

## SAAS VIRTUALIZATION METHOD AND ITS APPLICATION

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### Метод виртуализации SaaS и его применение

В работе предлагается метод построения информационной системы для компании, которая нуждается в сервисах облачного вычисления. Этот метод основывается на объединении преимуществ облачных технологий, которые используют телекоммуникационные операторы, и технологии SaaS. Этот метод комбинирует базовую систему услуг SaaS и магистральную систему, расположенную на производственной площадке, с VPN в замкнутой области сети.

**Introduction.** Nowadays the Internet is used for business by different companies. Not only telecom companies provide information business. There are also cloud computing services and SaaS vendors (companies, that offer SaaS services). Telecom operators are seeking the safety of communication offering their services. SaaS vendors are trying to provide more economical and convenient service as well.

In this paper we propose a method of configuring an information system for a company that needs cloud computing services. The main idea is to optimize the advantage of cloud computing service provided by telecom operators and SaaS vendors.

We have identified the difference in policy and issue of telecom operator, SaaS vendor and client company. It is shown in Table 1.

Table-1 Policy and issue

	<b>Telecom operator</b>	<b>SaaS vendor</b>	<b>Client companies</b>
System policy	Provides overall network services	Constructs own SaaS system	Construct a backbone system
Business policy	Provides End-to-End network services Pursuing the security of communication	Pursuing economy Pursuing convenience Encloses a lot of companies with needs	Fast access to information Updating of business process Low cost
Issue	Paying attention to network service	Forcing security of communication	Functionality Enhancement of systems

**Main part.** Two systems existing in different network spaces work separately and the stored information cannot cooperate. It means that the SaaS base system and on-premise backbone system existing in different network spaces operate independently and the information cannot be shared.

So we propose “SaaS virtualization method” (Fig.1). The main idea of this method is to connect the SaaS base system and the on-premise VPN backbone system of closed area network. It will be possible to connect the SaaS base service system assigned to each client company existing externally to the on-premise backbone system existing internally. That is, the external SaaS base system and the internal backbone system are combined together by virtualization.

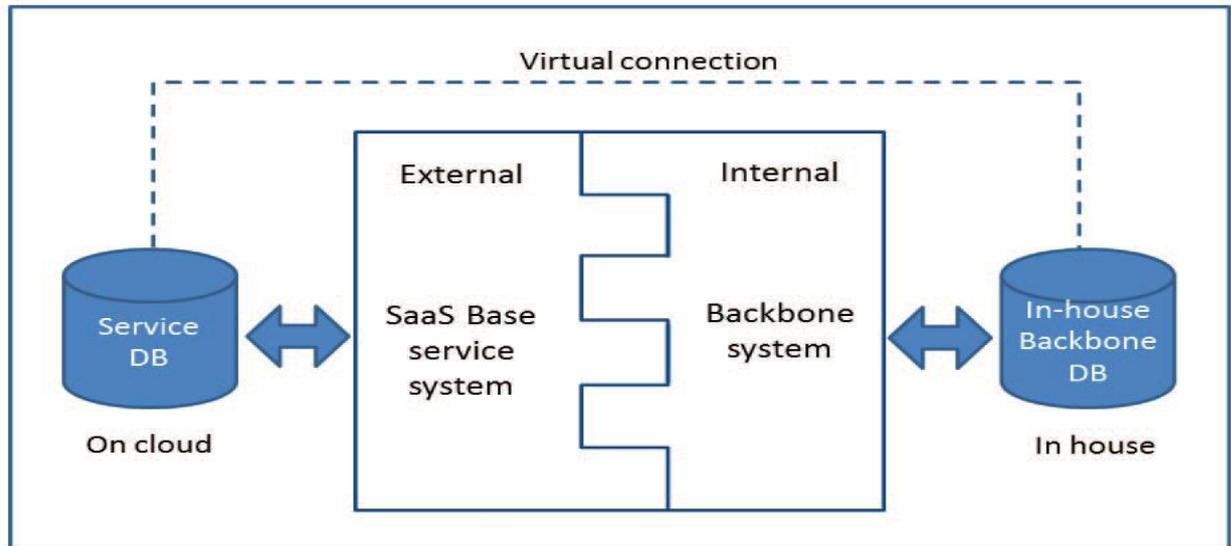


Fig.1 SaaS Virtualization Method

**Implementation.** To realize the system we described earlier we need the cloud service that enables client company to utilize SaaS service assigned through secure VPN network. It can be implemented by constructing the commercial application type cloud service on the SaaS basic service. This service realizes secure connection by connecting three different network spaces: on-premise backbone system of client company, the network space of VPN and the network space of gateway that combines two former network spaces. So the external SaaS base system and the internal backbone system are securely combined together by connecting these three different networks by virtualization. As a result, a company can utilize SaaS service assigned by cloud service company as on-premises.

