Virtual PBX-type Services in Office link

Core Network Development Department
Seiji Koga
Solution Business Department
Hiroshi Yamamoto

1. Introduction

NTT DOCOMO has been providing the "Office link (Customer PBX-type)" enterprise internal-line service since September 2009. "Customer PBX-type" makes FOMA/Xi mobile terminals available as internal line services in FOMA areas nationwide. This service has provided users with benefits that were not previously available with internal line terminals (fixed-line telephones and in-house PHS etc).

"Customer PBX-type" offers the following advantages:

- Use of internal lines regardless of location
- Flat-rate calling between FOMA/Xi, or between FOMA/Xi and fixed-line telephones in offices

However with the conventional "Customer PBX-type," because this was provided as a system in which the Office link system was connected to a Private Branch eXchange (PBX)[*1], functions available were limited to basic functions such as calling and accepting calls between FOMA/Xi and fixed-lines under PBX and so forth, even though internal line functions were available for FOMA/Xi.

Countering this, the "Office link (Virtual PBX-type)" service that commenced in August of 2012 is a cloud-based service that provides the whole batch of PBX functions in the Office link system. **Figure 1** shows an image of the service.

The service is designed to meet the needs of corporate users who want to reduce their own PBX assets and replace them with a cloud-based PBX service. In this article, we describe an overview and beneficial functions of the "Virtual PBX-type."

2. "Virtual PBX-type" Benefits

With "Virtual PBX-type," we have added four new and appealing advantages to the list of benefits that were available with the older "customer PBX-type," by having NTT DOCOMO provide the batch of functions that were previously dealt with in PBX.

1) Reduction of Implementation Costs and Capital Assets for PBX Upgrades

By using NTT DOCOMO's cloud-based PBX, a PBX system is no longer required in the office. This means users can reduce deployment costs and capital assets associated with PBX upgrades. Accordingly, users can also expect their PBX maintenance costs to fall, because NTT DOCOMO maintains the Office link system 24 hours a day, 365 days a year.

2) Improved Convenience between FOMA/Xi and Fixed-line Telephones

Because FOMA/Xi belonged to the Office link

*1 **PBX**: An enterprise private branch exchange; it has functions for internal line connection as well as external line connections.

External-line access using DOCOMO 050 number

Other operator network

Office link system

Call control apparatus

FOMA/Xi network

External connection GW provides external-line calling from in-house fixed-line phones.

In-house

GW*

FOMA/Xi

Fixed-line telephone

Office link "Virtual PBX-type"

