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Japan Fair Trade Commission

Report on Trade Practices in Cloud Services Sector (Summary)

for

“Competition in Cloud Computing and Other Disruptive Technologies: What’s on the Horizon ?”

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Reiko AOKI
Commissioner, the Japan Fair Trade Commission (JFTC)

* The views expressed in this presentation are solely the speaker’s and do not necessarily reflect the views of the JFTC.

Cloud services subject to the survey

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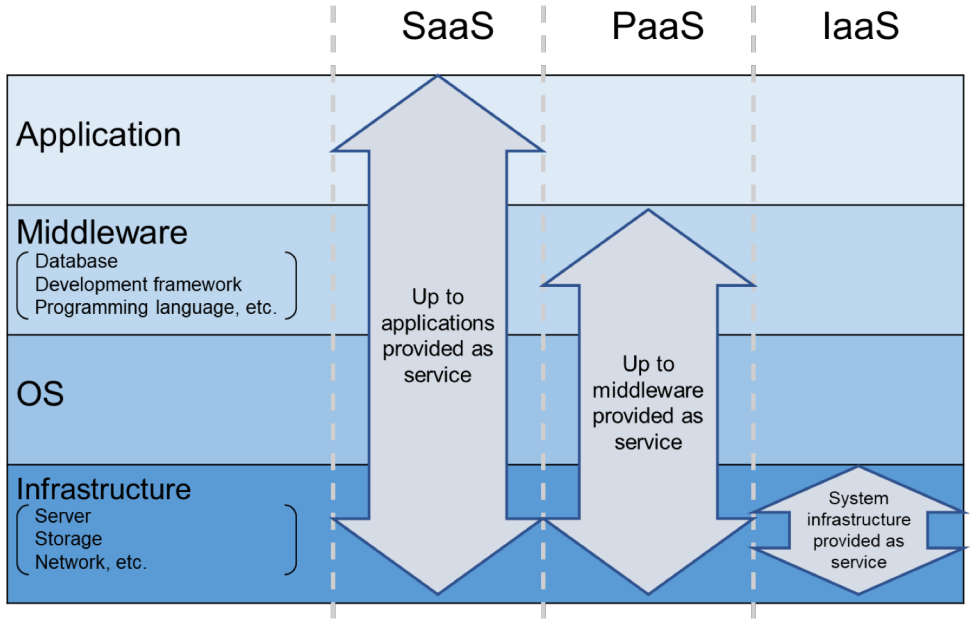
- The survey mainly targets IaaS and PaaS with a focus on their roles of the cloud services as the foundation or a component in the digital market.
  (On the following pages, “cloud” refers to IaaS and PaaS, unless otherwise specified.)

Classifications of cloud services by service model



Source: Data produced by JFTC, based on documents such as NIST Special Publication 800-145: *The NIST Definition of Cloud Computing*, by Peter Mell and Timothy Grance (September 2011)

IaaS（Infrastructure as a Service）

- IaaS provides infrastructure resources such as servers, storage and networks via a network (to enable the construction of infrastructure in a virtualized environment).
- The CSCs must introduce and manage its middleware, applications and other software by themselves.

PaaS（Platform as a Service）

- In addition to infrastructure resources, PaaS provides platforms and middleware resources required to operate applications via a network.
- When an environment for application development and execution is provided, for instance, the CSCs can start developing applications without the need to build their development environment by themselves.
- Now, PaaS also provides functions for the foundation of IoT and AI.

SaaS（Software as a Service）

- SaaS provides applications that operate on cloud infrastructure via a network.
- For example, SaaS provides groupware and Customer Relationship Management (CRM).

