Cloud Service "EXaaS™"

Yasushi Date   **Masahiro Kawahara**
Koji Shimazaki   **Jiro Naniwa**

Cloud services allow customers to use servers and applications whenever they require and as often as necessary without worrying about communication networks or specific computers.

To the service provider, cloud services are technologies to provide services on a platform in which equipment, software, operation and maintenance have been fully optimized through virtualization/standardization/automation.

In general, cloud services can be largely divided into three classes depending on the service tier (**Table 1**) or service form (**Table 2**).

Table 1. Cloud Service Classification According to Service Tier

Name	Provided Service
SaaS (Software as a Service)	Applications are provided as service
PaaS (Platform as a Service)	Platforms for running applications are provided as service
IaaS (Infrastructure as a Service)	Servers, CPUs, storages and other infrastructures are provided as service

Table 2. Cloud Service Classification According to Service Form

Name	Service Form	Feature
Private Cloud	Resources are shared within a company or business group	Flexibility to meet the requirements of individual customers
Shared Cloud	Resources are jointly shared by multiple affiliated companies	Less freedom compared to the private cloud, but lower cost burden per company
Public Cloud	Resources are shared over the Internet by an undetermined number of general users	Provides generic functions to accommodate large number of users making it difficult to customize for individual requirements

Today, cloud services are provided by a variety of businesses, and customers' request to "use advanced features safely and securely at an optimal cost" seems to be met.

However, many of the services are generic standardized services as represented by the public cloud and does not demonstrate the full potential of cloud utilization.

EXaaS Concept

EXaaS™*1) is a new cloud service that maximizes the benefits of cloud computing and combines services from business sectors in which OKI has expertise. EXaaS provides applications, but also supports Life Cycle Management (LCM) of general-purpose terminals as well as specialized terminals such as ATMs and ticketing machines, thereby offering customers the sense of safety and security (**Figure 1**, **Figure 2**).
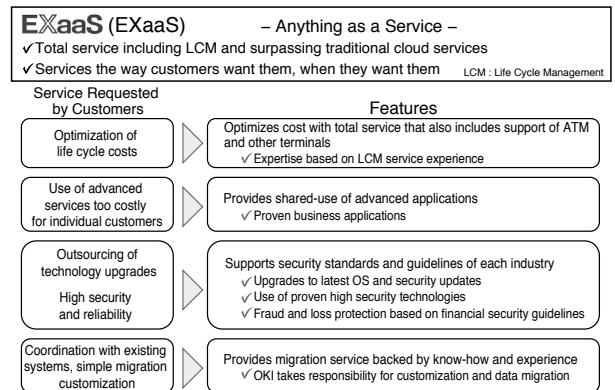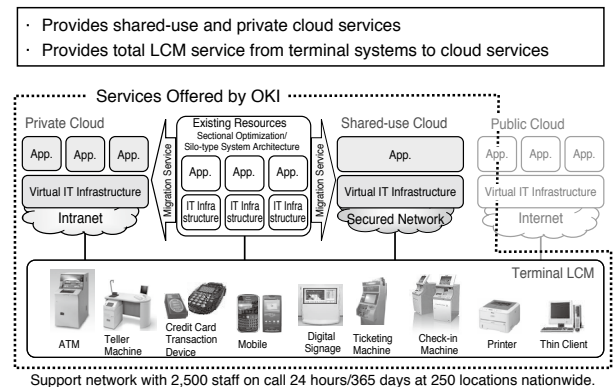

Figure 1. EXaaS Concept

Figure 2. EXaaS Services

Cloud SI Service

One of the services offered with EXaaS is the private cloud SI (system integration) service, which sets up a cloud infrastructure on the customer's premise.

(1) Features of Private Cloud Implementation Service

To enjoy the benefit of a private cloud environment, one must draw out a precise implementation roadmap of cloud-based technologies that covers everything from planning to operation. Preparation of such a roadmap would require actual experience constructing and operating a private cloud infrastructure.

OKI has taken the experience gained from implementing/operating its own private cloud and offers it as the Private Cloud Implementation Service.

The implementation service is composed of the following.

1) Private Cloud Implementation Consulting Service

In studying cloud implementation, gap between the current situation and "ideal" infrastructure is analyzed. Then, a grand design and implementation roadmap is formulated to achieve the "best overall" infrastructure.

