NTT IT's Telework Solutions

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Abstract

NTT IT has been supporting the deployment of corporate telework systems by providing its MagicConnect remote-access virtual private network service and MeetingPlaza web conferencing service. This article describes the features of these two services and introduces NTT IT's new SmartTelework service, which combines these services to resolve key telework issues.

1. Introduction

Telework has traditionally been promoted as a means of providing employee benefits, as in working from home to (1) enable child care and care giving and (2) achieve a work-life balance. As a consequence, telework experiments have been limited in range. However, the appearance of new influenza strains at the end of 2009 and the Great East Japan Earthquake of March 2011 and subsequent power-saving measures in the summer of 2011 highlighted the main benefit of teleworking—working from anywhere at anytime—as an effective means of ensuring business continuity.

For telework purposes, NTT IT provides MagicConnect™*1, a remote-access virtual private network (VPN) service, and MeetingPlaza™*2, a web conferencing service. Through these two services, it has been supporting companies creating telework environments. Demand for MagicConnect and MeetingPlaza jumped immediately after the flu outbreak and the earthquake/tsunami disaster, but these days, many companies are still expressing their desire to use these services to ensure business continuity.

2. Issues and solutions

According to the survey described in the "2010 White Paper on Information and Communications in Japan" from the Ministry of Internal Affairs and Communications (MIC), companies in Japan consider the following issues to be the main obstacles to the spread of teleworking:

- No work applicable to teleworking
- Cost
- Information security
- Management of employee work and results
- Communication

Resolving these issues should therefore boost the use of telework systems. Among these issues, we think that information security, management of employee work and results, and communication can be solved by technical means (**Table 1**). For this purpose, NTT IT provides the MagicConnect and MeetingPlaza services as well as its new SmartTelework*3 service, which combines these two services. These three services are described below.

3. Services

3.1 MagicConnect: remote access VPN service

MagicConnect is a remote access VPN service that enables the screen contents displayed on an office personal computer (PC) normally used for everyday in-house work to be displayed and manipulated on the user's remote terminal (home PC, tablet computer, etc.) without any data files being downloaded to that terminal. It solves the problem of information security usually raised as a telework issue and enables everyday work to be performed safely and easily from outside the company (**Fig. 1**).

When an employee is performing work outside the company as in teleworking, his or her environment

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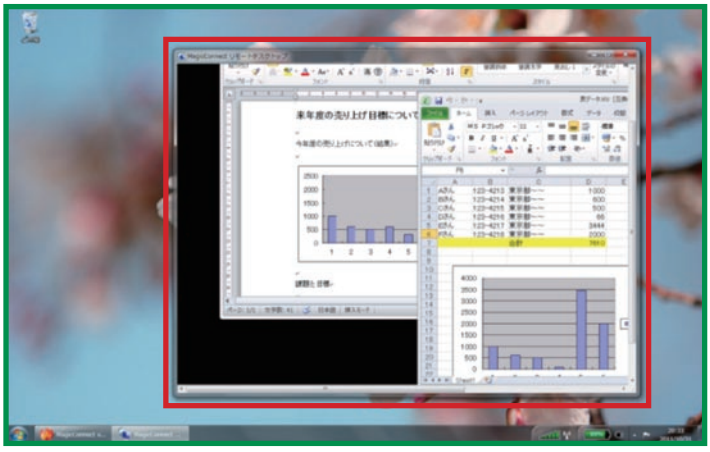
*1 MagicConnect™ is a registered trademark of NTT IT.
*2 MeetingPlaza™ is a registered trademark of NTT IT.
*3 SmartTelework is a trademark of NTT IT.

Table 1. Main issues hindering the spread of teleworking.

