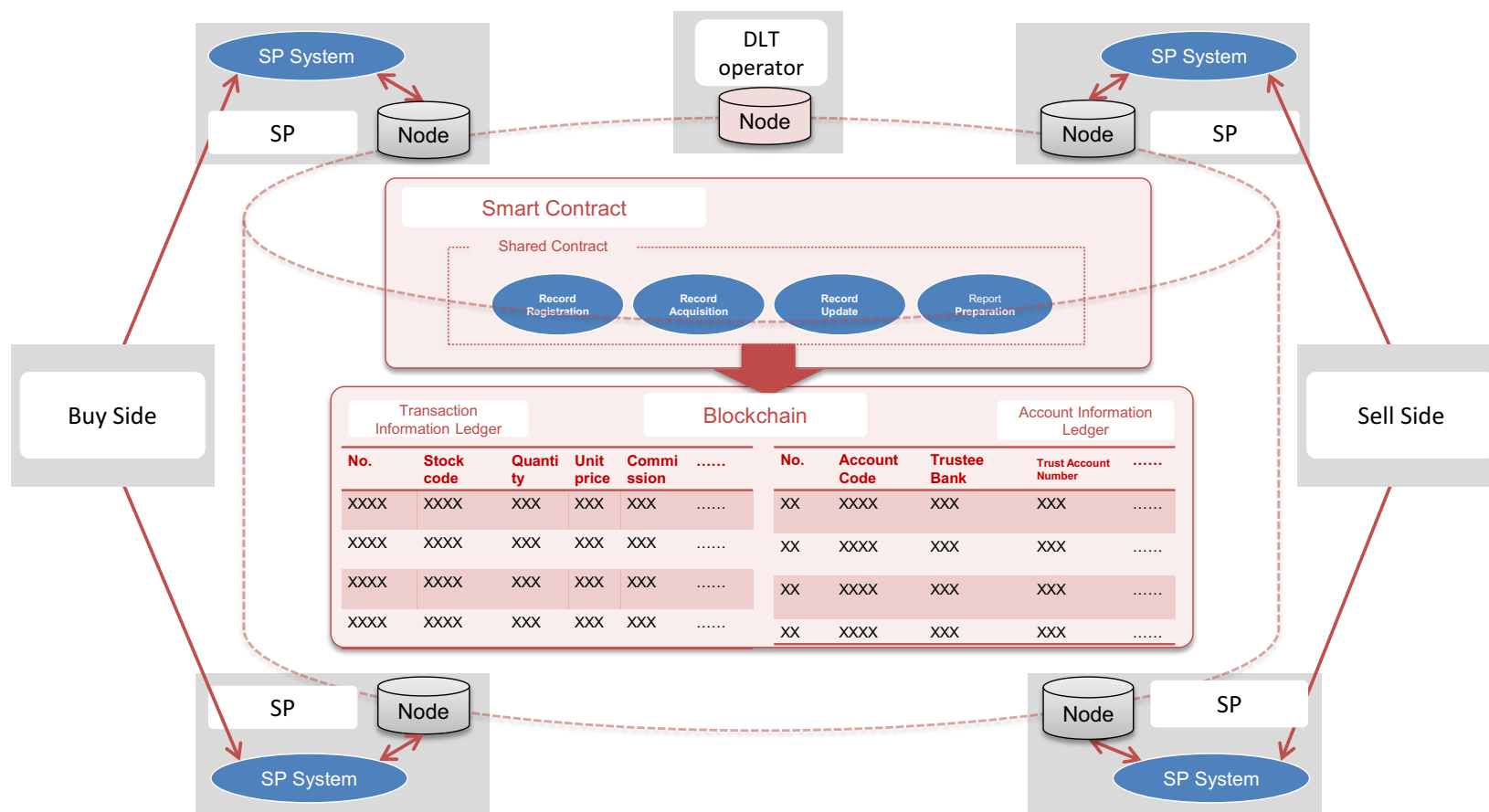
### III-1. Current situation and issues ③

- Many issues can be solved by defining the standards and best practices.
- It is highly possible that implementation with DLT is suitable for companies to conduct their business according to standardized rules.

