



Telecommuting Report: A Year of Experiences

- C. Christian IRM/BPC/eDIP

Summary

This document reports direct experience with telecommuting combined with information provided from other Department of State (DoS) telecommuters. Herein, telework and telecommuting are used interchangeably and viewed as a subset of “mobile access”. In most cases relayed here, users employed either a Secure Domestic Dial-In (SDDI) or a Secure Dial-In (SDI) laptop computer provided by DoS.

In general, users value the greater continuity of access to information and the flexibility that telework offers. Users reported they were more productive in an overall sense when telework was integrated into their work schedules. Remote email access was given the highest priority by users and managers, when considering the various tiers of connectivity that might be possible for DoS.

Users have experienced mixed enthusiasm and support for telework from managers. Many managers are reluctant to approve telework, are not sensitive to the federal mandates requiring telework program support, and have used lack of external email access as a significant barrier to permitting telework. Users found that once the laptops worked, they could be productive, however, connectivity issues and poor response from the Citrix server were often encountered, frustrating work. Users with higher capability and requiring access to more complex applications were often inhibited because applications either did not work well, were not enabled, or performance was too slow to be practical. For users without broadband, the DoS-issued laptops are usable only for reading e-mail. Any other functions, such as responding to e-mail, cannot be easily accomplished. In general, bureaus and posts find the secure laptops to be too expensive (\$2,000+ per unit) to allow many employees to take advantage of telework.

Telecommuters at this time cannot use the secure laptops in local area networks found in many telework centers, home networks, hotels, and other places of business due to the particular technology employed on the laptop. Many users would value the ability to use wireless networks.

Users would greatly value a simple solution that accommodates straight-forward remote access to email. Many users have experience with alternative Virtual Private Network/Secure Socket Layer (VPN/SSL) solutions (including Open Source

Information System [OSIS] remote dial-in) that provide secure access to unclassified information in other situations and would value such a solution for DoS.

Background

The Office of eDiplomacy of the Information Resource Management Bureau is chartered to put “the power of innovation in technologies and practices at the fingertips of the individual user” and to “give each practitioner of diplomacy fast, reliable access to the knowledge he or she needs to do the job.” To this end, eDiplomacy interfaces with users to identify their needs and values and broker technological solutions. One pressing business need is the implementation of a mobile technology program to allow State users to maintain communication and continuous work flow anytime, anywhere. As a facet of this larger mobile access program, State users must have technical solutions allowing them to telecommute, that is, participate in a telework program. In fact, participation in a telework program is also a mandate, outlined in Public Law 106-346 (FY 2001 Department of Transportation and Related Agencies Appropriations Act), Section 359. Finally, a robust telework program is an important facet of Continuity of Operations Planning and implementation.

To investigate and promote technologies that enable telework, eDiplomacy initiated a number of activities:

1. Regular communication and cooperation with Bureau of Human Resources personnel responsible for the Department of State telework program to promote telework;
2. Collection of information regarding a variety of technical solutions available for teleworkers;
3. Frequent interaction with current State teleworkers to document user experiences, provide support and access user needs;
4. Consultation with the Messaging Systems Programs (IRM/OPS/MSO/MSP) staff on technology issues such as SDDI, SDI, and Open Net Everywhere (ONE);
5. Establishment of a Telework Website (see <http://www.extranet.state.gov/m/ediplomacy/> links), and telework listserv -- C. Christian curator;
6. eDiplomacy personnel participation in the telework program including testing of technology and Federal Telework Centers;
7. Participation in Enterprise Architecture and Planning's (IRM/BPC/EAP) Anywhere Anytime Computing Study;

8. Networking with telework professionals and users through telework seminars and conferences.

This report documents the direct telework experience (item 6 above) of the author over the last year, integrated with experiences from other DoS teleworkers (item 3 above).

Note that the SDDI laptop uses SAFENET security with a smart card and several layers of security with different passwords. The SDI laptop uses the DoS PKI ID card with layers of security, but one password for access. Both laptops have encrypted disks and are configured to disallow any user addition of software, drivers or other utilities. The OSIS dial-in capability is accomplished through a user installed VPN on a personal computer (non-USG) and a dial-in user account.