*GW connects in-house fixed-line telephones

Other operator network

Office link system

Call control apparatus

FOMA/Xi network

External-line access from FOMA/Xi

VoIP-GW

PBX

FOMA/Xi

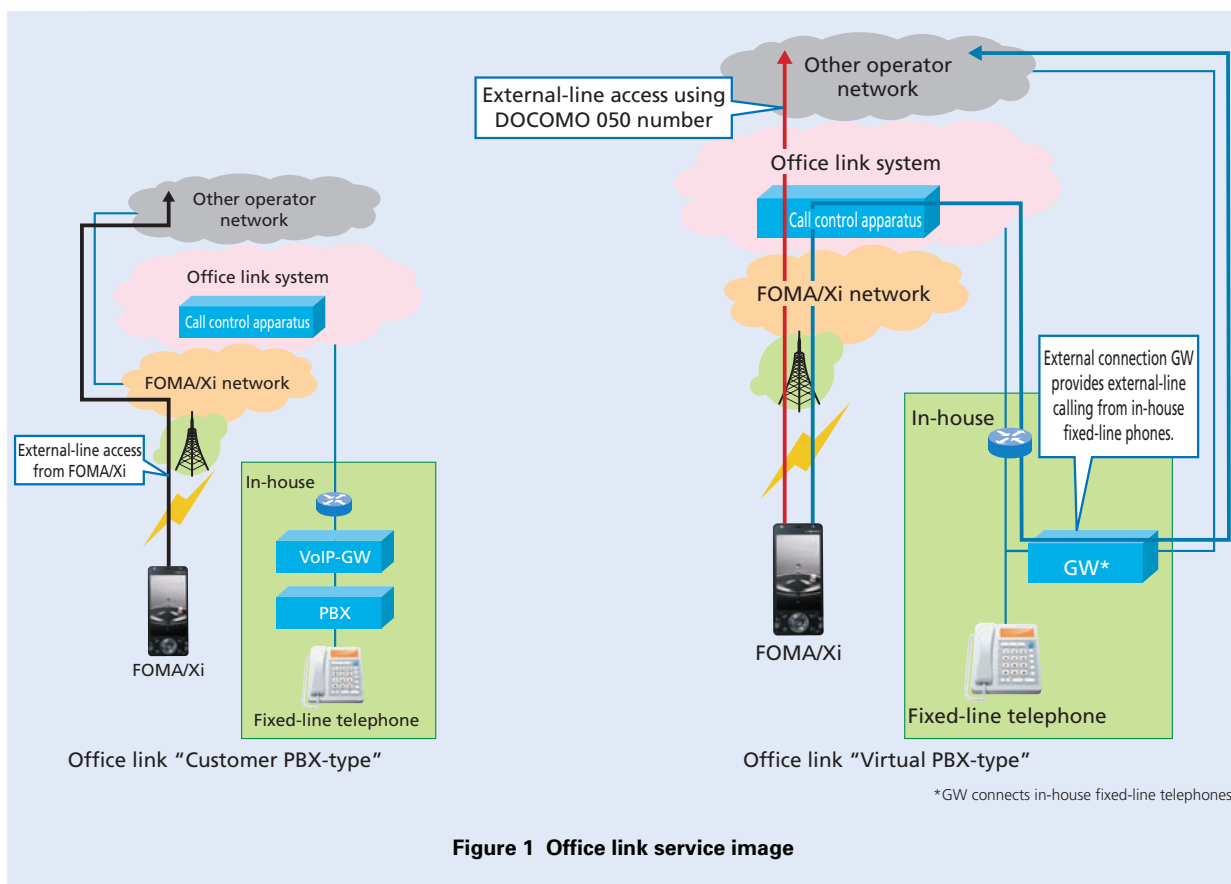Fixed-line telephone

Office link "Customer PBX-type"

Figure 1 Office link service image

system rather than PBX in "Customer PBX-type," it was not possible to link functions between FOMA/Xi and fixed-line telephones.

In one prominent example, the "pickup" function has often been used between in-house PHS and fixed-line telephones to answer calls sent to other telephones, however it was not possible to "pickup" fixed-line phones from FOMA/Xi with "Customer PBX-type." In answering this issue, "Virtual PBX-type" facilitates function linking that enables FOMA/Xi users to "pickup" calls to fixed-line telephones with the same operability as in-house PHS, because FOMA/Xi and fixed-line telephones are batch-controlled in the Office link system, and thus offers users an even greater level of convenience.

3) Cost-reducing Optional External-line Access Service

Optional external-line access service is now available through the PBX functions provided by the Office link system.

Two types are available — "external-line access

using the DOCOMO 050 number" and "external-line access from fixed company lines via an external-line connection GateWay (GW)."

External-line access is an ordinary function in any PBX system. However, "Virtual PBX-type" provides external-line access from both fixed-lines and FOMA/Xi. By using the optional external-line access service with FOMA/Xi, users can now enjoy cheaper rates than those usually charged with 090/080 numbers.

As well as reduced rates, optional external-line access services also offer the benefit of the "company number notification" function. This function enables notification of the company number to the other party instead of the user's personal number. In other words, the company number can be notified even when calling from FOMA/Xi.

4) Rich PBX Functions

As well as the above functions, "Virtual PBX-type" also provides support functions that can be tailored to the user's business operations such as

"telephone answering service" for calls made to fixed-lines, and "message answering service" - a function that replays after-hours guidance or other information when calls arrive via external lines using the DOCOMO 050 number.

3. Service Configuration

3.1 External-line Calling Control Function

As already mentioned, Office link Virtual PBX-type offers optional external-line access services via the 050 number.

However, FOMA/Xi users in companies subscribing to this service may or may not need to make calls outside the company for business purposes. For this reason, we have developed an external-line access control function that enables permission to be granted to individual FOMA/Xi users, so that they can access external-lines and make calls outside of the company if required.

3.2 Functional Divisions

The external-line access control function has been achieved through the call control apparatus and audio delivery apparatus in the existing functional divisions in the Office link system. The call control apparatus contains subscription data for the optional external-line access service for each user, and controls external-line access and guidance delivery commands depending on whether the user has a subscription, whereas the audio delivery apparatus follows the commands issued by the call control apparatus, and delivers external-line access-denied guidance to the caller (e.g. "This is NTT DOCOMO. The number you have called is not accessible from your telephone number").

