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**Cloud computing's biggest benefit
for financial institutions is PaaS**

The term "cloud" is often heard in the IT industry. Financial market players tend to associate cloud computing with cost-cutting, but among cloud computing technologies, PaaS has the potential to substantially benefit financial institutions operationally.

What is a "cloud"?

Cloud computing is the concept of utilizing computer resources as services on an as-needed basis. It is highly scalable and enables available resources to be flexibly adjusted in size, but the resources' physical location is concealed. Hence the name "cloud." The term dates back to 2006, when it was first mentioned publicly by Google CEO Eric Schmidt. In the four years since, e-mail environments and software (e.g., CRM¹) packages) have become available over the Internet.

Cloud computing services can be classified by provider, use, or various other attributes. I present two classification schemes herein, one based on service models (Exhibit 1) and the other based on users (Exhibit 2). Because the term "cloud" is defined conceptually and classified variously, it may be seen as merely a trendy buzzword by some. Regardless of how the term comes to be used in the future, however, cloud-related technologies and service models continue to advance and will clearly play a fundamental role in future IT system usage.

Cloud computing's potential for Japanese financial institutions

Among Japanese financial institutions, migration to cloud computing is likely to be limited to localized usage over the near term.

Major financial institutions operate their core IT systems at their own data centers. These systems are developed and maintained by in-house staff or subsidiaries. In this realm, they are likely to develop private clouds that utilize cloud-related technologies to reduce their number of physical servers through virtualization and/or improve system utilization through dynamic resource allocation. From an economic standpoint, cloud computing requires economies of scale. Major financial institutions therefore may begin by taking small steps toward cloud computing as cost-cutting initiatives (e.g., reconfiguring networks and/or other hardware) without having to completely upgrade their core system infrastructure.

Among other financial institutions, many are currently using shared services furnished by ASPs². In actuality, it can be said that they are already using SaaS or a community cloud for core applications. If providers were to spearhead migration to cloud technologies, the content of the services provided would ostensibly not change from

Exhibit 1. Classification by service model

Service model	Description
SaaS (Software as a Service)	Provision of software via the Internet. Examples include Google Apps (Gmail, Google Calendar, etc.) and Salesforce CRM.
PaaS (Platform as a Service)	Provision of development environment and middleware via the Internet as a platform for building applications. Examples include Google App Engine, Windows Azure, and Force.com.
IaaS (Infrastructure as a Service)	Provision of hardware (e.g., servers, storage) via the Internet. Examples include Amazon EC2 (Elastic Compute Cloud).

Source: NRI, based on National Institute of Standards and Technology (NIST) definitions

Exhibit 2. Classification by user type

Type	Description
Private cloud	Cloud computing environment built for a specific user.
Community cloud	Cloud computing environment shared by multiple organizations. Provided by the participating organizations or a third-party provider.
Public cloud	Cloud computing environment available to the general public via the Internet.
Hybrid cloud	Cloud computing environment that combines public and private clouds.

Source: NRI, based on NIST definitions

the standpoint of users (financial institutions). Users' cost savings would therefore likely be limited.

Additionally, financial institutions of all sizes and types are apparently increasingly using SaaS cloud services for generic applications such as CRM. Among financial institutions, adoption of cloud technologies and services is already becoming essential in realms where it is clearly cost-beneficial.

Cloud computing's benefits are not limited to cost savings alone

Although adoption of cloud computing by financial institutions appears to be driven solely by cost-cutting, cloud computing offers other benefits. I believe that PaaS will increase in importance as a cloud service model directly beneficial to not only IT staff but operations departments also.

Financial institutions have many routine business processes that are not automated even on their core IT systems. PaaS is an effective means of systematizing operations that financial institutions have hitherto managed to keep up and running through EUC or EUD³. EUC and EUD are recognized by both operations departments and IT staff as problematic in terms of controls, including maintainability and business continuity, but they have benefits in terms of cost efficiency, flexibility to meet requirements and, until now, speed. Financial institutions have consequently been resorting to EUC and EUD for lack of a better alternative.

With PaaS, users are provided a suite of development tools, enabling flexible system operation in a controlled environment. From the standpoint of operations departments, PaaS is on a par with EUC/EUD in terms of benefits. Meanwhile, PaaS also offers substantial incentives to IT staff and providers by enabling development of controlled, highly maintainable systems.

Financial institutions have many important operations that cannot be reduced to routine procedures and operations that involve gathering and analyzing data from spreadsheets dispersed throughout their organizations. If

such operations can be automated and executed from a browser linked to a data center, such an advance would be a revolutionary breakthrough.

Building a PaaS environment

In building and providing a PaaS environment, IT staff and system providers should pursue more of an integrated approach technologically and operationally.

To facilitate system building in a PaaS environment, key systems must be easy to use and data easily referenceable. Otherwise, it would be more costly and time-consuming to build a PaaS environment than a conventional one. Financial institutions will likely have to restructure their legacy systems and adopt technologies such as SOA⁴. Additionally, if access to the development environment is made available to operations departments, controls over system operating and development environments will also be needed. Operationally, desired capabilities include the ability to analyze and integrate or disaggregate business processes and the ability to optimally configure the location of data. Good judgment in such matters is another required capability.

For financial institutions to enjoy cloud computing's benefits other than cost savings, their IT staffs and system providers will have to act as operational and technological coordinators.



Note

1) CRM (customer relationship management) is a method whereby companies build long-term relationships with their customers by using IT systems to manage information on interactions with individual customers (e.g., product purchases, maintenance service, inquiries, claims) based on a detailed customer database.

2) An ASP (application service provider) is a provider of application systems via a network.

3) EUC (end-user computing) and EUD (end-user development) both refer to system development by users, not IT staff.

4) SOA (service-oriented architecture) is a modular design method for large IT systems. With SOA, business processes are broken down into components called "services" that are interlinked with standard technologies.

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