Data Collection Method

Data was collected from: a) a telecommuting diary kept by the author and b) experiences related to eDiplomacy from teleworkers and other interested persons through interviews, solicited feedback, and open commentary *via* email.

For technology evaluation using current (2004) available solutions at State, the author tested both an SDDI laptop and a domestically configured SDI laptop. A variety of connection methods were used: a) dial-in *via* phone line and modem from home in the Baltimore area, a telework center, and a hotel, b) broadband connection through Comcast, c) a 10Mbps network through Space Telescope Science Institute (Johns Hopkins Homewood Campus) *via* NASA's Goddard Space Flight Center network, and d) through Telework Centers. Other eDiplomacy personnel (G. Galloway) tested an SDDI laptop and OSIS dial-in from a home network connected to broadband and through phone dial-in from home and hotels. Other users who provided input utilized phone lines or broadband. A few reports were obtained from users at posts.

The author and other users related their own telecommuting experiences and those of others (spouse, close friend) using alternative technologies for other organizations and companies – VPN/SSL connections, wireless connections, and web-based username/password protected applications. These were mentioned as a comparison to their DoS telecommuting experience.

IRM/OPS/MSO provided input on technical issues and (IRM/OPS/MSO/EML), the “SDDI group”, was continually supportive and helpful.

Summarized Results

- A very limited amount of telework can be accomplished by transporting materials (paper or electronic media) from the office to home coupled with maintaining telephone communication with co-workers, supervisors, and clients.
- Most teleworkers and their supervisors insist that offsite personnel (including supervisors and managers) need access to email to be effective. Users feel access to email is a basic level in the tier of telework capabilities DoS should offer. Many managers currently will not consider the telework program for themselves or employees without email communication.
- Many managers are very reluctant to allow telework and will need an incentive as well as training to accommodate telework in every day operations. Managers are not taking seriously the federal mandate for agency telework compliance and appear unaffected by the threat that the FY05 DoS budget will be adversely impacted for non-compliance.
- Teleworkers, and more generally, mobile workers, value the ability to respond to situations quickly, keep abreast of important issues, and maintain continuity in projects and tasks while away from the office. Users would greatly benefit from affordable, reliable solutions to address these business requirements; DoS would benefit from the improved productivity of employees.
- The SDDI and SDI laptops are overkill and expensive (>\$2000) solutions for addressing the basic need for email. However once users have access to email, they value access to files and applications for regular telework.
- Use of the SDI laptop proved, in some cases, to be easier to use and less problematic than the SDDI laptop, with the caveat that the restrictions on the systems inhibit robust telework (use of applications, ability to add software and printers, etc.). However, the SDI solution remains generally unavailable to domestic Department users.
- Teleworkers who use an SDDI or SDI laptop need to be able to connect through any network including translated services (such as NATted networks), however this capability is not available today. Users need to be able to connect without resorting to having the laptop reconfigured for specific TCP/IP setup (for example for telework centers).
- Teleworkers must have the opportunity and technology solution to work from federal telework centers.
- Teleworkers need to be able to print and use other output devices from laptops. They value and are more productive with a true office environment away from their duty station.

- Encrypted wireless for the SBU laptop has been tested within MSO and could be used, and is used by other federal agencies.
- Users experienced that VPN/SSL solutions (e.g., OSIS, NASA, DoD) on home computers performed reliably and safely and users value that such technology performs more smoothly than the multi-tiered security and locked down nature of the SDDI and SDI laptops. A few instances of VPN/SSL access have been implemented by posts abroad with success.
- Several DoS users have access to OSIS accounts. Protection is provided through a user-installed VPN on a user-controlled (e.g., home) computer. Users have access to OSIS email and other applications. Some limited DoS applications are available to OSIS users also. In addition, in a few limited cases, users with OSIS access have gain access to DoS email through Outlook Web Access (OWA). The solution is simple and straightforward from the users perspective. From the Department perspective, creating a large community of DoS users with OSIS emails and access would represent extensive additional support and user validation and unnecessary additional layers of applications. Direct VPN access to DoS email and applications is preferred by current users.