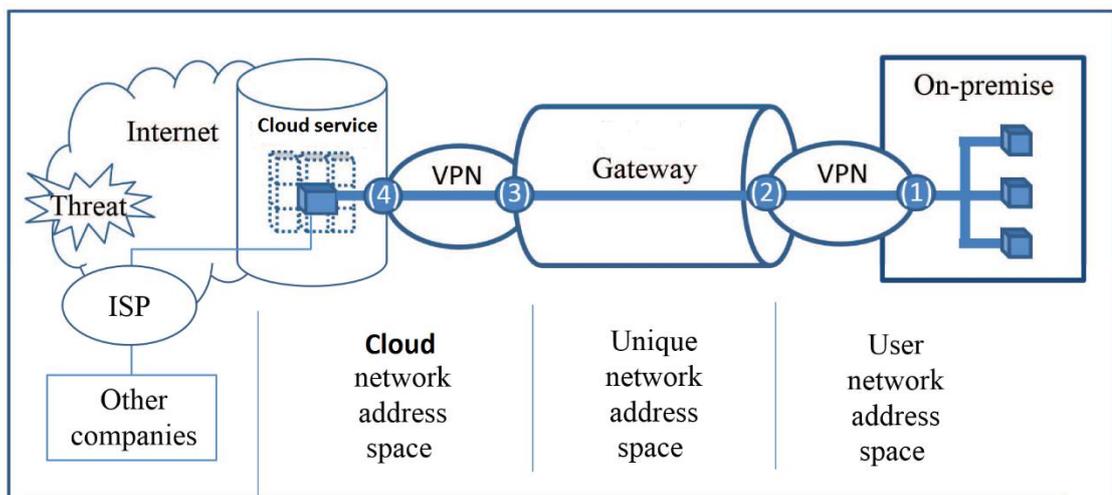


Fig.2 Construction of secure connection

We will describe in details the communication of this model. The IP packet sent from the on-premise system has the source IP address (1), and the destination IP address (2) of the on-premise side of gateway system. The port number is 1000. When the IP packet reaches the gateway system, the source IP address is rewritten from (1) to (3) of cloud service side, the destination IP address is rewritten from (2) to (4) of cloud service and the source port number is rewritten from 1000 to 3000. Cloud service system receives the rewritten IP packet and replies the IP packet to the gateway system. The IP packet sent from the cloud service system is the source IP address (4) and the destination IP address (3) of cloud service. When the IP packet reaches the gateway system, it is being transferred to the on-premise system with rewritten from (4) to (2) source IP address and rewritten from (3) to (1) destination IP address. The port number is rewritten from 3000 to 1000. The on-premise system receives the reply packet from the cloud service system.

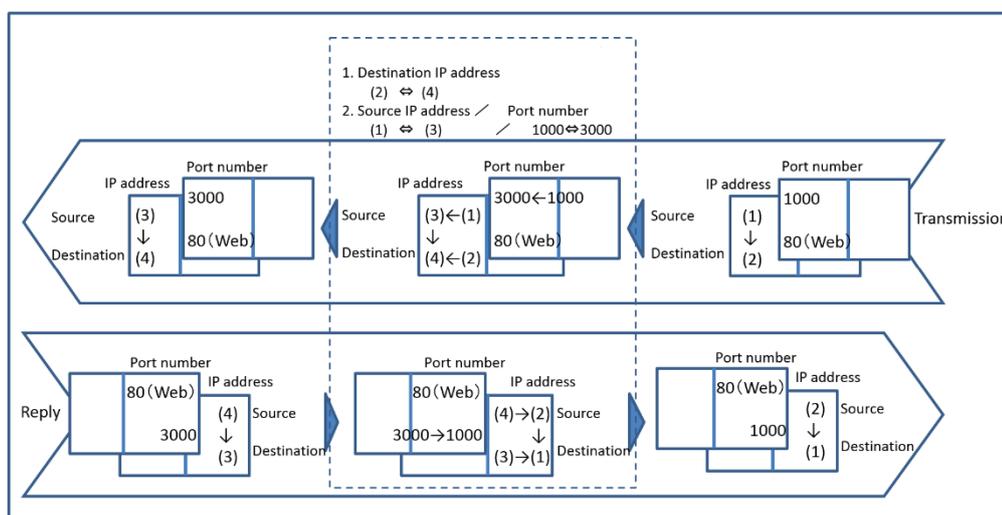


Fig. 3 Details of the communication.

**Conclusion.** As a result, the company will be able to utilize resources given by using cloud services, especially using SaaS model, therefore dramatically increasing services infrastructure. Moreover, the use of virtualization technologies will provide high mobility of software solutions which are needed to maintain redundant IT environment. Also, the use of VPN solution will be brought to solve security issues while exchanging data between company's network and cloud.

## References

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