	What should be abolished?	Direction of problem solving	Standardization	DLT Installation
Normal time	No compatibility between the SP systems	<ul style="list-style-type: none"> <li>The solution is to prescribe the format and decide the items that must be provided and matched.</li> <li>This is more an issue of whether the SPs will respond rather than an issue for the buy-side/sell-side. Incentives for the SPs must be examined.</li> </ul>	<input type="radio"/>	<input type="radio"/>
	Different formats and codes for each client/SP system	<ul style="list-style-type: none"> <li>To proceed, industry-standard formats and codes are needed.</li> <li>Although it can be resolved with the existing system, DLT is more suitable for creating a common table.</li> </ul>	<input type="radio"/>	<input type="radio"/>
	Troublesome procedures when opening/updating accounts	<ul style="list-style-type: none"> <li>This issue cannot be solved by individual companies. An industry-wide solution is necessary. The solution may be in DLT information linkage.</li> </ul>	<input type="radio"/>	<input type="radio"/>
	No tolerance to tiny differences	<ul style="list-style-type: none"> <li>Small differences cannot be completely eradicated.</li> <li>However, the rules for responding to small differences can be defined and its processing can be automated.</li> </ul>	<input type="radio"/>	
	Various calculation methods	<ul style="list-style-type: none"> <li>In the absence of an industry standard, each party has formed its own rules to deal with them.</li> </ul>	<input type="radio"/>	
	Processing using individual unit prices	<ul style="list-style-type: none"> <li>A custom unique to Japan, it is largely determined by requests from the sponsors. Therefore, it may not be addressed only by the buy-side.</li> <li>Government guidance may be effective for its elimination.</li> </ul>	<input type="radio"/>	
System Failure	Confirmation via E-mail or Fax	<ul style="list-style-type: none"> <li>It is difficult for the sell-side to propose abolishing it, and it will not disappear on its own. Hopefully this will be solved by an industry-wide initiative.</li> <li>It can be solved by DLT.</li> </ul>	<input type="radio"/>	<input type="radio"/>
	Situation wherein both sides cannot communicate on the same screen	<ul style="list-style-type: none"> <li>Communication is hindered by the fact that the conversation is conducted through different formats and coding.</li> <li>As DLT allows every authorized person to check updates, it has the potential to solve this issue.</li> </ul>	<input type="radio"/>	<input type="radio"/>
	Diverse contingency plans	<ul style="list-style-type: none"> <li>The sell-side may not be changed when there is a problem as long as there is an alternative method.</li> <li>SP system linkage using DLT (offering alternative methods that allow work to continue) may solve the issue.</li> </ul>	<input type="radio"/>	<input type="radio"/>

## III-2. Solution with the DLT system (DLT concept plan) ①

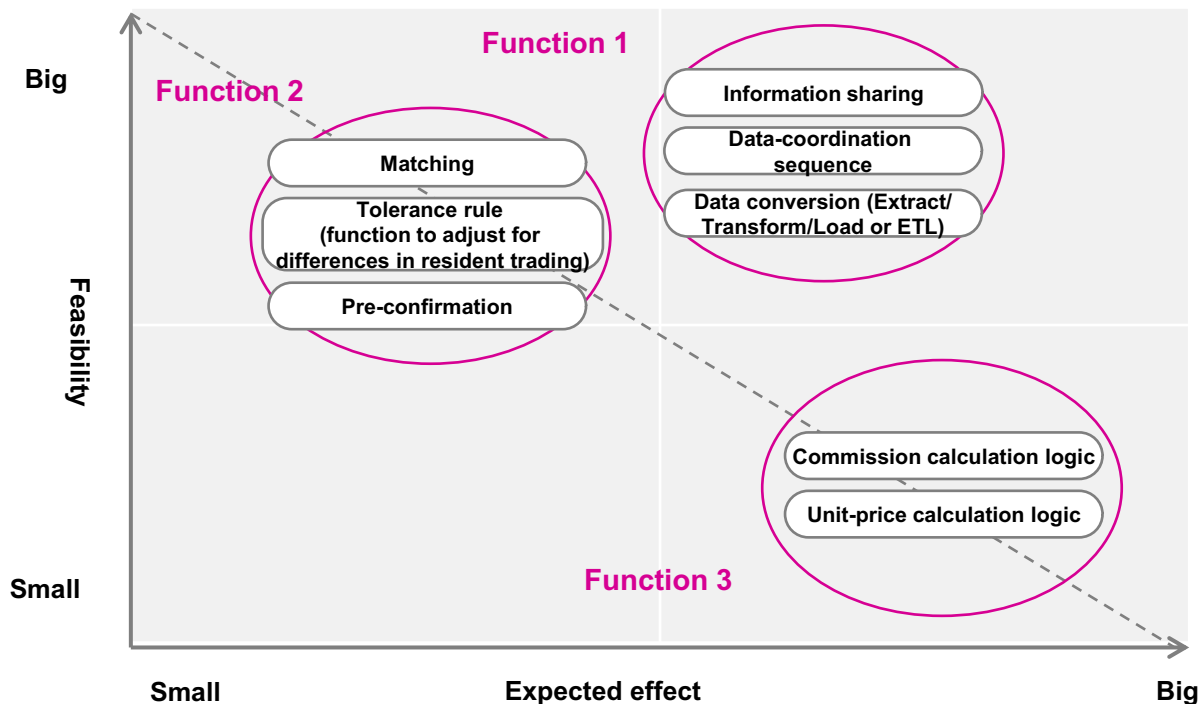
- The DTL system has standardized functions, data and smart contract on DLT. While SPs would provide their services to the client, each company would have their own DLT node and the scandalized function would work on DLT system.
- Data would be stored in DLT, and clients could refer to and control with their own data via any SP.