Users perceive that a major barrier to implementing simpler remote access technologies is the current policy mixing unclassified and SBU materials in one category. Users believe they are capable of protecting SBU hardcopy materials and can do likewise with electronic materials.

Detailed Results

Some individuals are able to structure their activities to accomplish tasks away from their main work location without access to the intranet, extranet, or any unclassified or SBU material residing at DoS. This takes care and planning and usually is accomplished by emailing critical files to a personal account, copying required materials on media, and/or transporting paper copies to the alternate work site. Communication can be accomplished by phone.

By and large, however, most DoS users, who regularly telework, need access to their email, and a significant number of users need access to applications and utilities, thereby expecting resources in their telework environment to match those at the office. The current telework program at DoS only accommodates access to DoS OpenNet infrastructure through a specially configured Secure Domestic Dial-Up (SDDI) or Secure Dial-Up (SDI) laptop. Most of the data presented here was obtained from telecommuters using such laptops, and so the results are dominated by their input.

Initial setup of laptop equipment - User account: Coordination between the SDDI group and the system manager responsible for the telecommuter's accounts must take place to insure that the roaming access account is enabled for the SDDI laptop and has access to all necessary files and applications including Outlook email, etc. When this is not done initially, much time is spent transporting the laptop back and forth to the Department associated with a loss of productivity for the teleworker, and numerous interruptions for the SDDI team and the systems support personnel.

Connectivity Configuration: The SDDI group does not have broadband access through their lab, so home broadband access may not work initially. Several trips back and forth with the laptop may be required because users do not have the correct permissions or, often, the experience to modify the configuration appropriately.

OSIS: The user must ask that access to a variety of external OSIS sites be tested during laptop configuration. OSIS access did not work initially with the SDDI laptop or the SDI laptop. An OSIS patch, put in place in late 2003 has solved this in principle, but users would value a standard that enables OSIS access at the outset.

In Situ Performance - Connection: Users found that broadband response was adequate but slower than other computers, either personal or professional hardware in the same network configuration. There was some subtle distinction between the specific networks used and use of some providers may work better than others (e.g. Vendor X cable modem might work better than Vendor Y DSL). Telephone dial-in was sometimes adequate for email access and to a lesser extent, (mostly textual) web use. Users often experienced dropouts and loss of connectivity both from broadband and dial-in connections. According to MSO personnel, dropouts may be due, in part, to protection against "open packets" from the Internet. This situation improved for some users in fall 2004, reason unknown.

Users experience that the initial connection to the Citrix servers and applications (Outlook, Word, Excel, etc.) requires multiple tries and performance is slow at the outset, possibly due to some software running in the background for several minutes. If a dropout occurs, users must re-establish a connection and the background task runs again, slowing performance and frustrating productivity. The root cause of this is yet undetermined. The SDI laptop configured for domestic use exhibits slowed performance at initial connection, but was subject to fewer dropouts and stayed connected for longer periods. The particular SDI laptop tested by the author was a higher performance laptop configured with adequate memory

(1Gb) and processor speed (1.6Ghz) and so is far more usable than the slower SDDI laptop through the same connection.

Network Configuration: The laptops with the current SAFENET or PKI security cannot be used on “translated” or NATted (Network Address Translation – often used by organizations as a short term solution to a depletion of IP addresses on Local Area Networks) networks. Therefore such laptops cannot be used easily on home networks, some telework centers, other locations like hotels, or public networks that employ NAT schemes. This situation does present a difficulty for home use as the home network (often dominated by wireless communications) must be disassembled each time the DoS employee needs to use the connection and no other person may use the network at the same time. According to MSO personnel, a change in security software possibly using a Nortel product may remedy this problem.

Telework Centers: Tests (Appendix A, B) were conducted at Federal General Services Administration Telework Centers (Appendix C). Such centers are distributed throughout the Baltimore-Washington-Fairfax area and potentially could provide alternate worksites, closer to home, for DoS users on telecommute days. Telework centers are a required facet of Continuity of Operations planning for federal agencies. The SDDI and SDI laptops could not be used at telework centers before August 2004 because all telework centers had NATted networks. In fall 2004, a few centers (e.g., Laurel and Waldorf) reconfigured their infrastructure. DoS laptops can be used at those locations, but the user would need to have the laptop specifically configured for the target telework center. To be useable, two configurations would have to be set up on one laptop (“home” or “roaming” and “telework center”) – both utilizing the current security mechanisms.