Overview of Cloud Service Market

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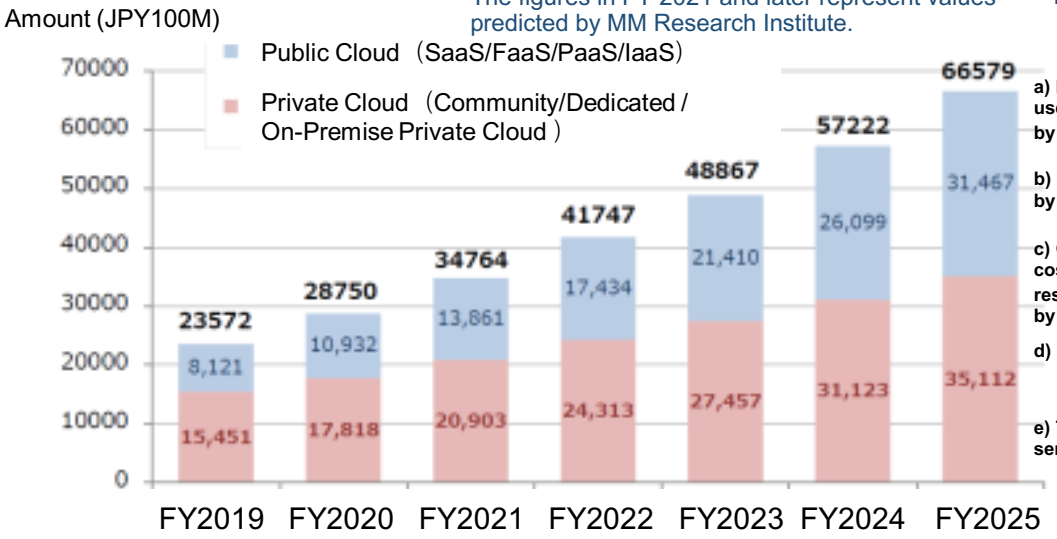
- The performance-based scale of the cloud service market (including SaaS) was nearly 3 trillion yen in FY 2020 and it is also expected to continue to expand.
- Only 10 to 20% of the respondents of the questionnaire have introduced “multi-cloud*,” which uses a combination of cloud services (IaaS/PaaS) provided by different providers.

* “Multi-cloud” is a cloud configuration that allows you to introduce multiple IaaS/PaaS provided by different providers and use a combination of the IaaS/PaaS by selecting the best service for each operation or assign the same function to IaaS/PaaS provided by different providers to achieve redundancy.

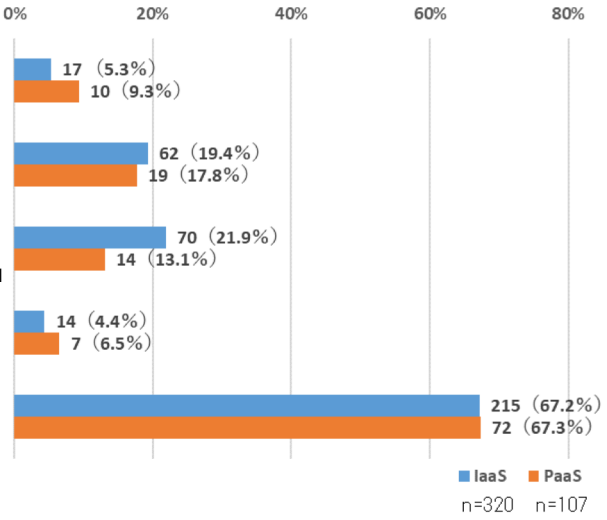
Changes in the market scale of the cloud service market

* Including SaaS
* The figures in FY 2021 and later represent values predicted by MM Research Institute.



Reasons why multi-cloud is yet to be introduced

(Questionnaire results from CSCs that answered they were yet to introduce it; multiple responses allowed)



Source: MM Research Institute, Ltd., *Trends in Demand for Cloud Services in Japan (2021 Edition)*

Advantages of cloud services (proportions of CSCs that answered in the CSC questionnaire, regarding reasons why they had introduced IaaS/PaaS)

- Flexibility / swiftness of construction (IaaS: 64.0%, PaaS: 55.1%)
- Effective use of internal IT human resources by outsourcing maintenance/operation (IaaS: 57.1%, PaaS: 52.0%)
- Availability/reliability (IaaS: 54.9%, PaaS: 45.7%)

Cost/number of cloud services (commented by CSPs)

- The cost of cloud services is on the decrease, especially for IaaS.
- The number of services provided by CSPs that have a large market share is increasing every year.