## III-2. Solution with the DLT system (DLT concept plan) ②

- The library (group of functions) provided by the DLT structure is categorized as follows: data standardization/coordination (Function 1), matching processing (Function 2), and standardization of calculation logic (Function 3).

- Categorization according to the Feasibility (vertical axis) and the expected effect of the function (horizontal axis)



<b>Function 1</b>	Data standardization/coordination
<b>Function 2</b>	Matching Processing
<b>Function 3</b>	Standardization of calculation logic

- ※ Functions 2 and 3 rely on Function 1
- ※ Functions 2 and 3 are parallel and indivisual. (One does not follow the other.)

### III-2. Solution with the DLT system (DLT concept plan) ③

- Aiming to rid “what should be stopped” and optimize the overall work flow process by realizing the DLT system.

		What should be abolished?	Direction of problem solving	Standard Agreement	DLT
Normal time	Diverse requirements/specifications	Coordination not possible between SP systems	<p>The solution is to prescribe the format and decide the items that must be provided and matched.</p> <ul style="list-style-type: none"> <li>This is more an issue of whether the SP will respond rather than an issue for the Buy-side/Sell-side. Incentives for the SP side must be examined.</li> </ul>	○	○
		Different formats and codes for each client/SP system	<p><b>Function 1</b></p> <ul style="list-style-type: none"> <li>To proceed, industrystandard formats and codes are needed.</li> <li>Although it can be used with the existing system, DLT is more suitable for creating a common table.</li> </ul>	○	○
		Troublesome procedures when opening/changing accounts	<ul style="list-style-type: none"> <li>This issue cannot be solved by individual companies. An industry-wide solution is necessary. The solution may be in DLT information coordination.</li> </ul>	○	○
		Response to small differences	<p><b>Function 2</b></p> <ul style="list-style-type: none"> <li>Small differences cannot be completely eradicated.</li> <li>However, the rules regarding small differences can be defined and its processing can be automated.</li> </ul>	○	○
		Commission-calculation methods such as for batch order	<p><b>Function 3</b></p> <ul style="list-style-type: none"> <li>In the absence of an industry standard, each party has formed its own rules.</li> </ul>	○	○
		Processing using individual unit prices	<p><b>Communicating information about the problems and the direction for their solutions</b></p> <ul style="list-style-type: none"> <li>A custom unique to Japan, it is largely determined by requests from the sponsors. Therefore, it cannot be solved by an industry-wide initiative.</li> <li>Government guidance is not effective for its elimination.</li> </ul>	○	○
	Confirmation via E-mail or Fax	<ul style="list-style-type: none"> <li>It is difficult for the Sell-side to propose abolishing it, and it will not disappear on its own. Hopefully this will be solved by an industry-wide initiative.</li> <li>It can be solved by DLT.</li> </ul>	○	○	
When a problem occurs	Diverse responses to system failure	Situation wherein both sides cannot communicate on the same screen	<p><b>Function 1</b></p> <p><b>Function 2</b></p> <ul style="list-style-type: none"> <li>Communication is hindered by the fact that the conversation is conducted through different formats and coding.</li> <li>As DLT allows every day updates, it has the potential to solve this issue.</li> </ul>	○	○
			<ul style="list-style-type: none"> <li>The trading partner will be changed when there is a problem as long as there is an alternative method.</li> <li>SP system coordination using DLT (offering alternative methods that allow work to continue) may solve the issue.</li> </ul>	○	○