1) External-line Access Control Actions (Unsubscribed)

Figure 2 (a) describes actions if a FOMA/Xi user performs operations to access an external-line but

(a) External-line access control actions (unsubscribed)

(b) External-line access control actions (subscribed)

Figure 2 Service configuration
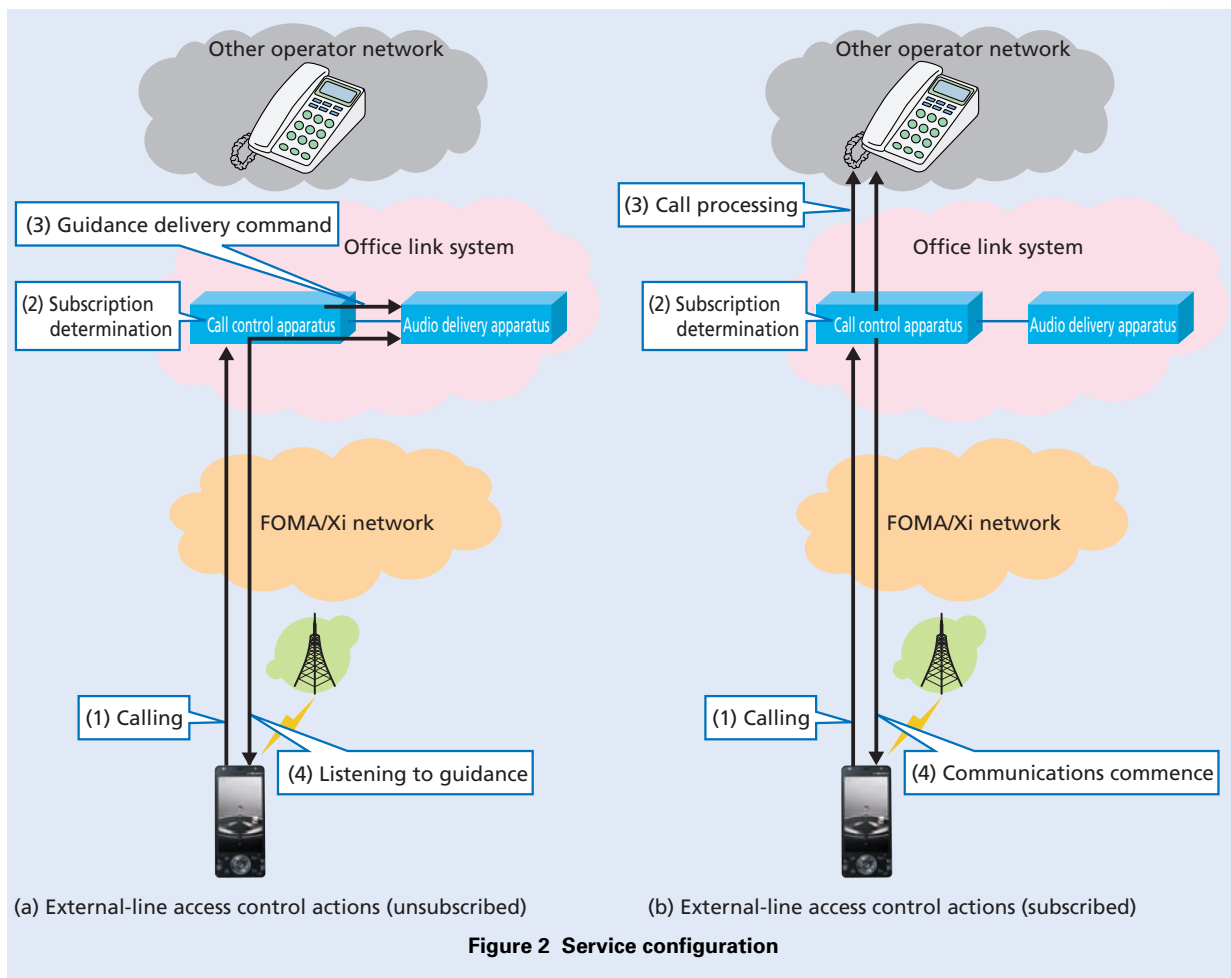
does not have a subscription for the optional external-line access service (i.e. external-line access is forbidden).

(1) The FOMA/Xi user dials the external-line access prefix and the external-line number.

(2) The call control apparatus determines that the caller does not have a subscription for the optional external-line service.

(3) The call control apparatus issues a command to deliver external-line access-denied guidance.

(4) The audio delivery apparatus delivers the external-line access-denied guidance to the caller.

2) External-line Access Control Actions (Subscribed)

Fig. 2 (b) describes actions when a FOMA/Xi user has a subscription for the optional external-line access service (external-line access permitted).

(1) The FOMA/Xi user dials the external-line access prefix and the external-line number

(2) The call control apparatus determines that the caller has a subscription for the optional external-line access service.

(3) The call control apparatus processes the call for the call receiver, who is on another network.

(4) When the receiver answers the call, communications commence.

We have used the existing functional divisions in the Office link system to achieve the above process, and have thus developed a more efficient system that provides the four new benefits described in chapter 2, and that does not adversely affect other functions.

4. Conclusion

This article has described an overview of the "Virtual PBX-type" service that has been newly added to the Office link system and the functional divisions therein.

Into the future, we intend to continue studying ways to further improve convenience and functions for FOMA/Xi users.