2) Private Cloud Construction Service

Based on the results of the consultation service, design/construction of the system infrastructure and operational design are performed.

3) System Platform Procurement Service

The service provides the equipment necessary to form the system infrastructure.

4) Operational Support Service

The service provides technical support and maintenance of the implemented equipment. Aftercare services such as design change consultation and study for the next phase are also offered.

With these services, a private cloud environment that spans the customer's entire IT infrastructure is created enabling standardization of infrastructure, cost cutting through overall optimization and immediate response to business changes. Summary of the services provided is presented in "**Table 3. Summary of Services**".

(2) Maintaining Operation and Supporting Environmental Changes

The following services are available to support the operation of the constructed private cloud environment.

1) Periodic Diagnostic Service

Various logs are regularly collected from the private cloud environment and checked for symptoms of hardware failure or lack of resources.

2) Migration Service to OKI Cloud Center

This service supports migration of the private cloud to the OKI Cloud Center (see next section). Continual use of

the private cloud environment may increase operational burden on the system.

In such a situation, the environment can be moved to the OKI Cloud Center to alleviate the operational burden (**Table 3**).

Table 3. Summary of Services

Private Cloud Implementation Consulting Service		
	Consultation for standardizing system infrastructure operations	
		Requirements, current configuration and operation of the customer's in-house IT system are investigated and report on the suitability of implementing a PaaS-type private cloud.
	Consultation for designing standard P/F system configuration model	
		Create a grand design for a private cloud environment. - Standardize/define the configuration and operation of in-house IT system - Infrastructure (system platform/operation platform) proposals - Image of service operations
	Consultation for planning an implementation roadmap	
		Draft a roadmap for actions/migration over to a virtual server environment upon implementation of a private cloud.
Private Cloud Construction Service		
	Service for planning implementation	
		Formulate plans for constructing infrastructure and migrating servers based on the results of consultation service.
	Service for detailed design of system infrastructure	
		Perform a detailed design of the system infrastructure based on the results of consultation service.
	Service for constructing system infrastructure	
		Construct a system infrastructure following the prepared detailed design.
System Platform Procurement Service		
	Service provides blade servers (if Server, OKITAC® *2)9000), virtual software (VMware® *3), Hyper-V™ *4), KVM), virtual environment management software and integrated storage.	
Operational Support Service		
	Technical support for implemented equipment	
		Answer inquires related to deliverables and support investigations when problems occur.
	Maintenance Service	
		Provide maintenance service when delivered hardware fails.
	Consultation for design changes	
		Provide aftercare services such as design change consultation and study for the next phase.

OKI Cloud Center

OKI Cloud Center is equipped with system and operation platforms that support EXaaS cloud services. This includes a high security network to ensure security of multi-tenant service, configurable architecture to flexibly adapt to resource expansion needs, and operational framework to ensure safe and reliable service.

(1) High Security Network

Network has been designed with security policies that ensure the security of multi-tenant service.

- **Major security policies**
  - ・Block communication between user sites
  - ・Adopt measures to prevent unauthorized network access
  - ・Minimize access route from large unspecified number of users
  - ・Adopt measures to prevent leakage/tampering of data transmission

User access layer is protected with firewall/NAT/VPN between the customer site and cloud center. At the network layer, logically divided networks, which are primarily VLAN separated user segments, are combined to ensure the same level of security as physically built individual networks.

(2) Configurable Architecture

There was a need for flexible expansion of computing resources to respond to changes in cloud service configuration, service characteristics and service scale. For this, a basic structural unit called "POD" was defined, and an architecture in which system infrastructure can be configured in units of POD was adopted.

POD consists of the following components.

- ・NBB : Network Building Block
- ・CBB : Computing Building Block
- ・SBB : Storage Building Block

The POD expandable architecture makes it simple to maintain a system expansion model. Furthermore, the POD expansion model eliminates interaction between the multiple PODs, and thereby prevents the PODs from impacting each other's performance and suppresses the spread of security incidents (**Figure 3**).

(3) Operational Framework

To ensure a safe and secure service, a response policy has been defined for each operation (**Table 4**).