## III-2. Solution with the DLT system (DLT concept plan) ④: Function 1

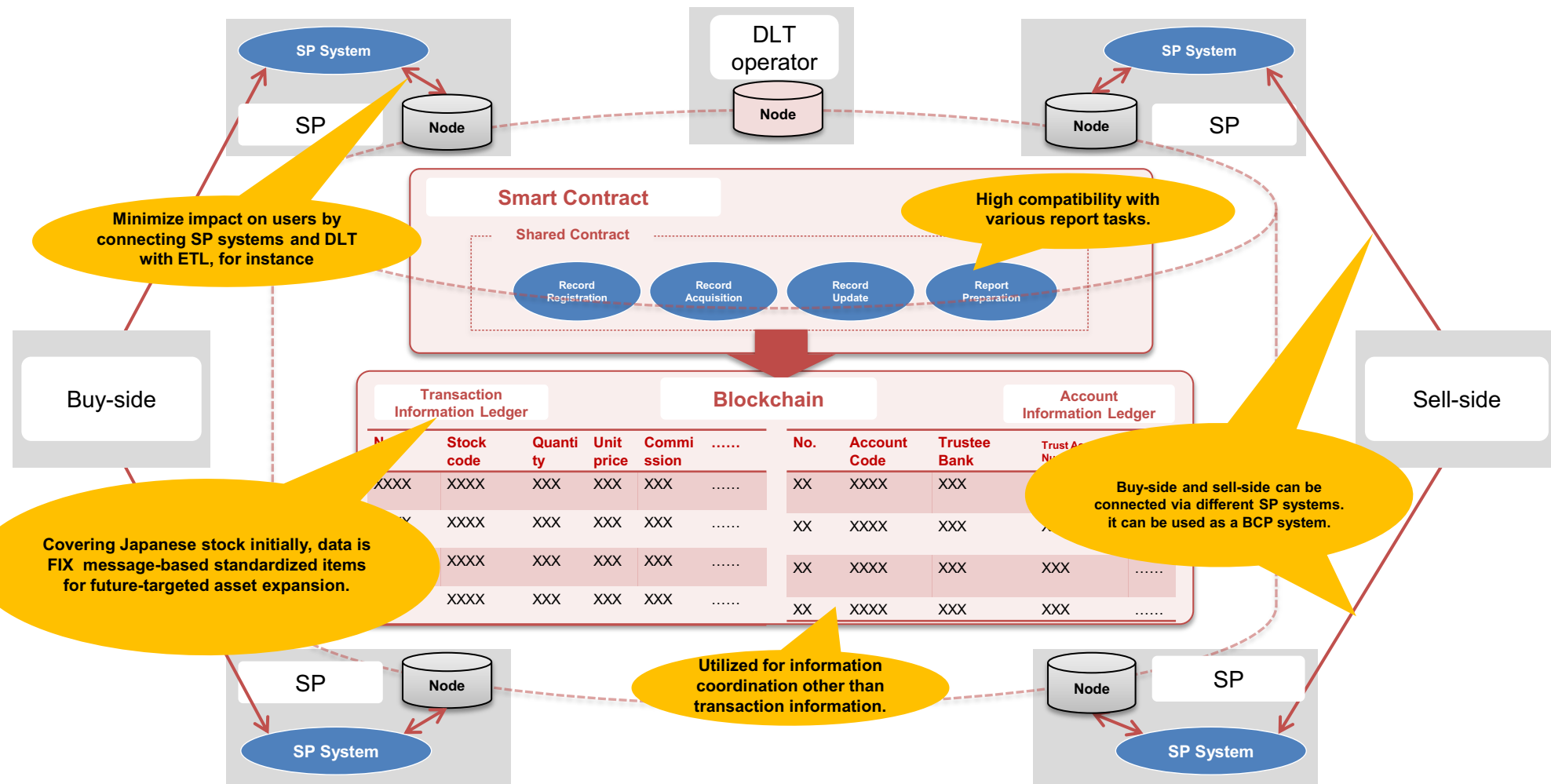
- Constructing the DLT system enable data coordination between SP systems using data with standardized data format .
- By connecting existing SP systems and DLT using ETL\* , minimize systematic impact on SP system users.
- General usage as a infrastructure for industry-wide data coordination is expected additionally.

Function	Summary
<p>1. Data standardization/coordination</p>	<ul style="list-style-type: none"> <li>▶ Realize <b>data coordination between SPs</b> within the DLT platform.</li> <li>▶ Enable <b>trade matching between companies using different SP systems.</b></li> <li>▶ As standardization of different data items and security code of each SP systems is necessary for data coordination, each SP must change their system to follow the standard specification or convert data items using ETL* for connection with DLT.</li> <li>▶ While standardization of matching methods between different SP systems will not be conducted, development will include the function to absorb the differences in the methods.</li> <li>▶ <b>By constructing the DLT system behind the SP systems, the impact on the Buy-side and Sell-side is minimized.</b></li> <li>▶ DLT is expected to work as BCP during a system failure.</li> <li>▶ General usage as the industry <b>data-coordination infrastructure</b>, for instance, for the <b>account information for new funds</b>, is also expected.</li> <li>▶ It is also expected to be <b>highly compatible with various report tasks</b> using ledger information, such as for regulatory reports.</li> </ul>

※ ETL: Extract/Transform/Load is a method/tool used for coordination between systems using different data formats

### III-2. Solution with the DLT system (DLT concept plan) ④: Function 1

- By coordinating between SP systems, reduction of adjustment load for each SP system and use as a BCP system are expected.
- As a general foundation for information infrastructure, DLT system is expected to be used for sharing information other than just transaction information (e.g., SSI information).



