Remote Access Technologies:

A Comparison of GoToMyPC™ and Virtual Network Computing (VNC)
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GoToMyPC is a cost-effective way to roll out and manage a corporate remote-access plan for telecommuters, work extenders, and mobile professionals.

When compared to VNC, GoToMyPC offers significant advantages. GoToMyPC is easier to set up, more available over networks with firewalls, and easier to use.
Executive Summary

Companies are looking for ways to provide cost-effective network access to their remote, mobile, and telecommuting employees. Remote control solutions such as GoToMyPC™ Corporate and AT&T Laboratories’ Virtual Networking Computing (VNC) are one way to provide this access.

With GoToMyPC Corporate, you can roll out and manage a remote access plan in minutes. It is a highly secure and cost-effective way for employees to access their computers and network resources remotely. Employees simply access and work on their computers using any Web browser.

This white paper demonstrates that GoToMyPC has significant advantages over Virtual Network Computing. The advantages include:

- **Installation and Setup.** GoToMyPC allows for a simple installation and setup that computer novices can perform in less than 5 minutes. Virtual Network Computing requires a multi-step process that may require the assistance of a systems administrator for information such as the host IP address.

- **Security.** GoToMyPC is pre-configured for maximum security using the industry standard Advanced Encryption Standard (AES) 128-bit encryption. GoToMyPC connects through most firewalls, ensuring your data and network are secure. Virtual Network Computing does not offer a secure method of connecting and requires purchasing third party security products.

- **Configuration for Firewalls.** GoToMyPC works through firewalls without additional network configuration. Virtual Network Computing requires that you establish an incoming TCP/IP connection, often dictating that the firewall be modified to allow this connection.

- **In Session Features.** GoToMyPC includes a wide range of features from security related functions such as keyboard locking to tools like file transferring. Virtual Network Computing is extremely limited in its feature set offering nothing more than simple viewing choices.

- **Reporting.** GoToMyPC offers detailed reporting capabilities that allow the manager to view and stop current connections as well as providing thorough event history. Virtual Network Computing was not designed with report tracking options; therefore, no options are available.

- **Guest Invitation.** GoToMyPC provides an easy method to invite guests to connect to your computer from a variety of Windows operating systems. Virtual Network Computing does not offer guest access.

Overall, GoToMyPC is an easier solution for users than Virtual Network Computing, because users do not need to configure items such as security settings or the IP address. In addition, GoToMyPC is firewall friendly, making it an easier solution for network administrators.

GoToMyPC provides a cost-effective, easy-to-implement, fast and secure way to provide remote access to corporate network resources. Users find that GoToMyPC is convenient because it can be used from almost anywhere and requires no configuration.
Remote Control Overview

One of the major issues confronting information systems managers today is providing secure access to corporate IS resources to people who are physically located outside of the corporate network.

In today’s increasingly connected society, traveling salespeople, telecommuters and work extenders all need access to resources on corporate networks. These resources – such as databases, sales tools, email, etc. – are usually behind firewalls for security reasons and cannot be accessed from outside the corporation.

Remote Control Solutions

A common method for allowing remote access to protected computing resources is to use remote control software, such as AT&T Laboratories’ free product, Virtual Network Computing (VNC). Such solutions ship only the keyboard input, mouse input and display output data between the local and remote computers. This functionality affords remote users access to computers on the corporate LAN, allowing them to remotely access certain computers, though performance is slower than if they were on the LAN itself.

Traditional remote control solutions such as VNC bring with them their own set of management and security challenges. This white paper compares the management and security issues of one remote control product, AT&T’s Virtual Network Computing, with Citrix Online’s GoToMyPC.

Intended Application

VNC is a software-based remote access program that allows users to connect to their computer from another computer running a variety of operating systems. It is best used by qualified network administrators managing computers within the corporate network.

Because VNC provides no encryption, no compression, may require registry edits, and requires knowledge of the host’s IP address, setup may call for more knowledge than that of the average computer user. Those interested in telecommuting or remote access should invest in other products.

GoToMyPC was developed exclusively for people with telecommuting or remote access needs. In addition to providing remote access to your computers, GoToMyPC includes many additional features such as file transfer capabilities, collaboration, and guest access.

Revolutionary Solution: Citrix Online’s GoToMyPC

GoToMyPC is Web-based screen-sharing software that allows users to access and use a PC through the GoToMyPC Web site. With GoToMyPC, users can see their computer’s screen and access all of their programs, files and network resources as if they were sitting at and using their computer, even though they may be a thousand miles away.

All communications between the host and client computers are encrypted using 128-bit encryption. Only screen and keyboard updates are sent between the host and the client computer used to access it (unless the user initiates a file transfer), so bandwidth demands are minimal.

Any Internet-connected computer can be used as a client to control the host computer because there is no need to install any client software. The client and host computers both initiate outward TCP connections on well-known ports, so firewall changes are usually not necessary.
Comparison of VNC and GoToMyPC

Installation and Setup

Virtual Network Computing: Installation of VNC on the host, or server, computer requires a minimum 10-step process (or more depending upon options), which includes downloading the software, unzipping, running setup, installing the service, editing registry settings, running App Mode, configuring the software, and deciphering complex instructions.