Applications: Users run applications through a Citrix client (see Figure 1). Typical applications are Outlook and the Microsoft Office Suite. However telecommuters require many other applications for fruitful work. Some but not all the necessary applications are available through the Citrix server. Some users are responsible for web development, including the author.

The author regularly telecommutes one day per week and often connects to DoS at night and on weekends. Besides reading email and creating Microsoft Office documents, web development and image analysis using large files was accomplished. Due to slow SDDI response, productivity was reduced, however the newer SDI laptop performance is quite reasonable for such work if no hardcopy is required.

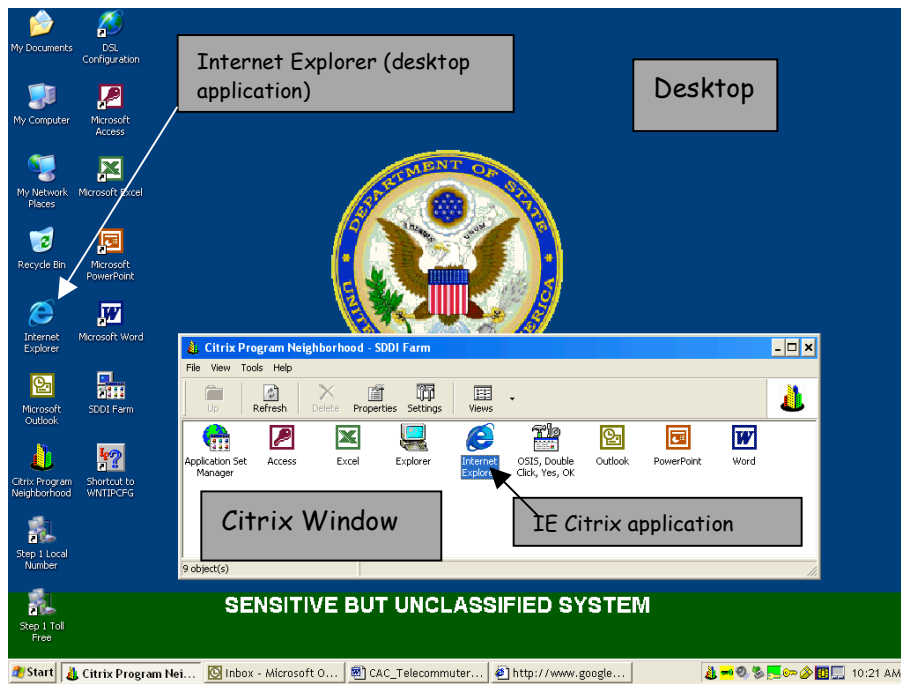


Figure 1: Screen shot of the SDI laptop with Citrix server running on Desktop.

Telecommuters find that the inability to transfer information from the Citrix client to the local desktop of their laptop inhibits productivity. Since no communication

between the user's Desktop and the Citrix client is allowed, printing, backup to media, and local manipulation of files (e.g., to save bandwidth) is impossible. As a work-around, users can email files to themselves and access them through Outlook Web Access on their State desktop browser, or by switching their network to their home configuration and using their personal computer. These operations are unnecessarily time consuming, clog bandwidth, and necessitate transfer of files back and forth many times, where drag and drop capability on the laptop would simplify tasks considerably.

Browser use: If properly configured, the browser available through the Citrix client can be used to browse OSIS and the Internet. However the browser on the laptop desktop can only access the State intranet. Therefore Extranet or Internet materials accessed and needed in hard copy cannot be printed or saved locally while teleworking.

Overall Experience: Some DoS teleworkers, with high motivation and perseverance, can make use of SDDI or (preferably) SDI laptops. Current teleworkers greatly value access to email as a core capability. For more capable teleworkers, and for more complex applications, the current laptops inhibit productivity. Many users are aware of or experienced with other secure configurations such as VPN/SSL used by other agencies and organizations and would value a simpler solution to DoS telework, allowing them to access DoS

email and applications from a machine they control. Users with OSIS accounts report ease of use and flexibility and would value direct access to DoS email through a technology such as OWA. Users would not mind the necessity for disk encryption if they could add applications, printers and other output devices they need for their work. Teleworkers would greatly value a solution in which their home networks could be shared with other users while teleworking. Experiences with phone line dial-in have been mixed. Usually the most success derives by limiting access to textual email.