## III-2. Solution with the DLT system (DLT concept plan) ④: Function 2

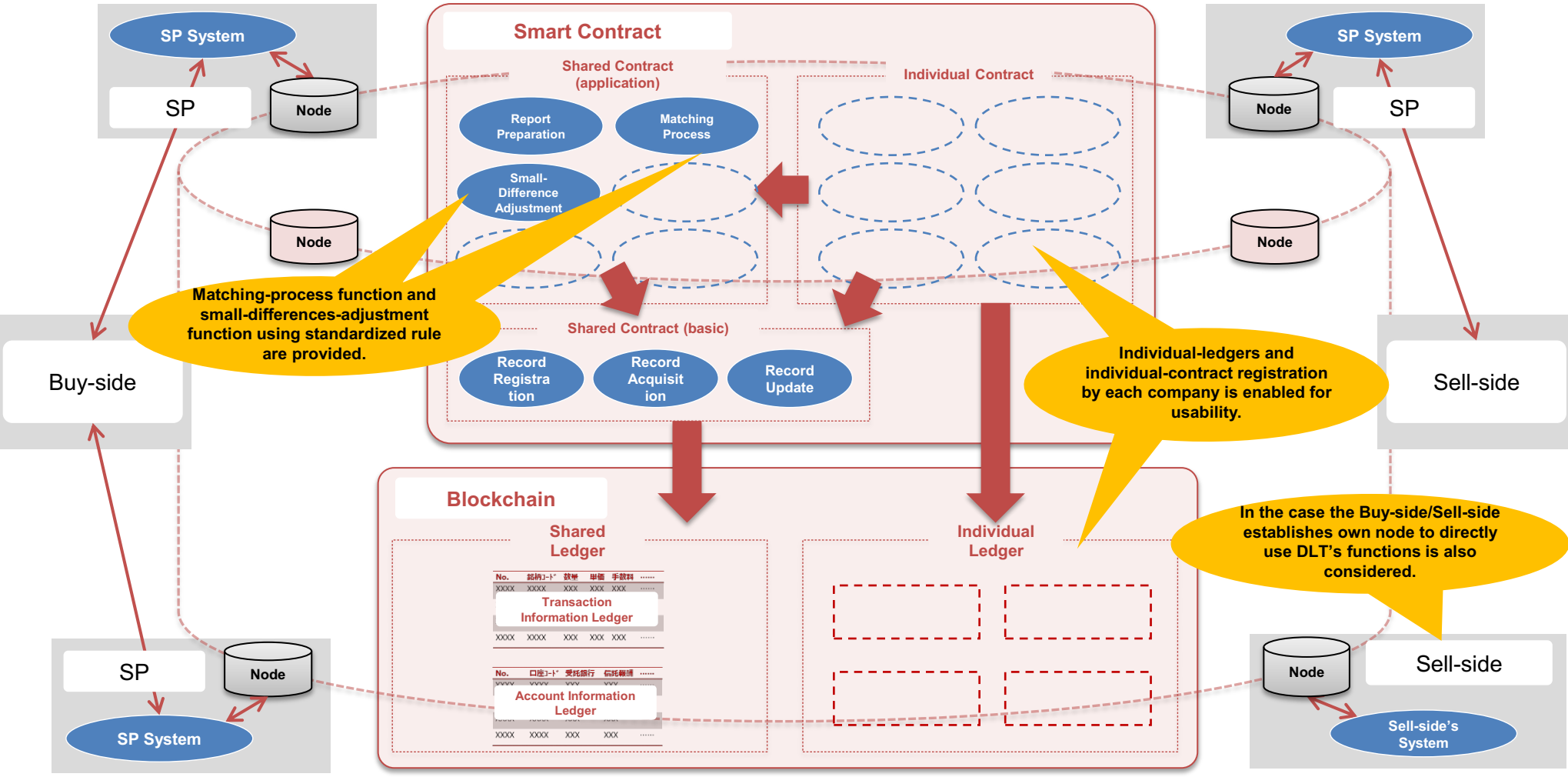
- The matching-process function enable automatic matching between different SP systems.
- While the tolerance rule is effective solution for the small-differences issue, its applying range will be kept to a bare minimum.
- With notification feature, the pre-confirmation communication can be omitted.

Function	Summary
<p>2. Matching process</p>	<ul style="list-style-type: none"> <li>▶ The matching-process function compares calculation results from the Buy-side and Sell-side on the blockchain, enabling <b>automatic matching between different SP systems.</b></li> <li>▶ <b>By incorporating the tolerance rule</b>, such as “when there is a difference within certain amount under a certain condition defined in advance, adapt the amount decided in advance as plus,” <b>a certain level of automation of response to small differences is expected.</b></li> <li>▶ Transaction amount should match basically and the automatic-adjustment function should not be introduced casually for verification discrepancies of unknown cause. <b>Range of applied usage of the tolerance rule for domestic institution trading should be kept at a bare minimum.</b></li> <li>▶ By incorporating a notification function in applying DLT, <b>it may be possible to omit communication of pre-confirmation</b> via E-mail, File Transfer Protocol (FTP), or FAX.</li> </ul>



### III-2. Solution with the DLT system (DLT concept plan) ④: Function 2

- Matching-process function equipped with a small-differences-adjustment feature, enhance automation of confirmation process.
- Include Individual-ledger/Individual contract function and direct participation of Buy-side/Sell-side company.