Issue	Details	Potential for technical solution
No work applicable to teleworking	• Work involving the telephone and face-to-face interaction is difficult by teleworking.	Fair
Cost	• Implementation incurs expenses. • Actual expenses are unknown. • Cost-benefit analysis is difficult.	Fair
Information security	• Telework environment could be unsecure. • There a risk of information leaking. • Viruses could be introduced into the company's system.	Good
Management of employee work and results	• Actual working time of employees cannot be determined. • Work results cannot be evaluated appropriately.	Good
Communication	• Teleworking hinders teamwork. • Employees feel alienated. • Sense of belonging to the organization is reduced.	Good



The green frame indicates the desktop screen of the user's remote PC.

The red frame indicates the desktop screen of the office PC.
Excel, Word, and other files are processed on the office PC.

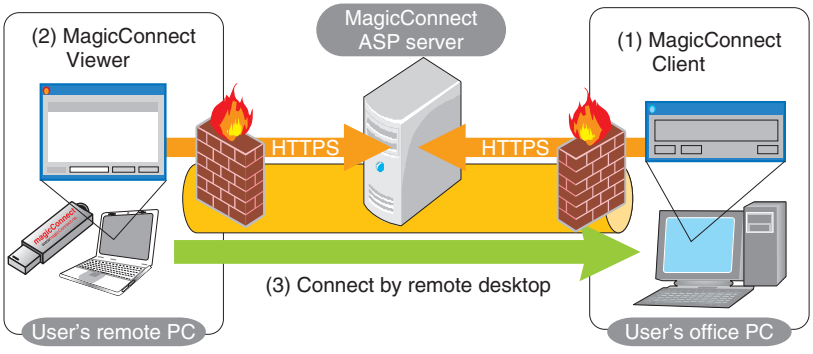
Fig. 1. MagicConnect screenshot.

consists of various elements such as the workplace itself and the terminal and network being used. Not all of these elements provide an adequate level of security, so security must be ensured from the telework-service side. MagicConnect has been highly evaluated by companies that have introduced it because of its superb performance in countering information leaks, virus infections, and spoofing (**Table 2**). Although security and convenience are often conflicting features, MagicConnect excels in both ease of deployment and convenience of use.

Implementing MagicConnect does not require a company to make network-related changes, such as releasing firewall ports or changing router settings, nor does it require the use of an expensive gateway. To get started with MagicConnect, the user first checks whether the office PC targeted for remote operation can connect to and browse the web. If it can, the user only has to install standby software called MagicConnect Client on that PC to set up an environment that enables access to it from the outside. The fact that no settings of existing network equipment need to be changed has the effect of not only simplifying implementation but also maintaining security policies ((1) in **Fig. 2**). The ASP (application service provider) server is a service server operated by NTT IT. It relays sessions performed in the personal computers as shown in (1) and (2) in Fig. 2.

Table 2. Comparison of security of existing services and MagicConnect.

Function	Existing services	MagicConnect
Preventing information leaks	Existing services such as IPsec VPN and Remote Access Service Server (RAS) allow email and files to be downloaded and processed on the user's remote terminal, which creates a risk of information leakage.	Eliminates the risk of information leakage by using a screen-transfer-type thin-client system (remote desktop) and by not transferring files to the user's remote terminal.
Preventing virus infections	Existing services such as IPsec VPN and RAS extend the in-house local area network to the outside, which leaves open the possibility of a virus infection via the communication path. They also allow the transmission of files into the company from the outside, which presents a risk of virus infection via files.	Prevents the company being infected by viruses by launching a preregistered remote-operation application from MagicConnect Viewer and disabling all other types of communication. It also disallows the transfer of files into the company.
Preventing spoofing	Authentication by only user ID and password may not prevent connections by other users (spoofing).	A hard-to-duplicate personal USB key, terminal information, and multifactor authentication combined with a certificate prevent spoofing.



(1) Install MagicConnect Client on user's office PC and connect to ASP server.
(2) Connect to ASP server from user's remote PC using MagicConnect Viewer.
(3) Operate the user's office PC by a remote desktop.

Fig. 2. Getting started with MagicConnect.