Changes in the market share of the cloud service market

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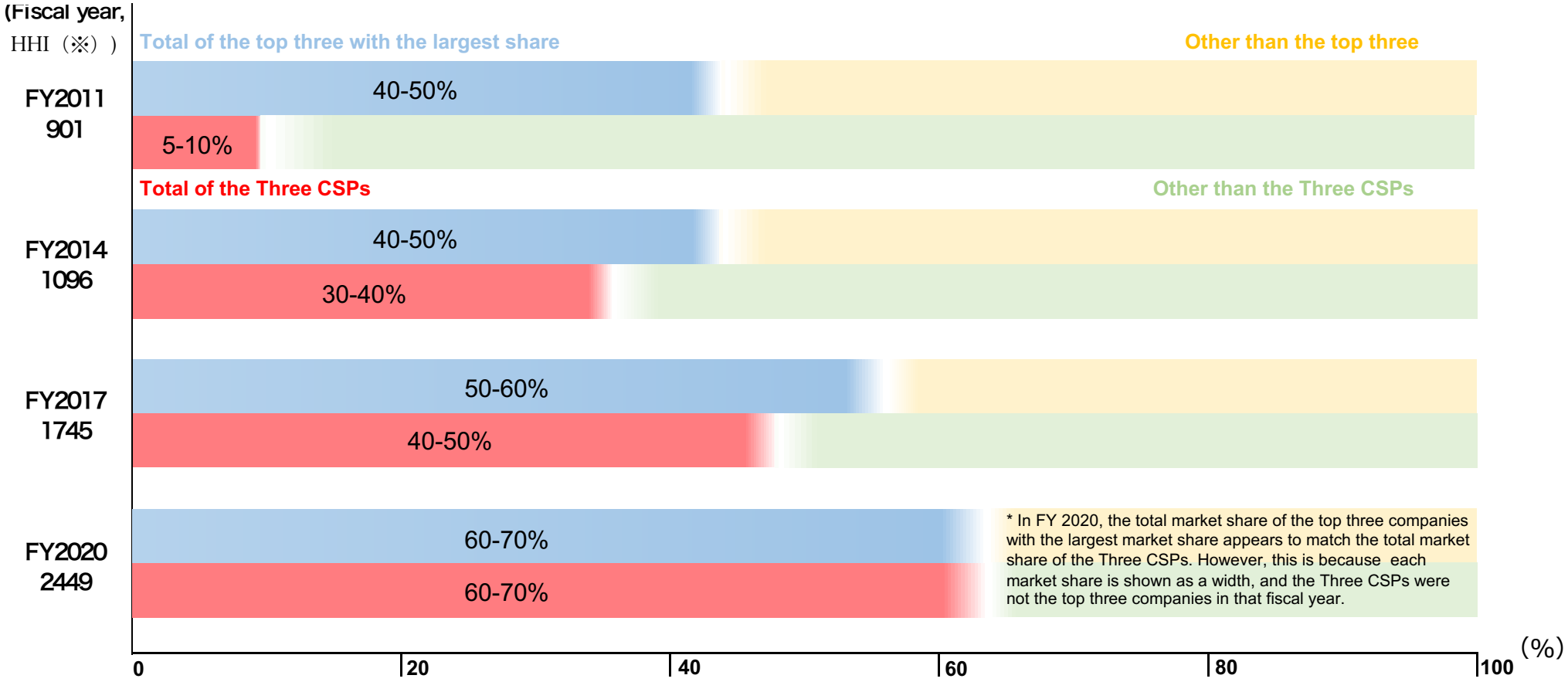
- The degree of market concentration in the IaaS and PaaS markets is increasing every year.
- Amazon Web Services (AWS), Microsoft and Google (hereinafter “the Three CSPs”), in particular, are expanding their market shares significantly.

Changes in the total market share of the top three companies with the largest market share in Japan and the total market share of the Three CSPs
(Total of IaaS and PaaS)



Source: The presented data was calculated by JFTC, based on information submitted by CSPs and *Present Situation and Future Outlook for Cloud Computing 2021 (Market)*, which was issued by Fuji Chimera Research Institute, Inc.

※ HHI (Herfindahl-Hirschman Index) is calculated by the sum of the squares of the market shares of each business in the market. The HHI in the figure is the sum of each of the Three CSPs.

Characteristics of Cloud Service Market (1)

Factors for Competitiveness

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In the cloud service market, the degree of its market concentration is increasing gradually and this trend is expected to continue in the future due to the following market characteristics.