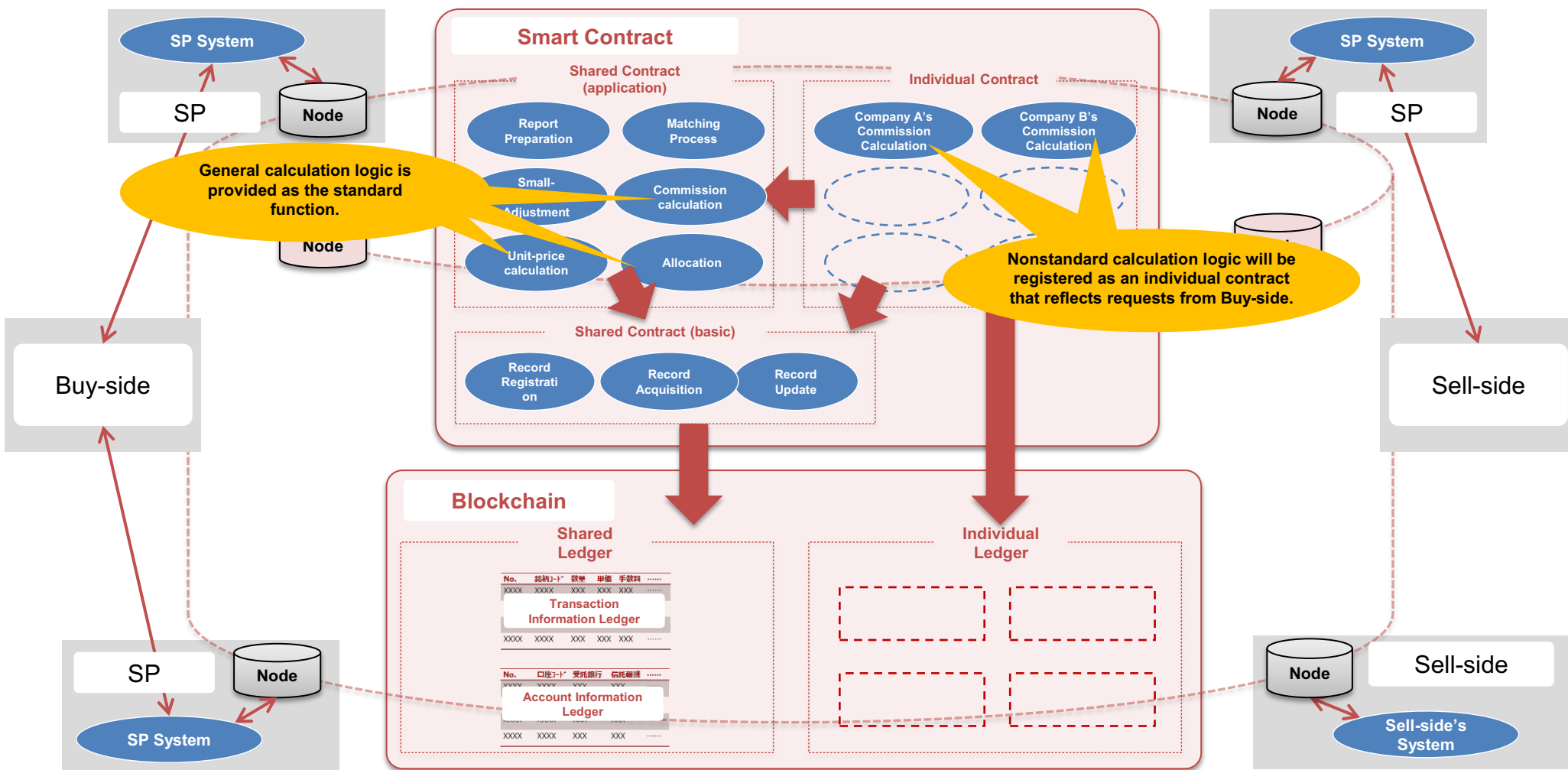
## III-2. Solution with the DLT system (DLT concept plan) ④: Function 3

- Include calculation functions in the DLT system as a smart contract.
- Abolishing the verification process work for reducing operation costs and number of mismatches.
- For each company's unique calculation logic, individual smart contracts will be examined as non-standard method.