To remotely access that office PC from the user's remote PC, the user inserts a personal USB (universal serial bus) key into the remote PC to start up MagicConnect Viewer. No pre-installation is required, and a borrowed or shared PC can be safely used instead of one's own PC. HTTPS (hypertext transfer protocol secure) is used to establish communications, which makes it easy to make connections from hotel lines and other circuits that have traditionally restricted connections to VPNs ((2) in Fig. 2). Once a VPN connection has been established with MagicConnect, the user can operate the office-PC desktop as usual and perform work ((3) in Fig. 2).

In the above way, MagicConnect provides both a high level of security and an exceptional degree of convenience. Far from being limited to working from home (telecommuting), it can also be used in a variety of fields including mobile telework and remote maintenance.

3.2 MeetingPlaza: web conferencing service

MeetingPlaza is a web conferencing service that has come to be used by more than 3000 companies since its launch about ten years ago.

As discussed above, management of employee work and results and communication have been raised as key telework issues. To resolve these issues, there is a need for functions that enable remotely located employees to determine each other's status and collaborate just as if they were working in an office. MeetingPlaza features a video-based status checking function and application-sharing function that enables users to hold meetings from remote locations and to engage in joint projects.

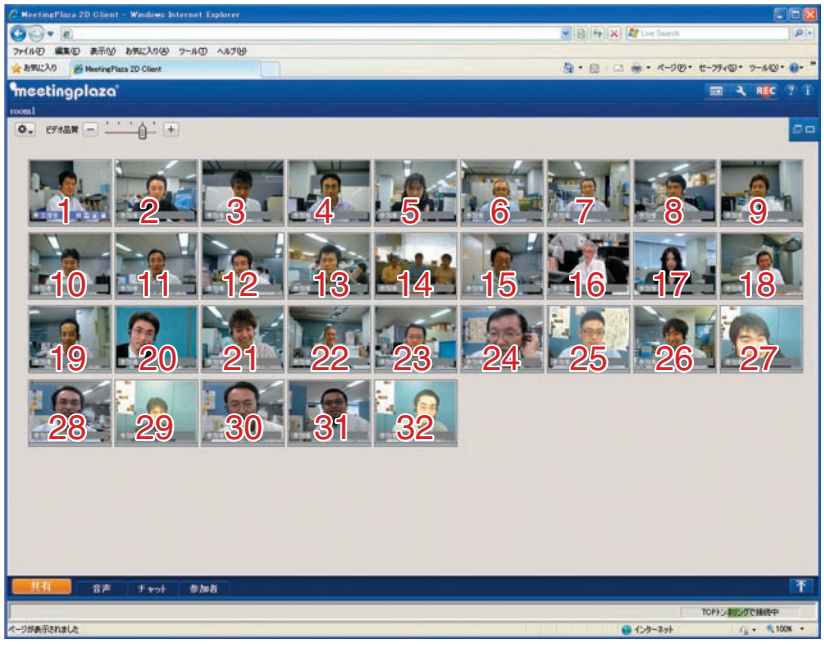


Fig. 3. Multi-user display screen.

Ordinary communication tools are intended for a small number of simultaneous users, so they cannot simultaneously display a large number of video images. By contrast, MeetingPlaza uses a proprietary protocol called Virtual Community Communication Protocol (VCCP), which controls the number of conference participants according to the available bandwidth and can simultaneously display and continuously deliver up to 32 portrait-type video streams, the largest number supported by any existing videoconferencing service, at home and abroad (**Fig. 3**).

This protocol can cope with a mixture of high-speed and low-speed terminals when making connections. Under VCCP, terminals capable of high-speed connections communicate with each other via high-quality audio and video, while all other combinations of terminals communicate by audio and video at a level appropriate to current network conditions. This automatic bandwidth adjustment function handles fluctuations in bandwidth and prevents problems like audio cutoffs and unintentional departures from the conference room. It lets teleworkers check the status of their colleagues just as they would in an office environment and perform their work with a sense of being in a workplace. Managers can check the work status of employees under their supervision by means of video, which lets them manage work effectively.