A CNet review of VNC describes the complex installation and setup process at:

To make a connection using VNC, a user is required to provide the IP address of the computer to which they wish to connect. Because dynamic IP addresses are often used in corporations to make administration easier, this creates havoc for VNC users. Even if the user writes down their IP address before they leave, it may change when it is renewed and they won’t be able to access their computer unless someone physically looks at the computer’s settings to identify the new IP address. Home users are not immune either, as most ISPs provide dynamic addresses, and firewalls and NATs used in a home network do as well.

A knowledgeable technician who is familiar with all functions of the computer’s operating system is needed to perform the installation in order to avoid harming the computer’s configuration. If any issues or problems occur during setup, users must revert to the VNC Web site for assistance, as there isn’t a help file included with the program or a phone number to call. Users in turn may need to rely on their company’s internal help desk for support. As noted on the VNC Web site: “If you try to contact the developers directly, please remember that VNC has thousands of users, and we cannot, in general, respond to individual queries. We will read your message, but don’t expect an answer!”

GoToMyPC: Installation of GoToMyPC is accomplished by simply logging on to https://www.gotomypc.com, clicking “Add Computer,” and creating a password for your computer. Installation and use is so easy that a non-internet savvy user can set up and start using GoToMyPC in less than 5 minutes. There are no special requirements or complicated settings to figure out.

While installation, setup, and use are extremely easy, a toll-free phone number, an email address, and a thorough Frequently Asked Questions (FAQ) document are provided for GoToMyPC support.

Figure 1: VNC installation requires a minimum 10-step process

Figure 2: GoToMyPC can be set up in less than 5 minutes
Security

Virtual Network Computing: While VNC provides support for a wide range of operating systems including Macintosh, Unix, and Windows, it does not offer a secure connection for any operating system. The only security offered is a user selectable password, which can be as few as one or as many as eight characters long. Inadequately configured security settings within VNC, such as a user setting a 1-digit password, can create a means for hackers to invade the home computer or the corporate network. Additionally, no verification is required to change a password on the host computer. Anyone can simply walk up to the host computer, right-click on the VNC icon in the system tray, choose properties, and type in a new password.

Not only are the user security settings inadequate, the data being sent from the host to the remote computer is not encrypted. Here is an excerpt from the VNC FAQ concerning security: "The data is unencrypted and could, in theory, be watched by other malicious users.” Furthermore, the FAQ mentions that if an “encryption scheme if this is important to you,” you should purchase a third party data encryption product to secure the data. This would require a user to install the third party product on their remote computer as well, which then removes the advantage of being able to connect from any web browser.

If VNC is to be used in the corporate environment, an administrator should be employed who has extensive experience configuring firewalls and security protocols. VNC requires firewall openings to allow incoming connections in order to function. While the firewalls may be restrictively configured to limit access, the fact that an opening exists makes it possible to exploit.

GoToMyPC: There are no security settings to accidentally configure incorrectly with GoToMyPC. Passwords are required to be alphanumeric, contain at least eight characters, and require a user to input the old password before being allowed to enter a new one.

GoToMyPC traffic is encrypted from start to finish with strong Advanced Encryption Standard (AES) 128-bit encryption using a secure challenge-response password authentication protocol. AES is the encryption selected by the National Institute of Standards and Technology (NIST) due to its security, computational efficiency, modest memory requirements, flexibility, and simplicity. AES is expected to become the U.S. government’s designated cipher for protecting sensitive information before 2002.

By making network-supported connections secure, reliable, and functional even in an environment with firewall protection, GoToMyPC allows users to confidently connect from any broadband ISP through the company’s existing Internet connection. No extra infrastructure is required at the central office, affording significant cost savings.
Configuration for Firewalls

Virtual Network Computing: To remotely access a computer using VNC, it is necessary to establish an incoming TCP/IP connection to that computer on the 5800 and 5900 port ranges. VNC is best suited for network administrators to access computers within their internal network. This is the most secure environment, provides the best performance, and quickest connection setup.

However, network connections that require an incoming port are problematic for firewalls. Corporate firewalls will almost certainly block incoming connections from the outside, and even in cases where a company’s security policy allows such incoming connections, providing this capability requires significant administrative overhead in firewall management.

Even in a non-corporate setting, supporting incoming connections can be problematic. Many home computers use personal firewall software or hardware or go through network address translation for their home network or their Internet service provider. Both of these must also be configured to allow incoming connections on the appropriate ports. If end users attempt this configuration, many will either inadvertently remove most or all the security the firewall provides or be unsuccessful in configuring the firewall. If the firewall or NAT belongs to their ISP, it will not be possible to configure it for access.

Compression is another area of concern for remote connections. Mobile users require compression, as it is essential to maximize speed. Unfortunately, VNC doesn’t provide any compression, which is the reason for the corresponding slowness in screen display.