OKI Cloud Center's operations management complies with ITIL® *5). ITIL is a framework for IT service management. It defines "functions" and "process" to manage service through the life cycle of the service.

For quality assurance, SLOs based on the Ministry of Economy, Trade and Industry's "SLA Guidelines for SaaS" are defined, and operations are designed to comply with each SLO.

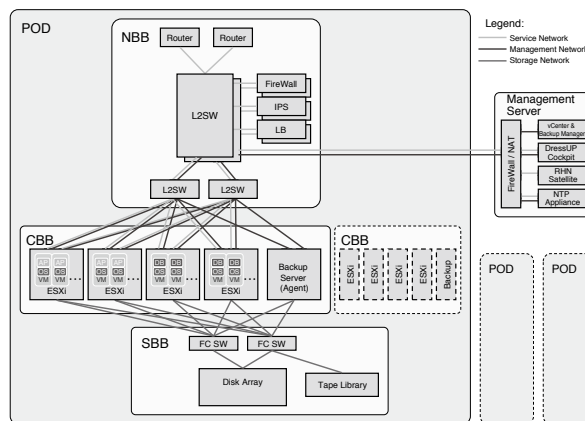Security measures comply with FISC safety standards.

*5) ITIL is a registered trademark of UK's Office of Government Commerce in the UK and other countries.

Figure 3. Architecture of System Infrastructure

Table 4. Operations and Support Criteria

Operation	Support Criteria
Operations Management	ITIL
Quality Assurance	Ministry of Economy, Trade and Industry's "SLA Guidelines for SaaS"
Security Measures	FISC safety standards
Privacy Measures	OKI Group Privacy Policy

Personal information is protected according to OKI Group's privacy policy.

Shared-use Services

The purpose of shared-use services is to allow multiple users to access application packages prepared for a business sector such as financial institutions.

(1) Centralized Exchange Service

The large volume of fund transfer forms arriving from branch offices and companies are sent physically or transmitted via images to a central office for processing in order to improve efficiency.

Many financial institutions implement their own centralized exchange system to centrally process fund transfers. However, for banks that process only a small number of transfers, investing in a centralized exchange system is not a viable option, and they are forced to process transfers using teller terminals deployed at branch offices.

OKI provides centralized exchange service to those financial institutions that have put off system investment. Using this service, customers can hold down initial cost and achieve operating service according to fees matching their usage (**Figure 4**).

The three features of this service are presented below.

1) Reduced service fee through standardization

Use of a standardized transfer form prepared for this service eliminates the need to create individual formats for forms and leads to reduction in service fees.

2) Use of proven exchange package

OKI's exchange package, which is No. 1 in market share, is used to provide high usability and rich set of features.

3) High reliability

Wide-area Ethernet has been adopted for communications to secure bandwidth and achieve the same high level of reliability as a leased line.
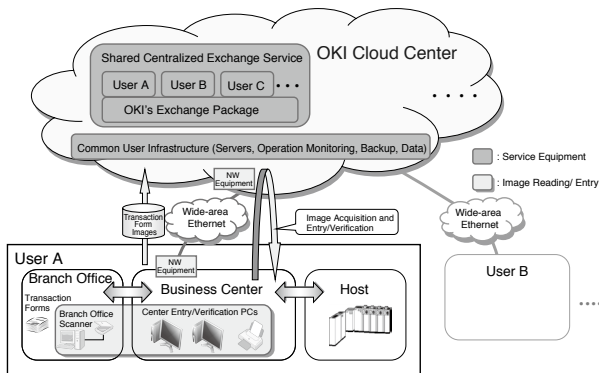

Figure 4. Overview of Centralized Exchange Service

(2) Centralized Answering Service

The service utilizes shared call center service and is primarily targeted at financial institutions.

Phone calls from end users are often for various types of inquires such as business hours or for claims/demands, and great deal of time is taken up answering calls that are not for the company's main line of business. If the answering person is not a specialist, there will be variations in phone skills. This can lead to drop in CS or have adverse effect on corporate brand image from negative posts on the Internet.

OKI offers a centralized answering service that will direct calls from end customers to a center where professional operators will answer calls. Using this service, the initial cost will be lower than installing an own system and the service fee will be in line with the number of received calls (**Figure 5**).

The three features of this service are presented below.