Ordinary communication tools can be adversely affected by the telework environment and local connections that can generate noise, making conversations difficult. To counter such noise, MeetingPlaza uses noise echo reduction (NOER) technology developed by NTT Cyber Space Laboratories. This technology features three-stage processing consisting of echo suppression, noise suppression, and processed-speech distortion suppression that counteracts the effects of the surrounding environment and produces high-quality speech.

MeetingPlaza also provides an application sharing function that enables conference participants to collaborate on projects just like in an office. This function provides the same sense of looking over the shoulder of a colleague working on his or her PC at the office and observing how that colleague is executing a certain application. It also enables a participant to obtain operation rights as the need arises and to remotely operate that application and edit materials (**Fig. 4**).

MeetingPlaza enables the type of collaborative work traditionally done in an office to be pursued in a telework environment by providing the above functions of simultaneous multi-screen video delivery, automatic bandwidth control, and application sharing.

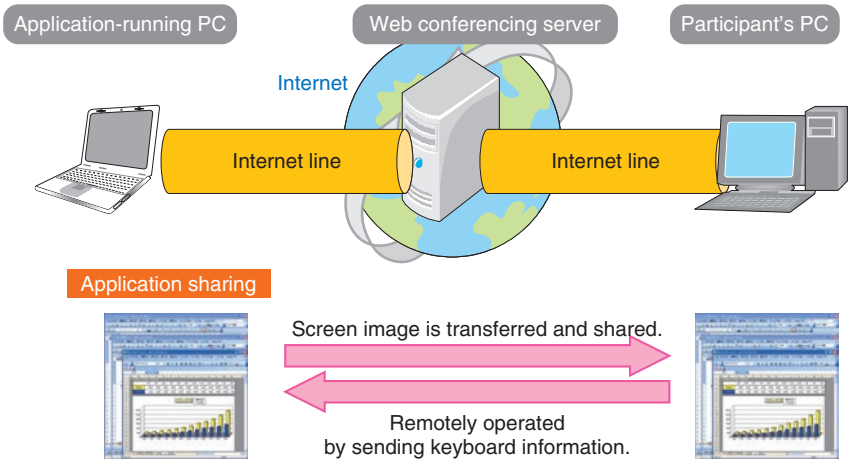


Fig. 4. Concept of application sharing.