Function	Summary
<p>3. Various calculations Calculation-logic standardization</p>	<ul style="list-style-type: none"> <li>▶ <u>Standardized calculation logic agreed upon by the Buy-side and Sell-side (e.g., average unit-price calculation and commission calculation) will be installed as a smart contract on DLT.</u></li> <li>▶ Through this smart contract, <u>the calculation process/matching process</u> (conducted by the Buy-side and Sell-side) <u>will omitted</u>. (Verification itself will become STP.) This will <u>reduce operation costs</u> and number of <u>mismatches</u> in strong time restriction.</li> <li>▶ <u>While most orders are programmable,</u> there are some cases, Buy-side is using a complex calculation logic are often seen.</li> <li>▶ Regarding the programmable patterns, several smart-contract patterns will be installed as standard calculation logic. <u>Unique logics</u> that do not correspond as standard calculation logic <u>will be examined mainly by Buy-side.</u></li> <li>▶ Before the Buy-side deploy smart contract on DLT, it must be reviewed by the Sell-side.</li> <li>▶ Possible methods for smart-contract installation include developing contracts by the Sell-side based on the request from the Buy-side.</li> </ul>

### III-2. Solution with the DLT system (DLT concept plan) ④: Function 3

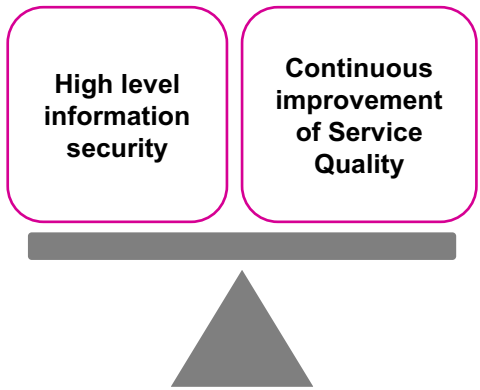
- By installing various standardized calculation methods with DLT, verification work itself can be skipped.
- Unique calculation logic can also be handled by Function 2 or by individual-contract registration.



### III-3. Issues to realize the DLT system plan ①

- High level information security is required for the DLT system for industry-wide usage.
- Timely and continuous system updating and improvement of service quality, timely response to regulations changes, change of trading products and participants, and technological developments are also required.

■ Requirements of the DLT system ①



- Foundation of industry-wide data coordination involving both the Sell-side and the Buy-side.
- Platform for trade matching
- Possibility for expansion as a foundation for sharing information other than transaction information.

- ▶ The DLT system supports industry-wide data coordination that can be used by Buy-side, Sell-side, and all other owners of a node.
- ▶ **High level of information security** is required of the DLT system with availability (full-time access) for industry-wide usage.
- ▶ An ideal system changes to response in regulation changes, trading products and trading participants, and technological development.
- ▶ Timely and continuous updating and service quality improvement to response to the changing environment.

### III-3. Issues faced while realizing the DLT system ②

- Realization of the DLT system requires marketing and management functions in addition system development and operation functions.
- To offer above all functions, establishment of a corporation may be necessary for this project .

#### ■ Requirement for the DLT foundation ②

1.	<b>System development/operation function</b>	<ul style="list-style-type: none"> <li>▶ Function to develop a system with guaranteed <b>high-level information security</b> and to stably operate the same.</li> <li>▶ Function to <b>appropriately update</b> the developed system to response to changes in business environment and users' needs.</li> </ul>
2.	<b>Sales/Support/Marketing</b>	<ul style="list-style-type: none"> <li>▶ <b>Sales</b> function to gain users, <b>Support</b> function for the users and potential users</li> <li>▶ <b>Marketing</b> function for appropriately understanding the users' needs.</li> <li>▶ <b>Research/Study</b> function for promptly understanding changes in environment, such as legal revision.</li> </ul>
3.	<b>Management</b>	<ul style="list-style-type: none"> <li>▶ <b>Financing</b> function to procure necessary funding</li> <li>▶ <b>Profit creation and accumulation</b> function for continuously creating profit and maintaining stable financial base</li> <li>▶ <b>Resource-distribution</b> function for allocating part of the profit for system updating or new investment in order to find next stable revenue source</li> <li>▶ <b>Governance</b> function for enabling fair, transparent, and healthy operation of the business.</li> </ul>

► **Possibility of establishment of a corporation for managing this project**

## (Reference) Discussion on the form of incorporation

- Considering the necessity to secure management transparency, work optimization, incentive for new businesses, and diversification/smoothing of financing, Corporation is the suitable type of organization for the managing DLT system development/operation.