1) Proven use with financial institution

The service utilizes a call center package that has already been proven with financial institutions, and it is
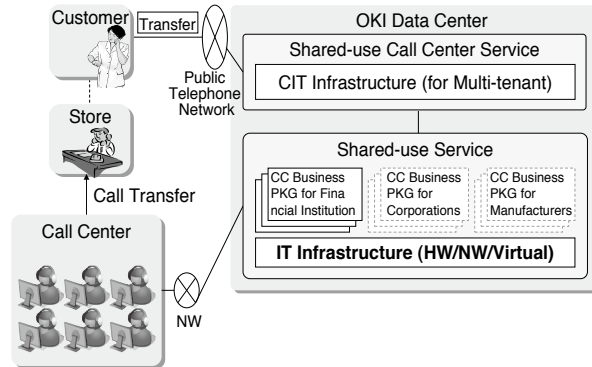

Figure 5. Overview of Centralized Answering Service

equipped with a database of past claims and demands as well as a rich set of management features.

2) Use of shared-use CTI infrastructure

The CTI infrastructure uses the call center service described in the next section. This allows the use of service for a fee equivalent to the number of seats. The use of "CTstage5i" with its proven implementation record will ensure access to the latest features while keeping initial cost to a minimum.

3) Allows small start-up

Investment in owning a centralized answering system is too much of a burden on businesses with only a few branch offices, and until now, only financial institutions with their large number of offices were able to implement such systems. Furthermore, sizing must be performed according to the scale of the system at time of implementation, so scaling is not possible later.

With the service, the fees will be set depending on scale and allow for small start-ups.

(3) Form Registration and Referral Service

Stores that handle customer application forms such as banks spend great deal of time checking form entries, confirming data and making corrections, which prevents them from concentrating on their true business of sales.

Even if an expensive entry system with imaging is implemented, program modifications that cost time and money are necessary every time a change is made in the forms.

OKI provides a form registration and referral service that utilizes expertise gained from working with image entry systems for financial institutions. Use of this service will reduce clerical work at stores and centralization can be achieved quickly and inexpensively (**Figure 6**).

The three features of this service are presented below.

1) Sort-less work through auto form recognition and classification

The service system is equipped with a high-performance OCR engine capable of performing auto recognition even on non-OCR forms. Forms are automatically classified according to type eliminating the need to manually pre-sort before the image reading process. A form registration tool is provided to the customers allowing them to easily add or change forms on their own.

2) Create high-quality data

Concentrated work by a dedicated operator using the entry verification method, which includes data entry check by a second operator, is a proven method with financial institutions, and it improves efficiency and prevents input errors at the same time. Efficient operation was achieved by having the same operator enter the same forms continuously.

3) Faster form searches

By enabling forms to be searched and browsed from a PC with a Web browser, a dedicated search computer or searching down the original form is unnecessary.
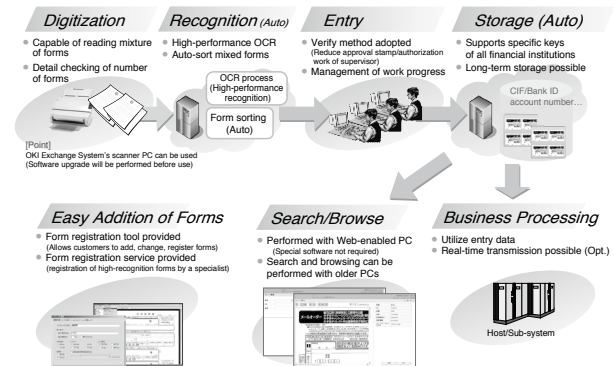

Figure 6. Overview of Form Registration and Referral Service

Common Industry Services

Common industry services target all business sectors.

As examples, the PC-LCM and call center services are described in this section.

(1) PC-LCM Service

PC-LCM (PC Life Cycle Management) service provides service at each phase of a PC's life cycle shown in **Figure 7**.
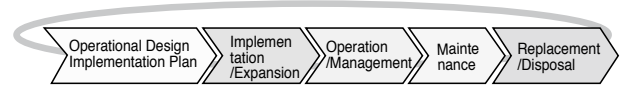

Figure 7. PC Life Cycle

PC-LCM related issues facing customers are listed below.