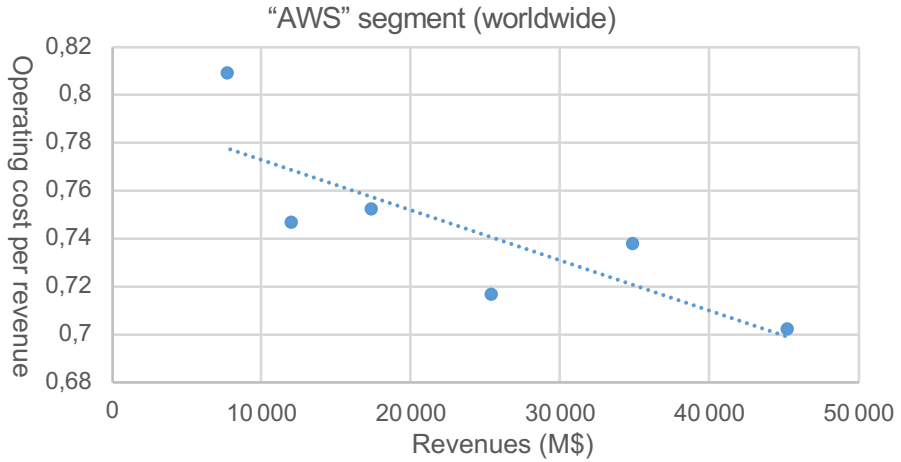
1. Competitiveness based on economies of scale
2. Competitiveness based on economies of scope
3. Competitiveness based on a wide range of provided services
4. Indirect network effects due to an increase in related businesses
5. Tendency among CSCs toward preferential use of services provided by current providers

1. Economies of scale

Competitiveness based on economies of scale includes that, as the scale of a business increases, it can reduce the procurement costs of hardware required to provide cloud services such as data centers and servers, electricity required to operate the hardware, etc.

2. Competitiveness based on economies of scope

A CSP may have an advantage from a cost perspective by using its equipment and technologies used in its existing businesses (other than cloud services) in its cloud services business, which can generate synergistic effects.



* Prepared by JFTC, based on Amazon.com, Inc. Form10-k (2015 - 2020).

A yearly trend on AWS can be recognized that its operating cost per revenue is on the decreases while its revenue is increasing.

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3. Competitiveness based on a wide range of provided services

For cloud services, it is important to have an ability to develop technologies that can provide a wide range of services and functions to meet diverse needs of CSCs in addition to differentiating each individual service.

[Result of the CSC questionnaire]
Regarding the reason why each CSC chose its current CSP, 22.9% of IaaS customers and 30.8% of PaaS customers answered, “There are abundant related services that operate on the cloud service, including (first-party) software and applications provided by such CSP.”

4. Indirect network effects due to an increase in related businesses

When there are a larger number of introduction support providers and engineers experienced in technologies related to a particular cloud service, CSCs have more opportunities to receive services optimized to their own needs. Then, as such cloud service becomes more convenient for CSCs and the number of CSCs using such service increases as a result, the number of introduction support providers and engineers dealing with such cloud service also increases as an indirect network effect.

[Result of the CSC questionnaire]
Regarding the reason why each CSC chose a particular cloud service, 23.1% of IaaS customers and 20.5% of PaaS customers answered, “There are a large number of introduction support providers and engineers, including SIer* and consultants, who can deal with that cloud service.”
* A company or individual who undertakes the construction and operation of information systems. Abbreviation for "system integrator".

5. Tendency among CSCs toward preferential use of services provided by current providers

When CSCs expand their use of cloud services, they tend to give priority to the services of CSPs they already use.

[Result of the CSC questionnaire]
Regarding a hypothetical expansion of use of IaaS or PaaS, 62.5% of IaaS customers and 63.7% of PaaS customers answered that they would consider their current CSP in principle or somewhat.