### ■ Comparison of organizational structure for the consideration of operator's organization

Requirements	Corporation	General incorporated association	General incorporated foundation
Involvement of the users in the decision-making for management.	○ (Through investment, investors can be involved in the decision-making as a shareholder.)	○ (An individual can be involved as staff through an approval from the board of trustees.)	△ (Depending on the sponsor of the establishment)
Securing management transparency	◎ (A company with directors is required to appoint an auditor) (A large company is required to appoint an auditor)	○ (A company with a board of trustees is required to appoint an auditor)	○ (With a trustee system)
Incentive for business optimization	◎ (The directors' duty is prudent management) (Surplus funds can be distributed among the investors)	○ (The trustees' duty is prudent management)	○ (The trustees' duty is prudent management)
Prompt response to needs and incentive for starting a new business	◎ (The directors' duty is prudent management) (Surplus funds can be distributed among the investors)	○ (The trustees' duty is prudent management)	△ (Depending on the sponsor of the establishment)
Diversification/smoothing of financing	◎ (Capital increase is possible; it can be listed)	△ (Financing through fund raising is possible)	× (In reality, limited to borrowing)

※ A large company is a joint-stock company with more than half a billion yen in capital or with more than 20 billion yen in liabilities.

## IV. Future Prospects

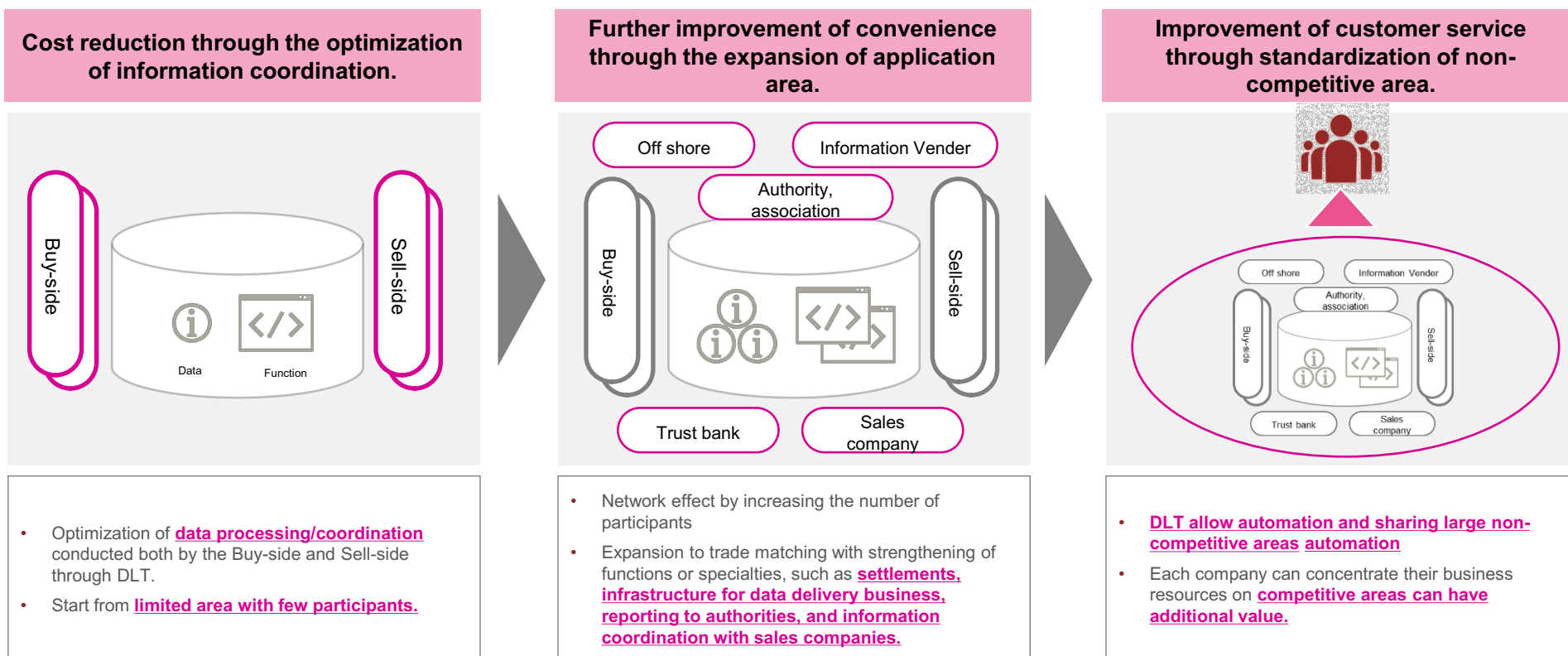
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## Expected effect of DLT foundation :medium to long term

- DLT foundation allow to change each company's non-competitive functions such as data processing/coordination which each company in industry has redundantly to standardized and automated functions.

It may cause the concentration of business resources to an appropriate competitive area.

### ■ Expected effect of DLT foundation application in medium to long term





- This DLT application plan is an effective choice for improvement of work efficiency in financial systems and for creation of new services and products. We consider it will also generate considerable benefits to the investors who are the ultimate beneficiaries.
- For the realization of this plan, the business framework which holds responsibility of the system development and administration, budget management and fund development will be required.
- We will continue to work for realization of this plan through further coordination with all the related companies.