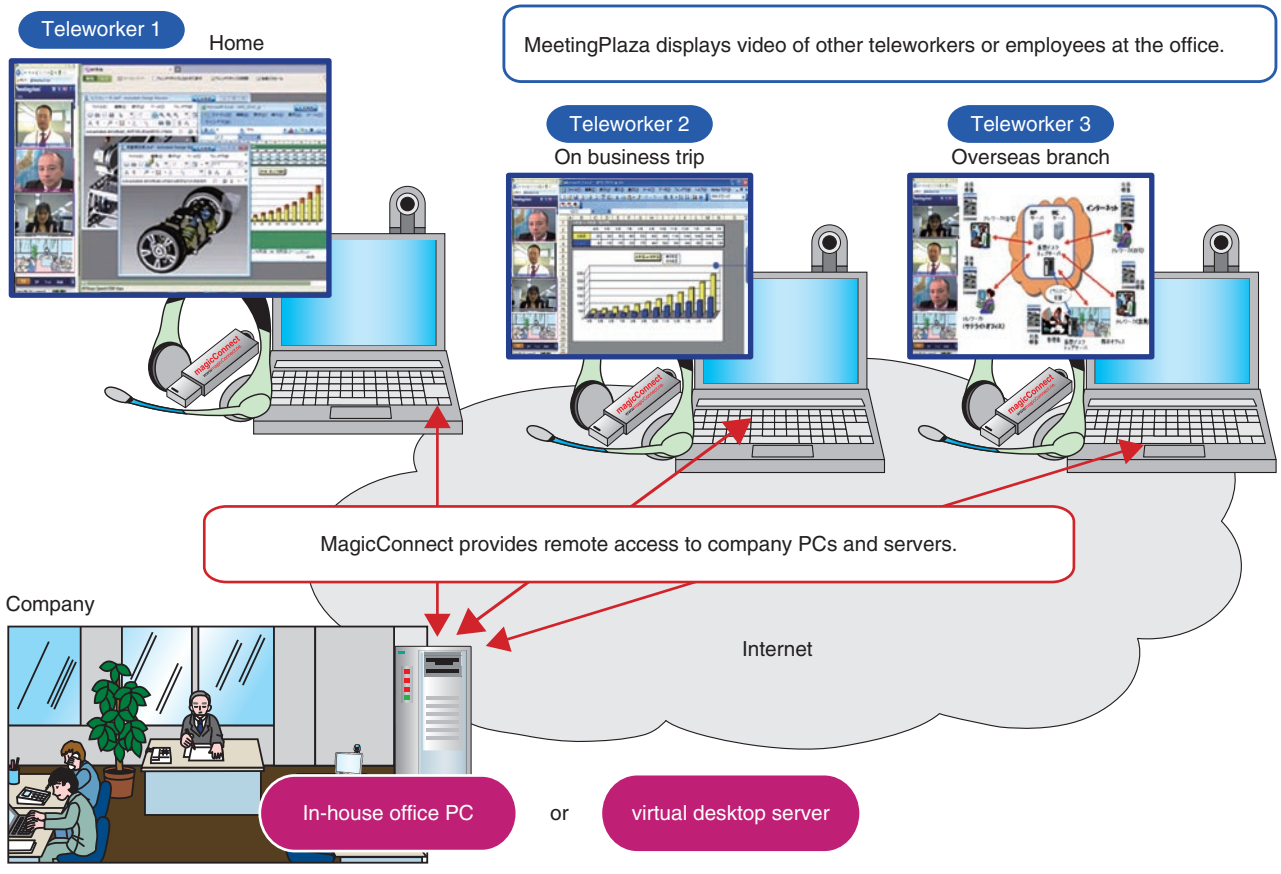


Fig. 5. Overview of SmartTelework.

3.3 SmartTelework: a telework solution

SmartTelework combines MagicConnect and MeetingPlaza to simultaneously resolve the three key telework issues (information security, management of employee work and results, and communication) and achieve an advanced telework environment (**Fig. 5**). With SmartTelework, a teleworker at home or on a business trip can use MagicConnect to perform the same PC-based work as normally done on an office PC. The same teleworker can also use MeetingPlaza to participate in web conferences and collaborative work with other teleworkers and/or employees at the office with the aim of solving work-related problems. A teleworker can also obtain a sense of office participation without feeling alienated through the display of continuous video streaming of other members in the organization. On the other hand, a manager can check the status of those members through video and can even determine the progress being made by teleworkers in their work.

Files used for telework are absolutely prevented from being moved outside the company, so there is no need to worry about information leaks. At the same time, a mechanism for managing centralized information on a file server, for example, enables a manager to check on the work being performed by teleworkers.

The combination of a remote-access VPN function that enables work to be done safely outside the office and a video-based communication function that enables employees to keep in touch with each other creates a synergetic effect that turns teleworking into a viable work format.

4. Concluding remarks

Ironically, it took the experience of an unprecedented disaster to make many people pay attention to the benefits of teleworking, which had until then made few inroads into society. Telework could potentially have an even greater impact in making work more efficient and improving the lives of working people, as has been suggested since the 1980s. There is considerable latent demand for teleworking across a wide range of applications beyond its use at the time of a national disaster. It is envisioned as a countermeasure to a dwindling labor force as the aging society advances, as a solution to demands for a new working style compatible with child-care and care-giving responsibilities, and as a means of recruiting highly capable personnel from all over the world.

Looking forward, we plan to further develop the SmartTelework concept and its supporting technologies. The telework field shows signs of genuine expansion in the years to come, and NTT IT aims to support its growth by providing easy-to-use telework technologies and services.

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