Characteristics of Cloud Service Market (3)

Service Switching

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- While a majority of the respondents have experienced switching from an on-premise service to a cloud service, **little switching from cloud services to on-premise would occur under a hypothetical price increase of 5-10%.**
- **Under a hypothetical price increase of 5-10%, there would also be little switching to other CSPs' services.**

Switching between a cloud service and on-premise service

(Analysis based on results of the CSC questionnaire)

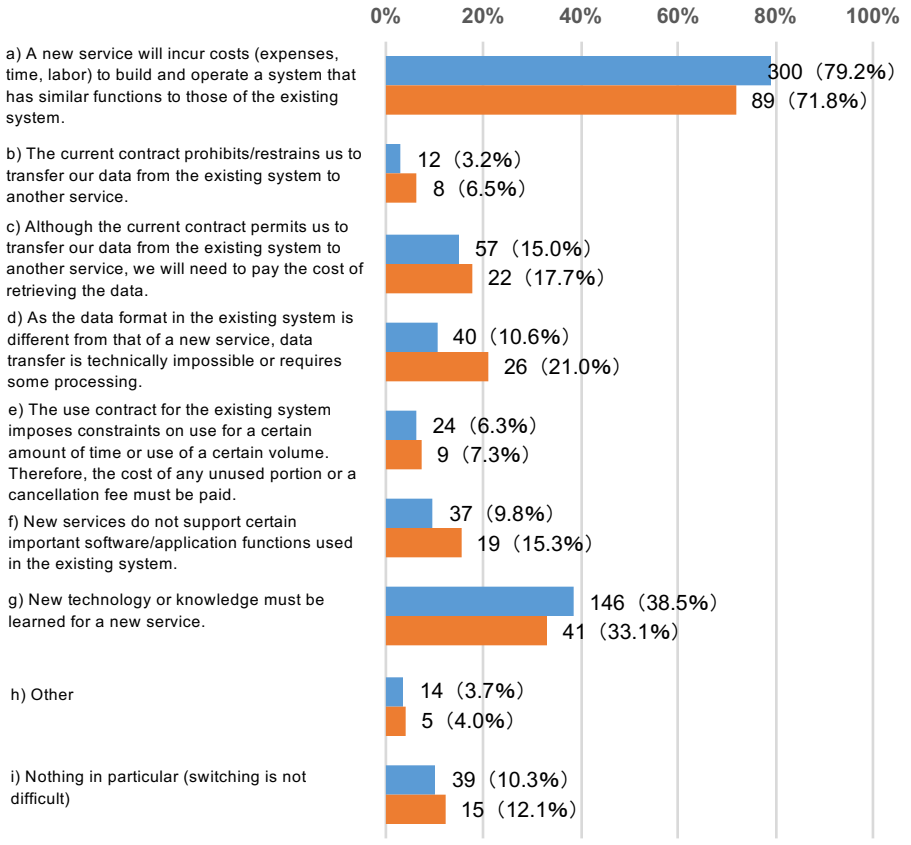
- 319 of 548 questionnaire respondents (58.2%) have experienced switching from on-premise services in the past.
- Even if all cloud services increased in price by 5-10%, **315 out of 533 respondents (95.7%, excluding 204 respondents who answered "unsure") answered that they would continue to use cloud services.**

Switching between cloud services

(Analysis based on results of the CSC questionnaire)

- If the price of currently used cloud services were to increase by 5-10%, **263 out of 480 respondents (85.9%, excluding 174 respondents who answered "unsure") would continue to use the cloud services they currently use.**

Factors that make it difficult to switch from the current cloud service (multiple responses allowed)



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- To make competition continue to function effectively in the cloud services market, it is **important to develop an environment in which a wide variety of businesses provide services and CSCs can freely select cloud services as needed.**

Basic views for preventing negative effects by concentration of market shares

(1) The contractual, technical, and economic constraints that CSCs face when switching are reduced as much as possible, such as that **CSCs should be able to switch to other cloud services or port to their own on-premise option if they wish,** and should not be required to bear excessive costs from the CSPs in doing so.

(2) **Interoperability of services between different providers should be ensured**. and **CSCs should be able to use IT services and software from different providers in a single system environment, regardless of format (cloud or on-premise),** in response to changing circumstances such as their changing needs or the appearance of innovative services from new providers, with the minimum necessary contractual, technical and economic constraints faced by CSCs in doing so.

Competition Policy Views (2)

Fairness and Transparency of Transactions

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- There are some issues concerning fairness and transparency of transactions, such as **asymmetry of information** between CSPs and CSCs.