- Concerns over virus infections
- Concerns over non-compliance with licenses
- Increased workload on IT administrators managing PC operations
- Deterioration of cash flow during the PC replacement

To address those issues, OKI provides a PC-LCM service with the following features based on the experience it gained standardizing 15,000 PCs within the OKI Group.

- PCs can be monitored individually to reduce security risks
- Software asset of each PC can be managed enabling the detection of license violations
- Keep an up-to-date record for each PC and outsource the complicated PC-LCM work performed by the IT administrator to OKI
- Service fee including the PC is charged monthly allowing for a better cash flow management.

The menu of PC-LCM service provided by OKI is shown in **Table 5**.

Outsourcing of the entire PC-LCM operation as well as PC asset and security managements is included in the service menu.

Table 5. PC-LCM Service Menu

	Service Name	Provided Service
1	Management Outsourcing Service	OKI accepts outsourcing of customer's operations management including SLM and contract managements to enhance compliance and make efficient use of assets.
2	Procurement/ Management Outsourcing Service	OKI accepts outsourcing of work required during each phase of the PC life cycle such as kitting, failure support and erasing data.
3	PC Asset/Security Management Cloud Service	OKI operates and manages PC asset/security management systems on behalf the customer through the public cloud.
4	SI Service (Private Cloud)	The system OKI will use to provide service is built and operated on the customer's premise.

(2) Call Center Service

OKI's "CTstage5i" has been adopted for the system infrastructure. The use of CTstage5i, which already has seen wide deployment as a call center system, allows the service to offer a variety of features necessary for call center operation including IVR, ACD, call recording and reporting (**Figure 8**).
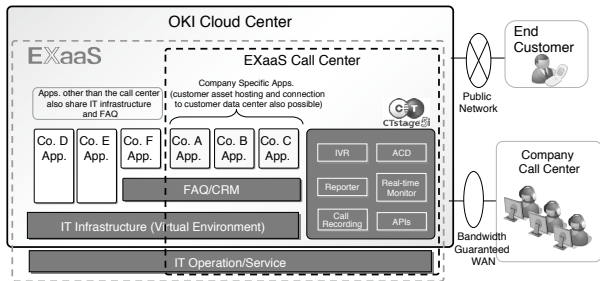
Figure 8. Conceptual View of EXaaS Call Center

The advantages of implementing a call center service are given below.

1) Off-balance-sheet financing

Service is provided for a monthly fee on a per seat basis, and initial cost required for use is small.

2) Does not require system management

The cumbersome everyday tasks of maintaining and managing the system such as phone number changes, applying security patches, data backups and system monitoring are all performed on behalf of the customer by OKI's professional staff allowing the customer to focus on their core business with confidence.

3) Full service menu

An extensive menu of options is available.

The service can coordinate with business applications that the customer owns and has the flexibility to support other individual needs.

Furthermore, the service can provide total outsourcing

of call center operations including the provisioning of operators.

4) Cost optimization (service scale can be flexibly adjusted)

The service responds easily to operating conditions allowing the customer to contract out the necessary scale (seats) at the necessary time.

Summary

OKI's cloud service "EXaaS" has been presented.

Commercial use of cloud services is growing. However, issues regarding customization as well as security in handling corporate and customer information remain. "EXaaS" provides total management of IT operations including the end terminals setting it apart from previous cloud services. Following the "EXaaS" concept, OKI plans to expand the service menu to solve the business challenges of customers from their perspective. In doing so, OKI hopes to approach a step closer to the customers' needs and help optimize the cost of the customers' IT investments. ◆◆

● Authors

Yasushi Date, Marketing Department, Financial Systems Division
Masahiro Kawahara, IT Services Department-2, IT Services Division
Koji Shimazaki, Technology Department-1, Software Center
Jiro Naniwa, IT Services Department-2, IT Services Division

【Glossary】

Multi-tenant
Several business users sharing a physical resource

NAT
Network Address Translation

VPN
Virtual Private Network

VLAN
Virtual LAN

ITIL
Information Technology Infrastructure Library.
Framework created by the British government providing a collection of best practice for IT service management.

SLO
Service Level Objective

FISC
The Center for Financial Industry Information Systems

OCR
Interactive Voice Response

IVR
Automatic Call Distributor

ACD
Automatic Call Distributor