The Technology of Telecommuting

Each month, the TSC examines a key emerging technology or its use. This time, we look at the technical side of telecommuting.

For many people, the notion of telecommuting is a mixed blessing. It avoids the unpleasantness of daily travel and allows greater flexibility in scheduling than is typically found in traditional workplaces. At the same time, though, it demands a high degree of self-discipline and a heavy dependence on not always reliable technology.

On the positive side, companies are able to retain people such as new parents, who need a period away from the traditional workplace or who would prefer working from their homes one or two days a week. (There are also some people who prefer to work from Telluride or Santa Fe, as well as those who move away from their employer's location on behalf of a "significant other.") On the negative side, there is currently no satisfactory substitute for occasional face-to-face meetings as a complement to electronic mail, overnight courier services and telephone conversations. Also, the cost of properly equipping telecommuters and other "road warriors" is often higher than originally forecast.

Among the technical issues for telecommuters and their employers are computing equipment, telecommunications facilities, access to corporate networks and software licenses. All of these issues must be satisfactorily resolved if the telecommuter is to be productive. There are also, of course, a large number of social and professional issues, including the ability of the telecommuter to work effectively in relative isolation and the willingness of his or her managers and colleagues to accommodate the arrangement. Although in practice these social and professional issues often dominate the technical issues, this article concentrates primarily on the latter.

Hooking Up and Communicating

Computing needs for the telecommuter have changed drastically over the past few years. Not long ago, all that was needed was an alphanumeric display and a modem. Today's requirements include a powerful personal machine (Macintosh, PC or Unix workstation) with ample secondary and backup storage, a local printer and high-speed communications. These systems need maintenance and system administration in much the same way as those at a corporate location.

Updates for system software and common applications must be obtained and installed, and repairs occasionally are needed. While major systems vendors provide rapid turnaround (including overnight courier service) for hardware repairs, telecommuters may be drastically less productive while their system is being repaired. Access to e-mail, the Internet and the organization's intranet limits the telecommuter's access to timely information. Thus, organizational support for telecommuters should include the rapid delivery of loaner hardware.

An efficient telecommunications link is also essential. Requirements vary from a dedicated high-speed (T1) line, which can be extremely expensive, to occasional low-speed (14.4K or 28.8K) dialup for reading mail and transferring small files. File transfer and World Wide Web navigation are often unacceptably slow at these lower speeds. As a result, people have explored ISDN and its 128K rate as a better link. Unfortunately, ISDN service is not universally available in the U.S., and some technical expertise is needed to install an ISDN connection. ISDN service requires ISDN modems, as well as an ISDN telephone line. Some regional telephone providers—notably Nynex—do not offer ISDN throughout their service areas. Pacific Bell, by contrast, provides good ISDN service but recently applied to double the fees charged for the use of such lines.

Of course, a telecommuter's telephone call to connect to his or her organization is often a toll call, adding yet another incremental cost. There are, however, some viable alternatives to such calls. One approach is to establish an account with one of the major online services, preferably one that does not charge for e-mail messages. These services have local points of presence across North America and are developing additional foreign sites. The telecommuter can forward e-mail messages from the corporate account to the online service account. There is, however, an hourly charge after the first few hours each month, so it is uneconomical to be a heavy user of such a service. Nonetheless, this approach can be useful for mobile telecommuters, such as consultants.

A better approach is to establish an account with an Internet service provider (ISP) that can be reached with a local telephone call from the telecommuter and that offers a large number of hours (preferably unlimited) for a fixed fee. (In San Francisco, there are several alternatives that cost $30 or less per month for unlimited access.) The telecommuter can dial this ISP and use Telnet to connect to his or her employer. Note that the telecommuter's computer may need some

By Anthony I. Wasserman

additional software installed to support the Internet Point-to-Point Protocol (PPP). Also note that neither of these alternatives provides access to an organization's intranet, which is typically protected by a firewall from outside access.