Basic views for ensuring fairness and transparency

(1) For services such as cloud services, for which it is often not easy for CSCs to switch services once they have started using them, it is especially important that **appropriate information is provided to CSCs before they start using the services, so that CSCs can voluntarily and rationally select services that are necessary for them.**

(2) In order not to prevent CSCs from combining or expanding services, it is necessary that **appropriate information on the contents of the service shall be provided even after the conclusion of the contract.** In addition, it is desirable that **a system will be established to appropriately accept consultation and negotiation from CSCs.**

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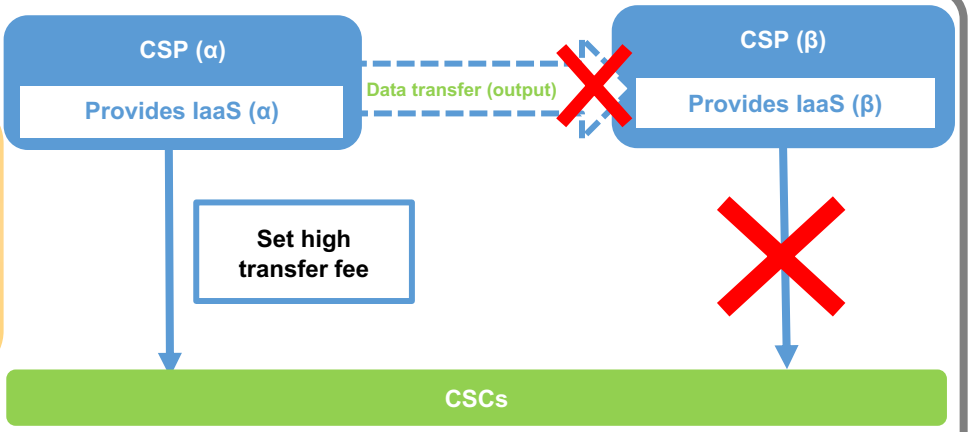
Setting of a data transfer fee

Comment from CSC, etc.

We have heard that, **as the data transfer fee for use of IaaS is set free for input, but expensive for output,** the high transfer fee for migration of accumulated data is a hurdle to switching cloud services.



Explanations by CSPs

The data transfer fee reflects costs associated with the development and maintenance of network infrastructure to provide network services to CSCs.
Our company is expanding our free data transfer allowance, which is applied to most of our CSCs. Charging for the excess of the free quota allows each CSC to pay a fairly calculated fee based on its usage.

Many CSPs may choose not to charge CSC for data input so as to support switching from other cloud services, and instead recover the cost of data transfer at the time of the CSC's data output.
CSPs provide CSCs with information about such cost for data transfer.

Views from the AMA and the competition policy

(★: Views from the AMA, ■: View from the competition policy)

★Setting an unfairly high data transfer fee by a CSP influential in the cloud services market would be a problem under the AMA, if it causes foreclosure effect (i.e., In the case that it will prevent CSCs from using cloud services provided by other CSPs, which may result in the exclusion of other CSPs or the decrease in trade opportunities for such other CSPs). (Interference with a competitor's transactions, etc.)

■ It is desirable that the data transfer fees at the time of output shall be reduced as much as possible, so as not to prevent CSCs from switching the cloud services.

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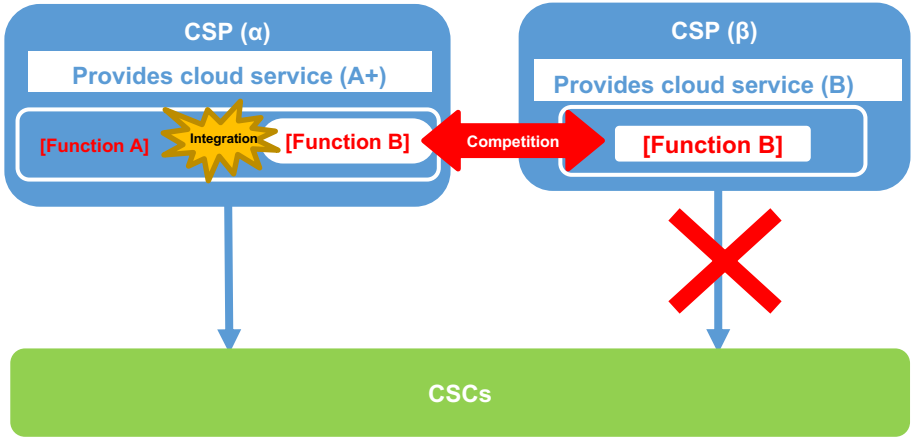
Integration of different functions that are traded independently

Comment from CSC, etc.