GoToMyPC: With GoToMyPC, both the host and client computers receive all communications through an outgoing TCP connection, using protocols and ports that can transparently transit almost all firewalls. Since GoToMyPC is firewall friendly, generally no settings or changes to your existing firewall are required. IP addresses are not required so users need only remember their email address, password, and the access code of the host computer.

Every GoToMyPC connection is fully encrypted and all data is compressed, allowing real-time connection speed and use. The host PC supplies its own compression and the client PC provides the decompression.

Figure 3: GoToMyPC provides access across most firewalls
**In Session Features**

**Virtual Network Computing:** One of the many limitations of VNC is its inability to provide features to assist the modern remote access professional. The in session features that VNC provides are limited to refreshing the screen and selecting a full screen mode.

**GoToMyPC:** GoToMyPC hosts an abundance of in session features to create a versatile tool that can be used for everything from sales presentations to training to help desk support. The features include several different screen-viewing options to allow full customization of the remote viewing experience. Drag and drop file transfer capabilities enable file sharing between both the client and host computers. Host screen blanking and keyboard locking will keep others from viewing or interrupting your remote sessions. Remote printing allows users to print either at the host or at the remote client location. Chat and screen drawing tools are available for complete collaboration between users.

**Reporting**

**Virtual Network Computing:** Most employers want detailed reporting about how many users are making remote connections, the employee names, and for what length of time they were connected. Obtaining this information with VNC isn't possible. There are no reporting options or information gathering log files to be analyzed.

It is possible for a highly skilled network engineer to use third party network software to monitor network traffic and then export log-file format data into a user-created database, but this method would be cost-prohibitive. Adding to the complexity is that the data would need to be analyzed using third-party data-analysis software.

**GoToMyPC:** Monitoring current sessions in progress or reviewing user connection history is a simple process with GoToMyPC. A monitor function displays everyone who is currently online along with his or her related connection information. The administrator can also end an employee's current session immediately using a link. An additional reporting section allows the manager to view detailed reports by individual or the whole company for any time frame in either HTML or Excel format.

![Figure 4: GoToMyPC has an abundance of features](image)

![Figure 5: GoToMyPC provides detailed reporting](image)
Guest Invitation

Virtual Network Computing: Many of today’s users are requiring more features from their remote access products. One of those required features is the ability to invite a guest to your computer for a product demonstration, training, or a world of other possibilities. Remote access users also want to be able to grant this remote access to a guest without changing settings or divulging sensitive information such as their passwords.

Unfortunately, VNC does not allow guest invitations. If a user wishes to invite a guest to their computer, the only way is to send VNC connection instructions to the guest with the IP address and the password of the host machine. If the user forgets to change the password immediately afterwards, the guest may gain full access to the host computer at any time.

GoToMyPC:

Inviting a guest to your PC with GoToMyPC is easy. Users send an invitation by right clicking on the GoToMyPC icon in the system tray and selecting Invite Guest to PC. They then fill in the email address of the invitee, and enter the GoToMyPC account email address and password.

The person who is connecting to your computer receives an email with a link that starts the screen sharing session for one time only. Users never have to compromise security by giving out their password or be required to change their password immediately after use.

GoToMyPC is firewall friendly and doesn’t require any firewall configuration or setup. This can be extremely useful when an important sales opportunity presents itself with a client who is on a corporate network with a firewall.

Figure 6: VNC requires giving guests your personal password

Figure 7: GoToMyPC’s Invite Guest feature works on a range of Windows systems
Conclusion

In contrast to other remote control products such as Virtual Network Computing, GoToMyPC provides a cost-effective, flexible, and secure method for remote access to corporate computing resources. With GoToMyPC, there is no downside in terms of extra management, loss of security or loss of performance.

GoToMyPC is also far more convenient for users than other solutions because it does not require any client software, is accessible from any Web browser and does not require technical expertise to use.

Summary Comparison of GoToMyPC vs. Virtual Network Computing

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<tr>
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<th>VNC</th>
<th>GoToMyPC</th>
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<tbody>
<tr>
<td>Installation and Setup</td>
<td>Confusing setup that requires a great depth of technical knowledge such as finding IP address.</td>
<td>Simple setup performed in less than 5 minutes by non-technical individuals.</td>
</tr>
<tr>
<td>Configuration for Firewalls</td>
<td>Network and firewall must be configured to allow incoming connections.</td>
<td>Outgoing connection only. No configuration of firewall.</td>
</tr>
<tr>
<td>In Session Features</td>
<td>Few features available.</td>
<td>Advanced features included such as file transfer and collaboration.</td>
</tr>
<tr>
<td>Reporting</td>
<td>No reporting capabilities.</td>
<td>Real-time, detailed reporting easily exported to Excel.</td>
</tr>
<tr>
<td>Guest Invitation</td>
<td>No guest access. Required to give out host IP address and personal password.</td>
<td>Easy and secure method of inviting guests to your desktop.</td>
</tr>
<tr>
<td>Customer Support</td>
<td>No Help file included with program; no phone or email support; limited online documentation.</td>
<td>Extensive online FAQs and Help; telephone and email support available.</td>
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