Balancing Security and Access

The firewall is but one way that an organization protects its systems from unwanted intrusion. Other security issues arise for systems used in telecommuting. First and foremost, some organizations (both commercial and military) attempt to maintain highly secure environments. Many of those systems can only be accessed over dedicated, private lines. Dialup connections are viewed as being inherently insecure. Next, the ability of a telecommuter to transfer files raises the possibility that proprietary materials may reside on the telecommuter's personal machine, outside the boundary of an organization's typical security. Finally, a telecommuter's machine is itself insecure, since it can be lost more easily than is the case with equipment located at a corporate site.

Organizations should establish a security policy for telecommuters, based on the value of the programs and data on the telecommuter's computer. For many telecommuters, the proprietary material is limited to saved e-mail messages along with other text and graphics. Some organizations may recommend that this material be encrypted.

Most of the other material on the telecommuter's storage devices is system software and commercial applications. These programs are typically purchased and licensed by the telecommuter's organization. Licensing of them may be subject to different rules than those applicable to programs used on the organization's local networks. For example, some software is licensed for use at a physical site, for which the telecommuter's software may not qualify. Similarly, some software is licensed for a fixed number of concurrent users on a network; again, the telecommuter's software may require separate licensing.

The World Wide Web contains numerous sources of additional information about telecommuting and related issues. There are two excellent overviews of the professional and technical issues: the Pacific Bell *Telecommuting Resources Guide* at http://www.pacbell.COM/Lib/TCGuide and the *Smart Valley Telecommuting Information Guide* at http://smartone.svi.org:80/PROJECTS/TCOMMUTE/TCGUIDE.

TeleCommute Solutions, a Sugar Land, TX consulting firm, maintains both a home page (http://tta.com/TCS/home. html) and a set of links (http://tta.com/TCS/links.html) to other relevant sites.

Finally, telecommuting is just one example of a growing trend toward distributed work. The Institute for the Study of Distributed Work maintains a bibliography on that topic (http://www.dnai.com/~isdw/Bibliography.html). The group can be contacted at isdw@aol.com. More sites can be found by searching on the word *telecommute* with one of several WWW search engines, such as AltaVista (http://altavista.digital.com). IT

Anthony I. Wasserman *is chairman and founder of Interactive Development Environments in San Francisco and a member of the UniForum Technical Steering Committee. He can be reached at tonyw@ide.com*

COMPANIES MENTIONED IN THIS ISSUE

FEATURES

More Than Money Can Buy: p. 26
Amdahl
DEC
Dun & Bradstreet Software
Hewlett-Packard
IBM
Oracle
Pyramid Technology
SAP America
Software AG
Sybase
UniKix

The Changing Face of Midrange Platforms: p. 32
Apple
AT&T
Bristol Technology
DEC
Hewlett-Packard
IBM
Mainsoft
Microsoft
Novell
SCO

CDE Finds a Comfortable Niche: p. 38
DEC
Hewlett-Packard
Microsoft
Novell
Open Software Foundation
Operations Control Systems
Silicon Graphics
Sun Microsystems
SunSoft
TriTeal
X/Open

Teamwork Behind the Scenes: p. 42
America Online
CompuServe
DEC
Marketplace MCI
Prodigy
Scan Systems
Silicon Graphics
Uunet Technologies
Web Factory

COLUMNS

Association News: p. 12
AGE
AT&T
IBM
Lotus
NCR
NetManage
Performix
Pure Software
QualTrack

Behind the News: p. 14
AT&T
DEC
Hewlett-Packard
Hitachi
IBM
ICL
Intel
Microsoft
NCR
NEC
Novell
Open Software Foundation
Pyramid Technology
SCO
Sun Microsystems
SunSoft
Unisys
X/Open

Home Page: p. 50
Macromedia Corp.
Netscape Communications
Sun Microsystems
White Pine Software

Concerning Your Career: p. 52
Adobe
AT&T
Autodesk
DEC
Hitachi
IBM
Microsoft
Oracle
Sharp
Stac Electronics
Toshiba
Unisys
Xerox

High Technology and the Law: p. 54
Access
Borland
Eolas Technologies
IBM
Informix
Lotus
Microsoft
Netscape Communications
Paradox
Sun Microsystems
Sybase