In a situation where CSP α provides Cloud Service A with Function A, and CSP β provides Cloud Service B with Function B in the market, CSP α may **integrate Function B into said Cloud Service A and provide it to CSCs as a new Cloud Service A+.**



Explanation by CSPs

Integrating different functions into a single product is a hallmark of technology products. For example, early productivity applications and "spell check" services were separate applications, but later spell check functionality was embedded into the productivity applications. Similar to this example, SaaS is also oriented toward adding functionality that increases the value of the service.

Views from the AMA and the competition policy

(★: Views from the AMA, ■: View from the competition policy)

★In the case CSP α is influential in the market of Function A, integrating Function B into Cloud Service A and providing it to CSCs as a new Cloud Service A+ or bundling Cloud Service A with Cloud Service B to CSCs would be a problem under the AMA, if such conducts cause foreclosure effect for the Cloud Service B market (i.e., In the case that such conducts may result in the exclusion of existing competitors and new entrants or the decrease in trade opportunities for such players.). (Tie-in sales, etc.)

■In order to enable other CSPs and software vendors to provide services in a fair competitive environment and to allow users to select the services they need from a wide variety of services, it is desirable that each function and service shall be provided as an independent service under reasonable conditions so that users can individually select each function and service that is subject to function integration or bundling.

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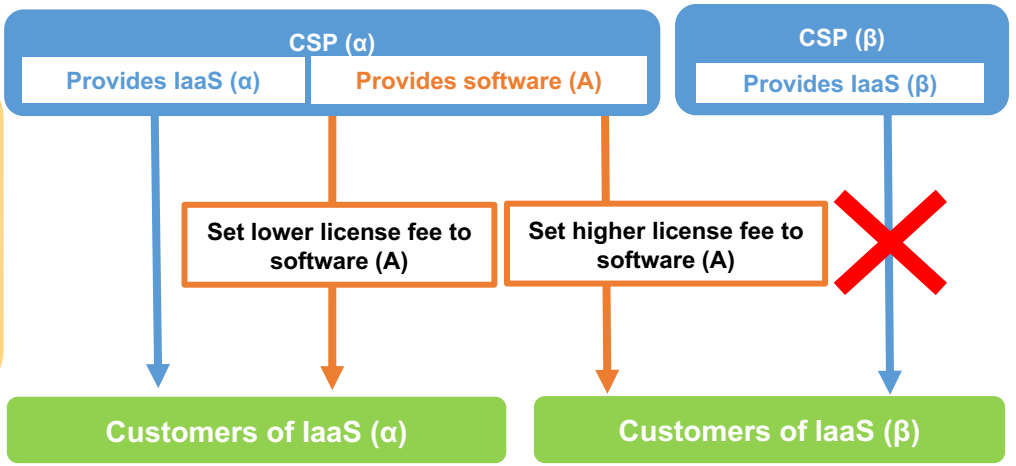
Self-preferential treatment in the licensing of software used in cloud services

Comment from CSC, etc.

When offering specific software to CSCs, some CSPs **set a higher license fee or differentiate support conditions when CSCs use the software on other CSPs' cloud services compared to when CSCs use the software on their own cloud services.**



Explanation by CSPs

A customer who has a license for certain software and wishes to operate that software on a new cloud service may receive an additional discount for the use of the software license from the relevant CSP. The customer may also purchase services related to such software from other CSPs who have obtained a license from us, and such CSP may offer the same discount to the customer as we do.

Views from the AMA and the competition policy

(★: Views from the AMA, ■: View from the competition policy)

★Setting an unfairly high software license fee by a CSP influential in the software market only for CSCs of IaaS provided by such CSP's competitor would be a problem under the AMA, if it causes foreclosure effect (i.e., In the case that it will prevent such CSCs from using cloud services provided by other CSPs, which may result in the exclusion of such other CSPs or the decrease in trade opportunities for such other CSPs). (Discriminatory consideration, discriminatory treatment on trade terms etc., interference with a competitor's transactions, etc.)

Thank you!