Appendix A: Report on an Experiment Using a Telework Center

- C. Christian (IRM/BPC/EDIP), 15 March, 2004

Summary

A short experiment at the Hagerstown Telework Center was conducted, taking advantage of the 60 day free test period. The test was specifically to see if the SDDI (secure domestic dial-in) laptop could be used with a high-speed connection to access the Department of State (DOS) Sensitive but Unclassified (SBU) network. SDDI laptops will work with a dial-up capability, but it is very slow. The SDDI laptop and network configurations could not be set up so that connections could be made to DOS successfully. Follow-up discussions with Telework Center personnel suggested that this is a common situation because the centers have firewalled LANs for a connection configuration. A few telework centers may be able to provide open IP connections to the Internet or custom configurations. It appears that work from a home office is the only viable scenario for regular teleworking to DOS unless the worker is willing to tolerate the slow connectivity of a dial-up connection.

About Telework Centers

The General Services Administration has established a network of interagency telework centers in communities surrounding Washington, DC Metropolitan area to support teleworkers from federal agencies. The Telework Centers provide cubicles for office space, basic computing equipment, and other business equipment (phones, copiers, etc.).

Telework Center usage costs about \$100 per visit or \$500 per week. Telephone charges should be handled by credit card or calling card. At the Hagerstown, MD facility, parking is available by meter or in a parking garage.

Free Test Period

A "60-Day-Test" free of charge, was offered from February 1 - March 31, 2004. To take advantage of this offer, I obtained approval from the home agency to telework from a GSA Telework Center, contacted the Telework Center operator, and completed the necessary telework center usage form.

Visit to Hagerstown Telework Center

I visited the Hagerstown, Maryland Telework Center on March 12. The center director, Ms. Mary Bray and her technical staff were very helpful and cooperative. The center has several regular users, and the times and days that each user will be

present are posted on the cubicle walls. The day I was there, approximately 5 other people were working there, one was from the FDA, and another was from the Navy. I was the only person from the Department of State (DOS) who had ever been there.

Experiment

In preparation for the visit, I discussed the visit with the very helpful DOS SDI support personnel. The only method for connecting the current secure SDI laptop is either by dial-up or by an “open” IP connection to the Internet, if the center can provide it. In consultation with the center director, the latter high-speed configuration appeared possible.

During the visit, I was assigned a cubicle and we connected the laptop to the center Ethernet. Several configurations were tried.

1. One configuration was to establish a connection to the internal center LAN, behind the center firewall. An IP address was dynamically assigned. Not surprisingly, this configuration failed due to the additional firewall.
2. The second configuration attempted was to use what was hoped to be an open IP address through a Hagerstown Library gateway. I was given the addresses for the full network configuration including a fixed IP. Other teleworkers are able to use this configuration to connect to their agencies since the IP address is known, and fixed rather than dynamically allocated. However, for the SDI laptop this configuration failed as well. The local library system has one gateway and has created several subnets, therefore the SDI laptop cannot connect to DOS this way.

A worker from the FDA also was present in the center, where he works regularly. The FDA had come out to Hagerstown and configured and locked down a workstation for him. No other user can use the system and the center personnel cannot log into it. The FDA worker is accessing SBU type material. He is not accessing classified material. He also was able to get to a .mil net address to help another worker (from the Navy) who was experiencing difficulties getting into his email.

Other Telework Centers

Subsequent to the experiment on March 12, I contacted two other centers to ask about connectivity. The Bowie, Maryland Telework Center at Bowie State has a firewalled LAN, so the SDDI laptop will be incompatible. They have never had a DOS teleworker. Other federal workers who use the facility use dial-up because they have a similar problem to mine.

The Frederick, Maryland Telework Center has 13 connections to a Class-C network available, so it might be possible that the center can provide support to DOS teleworkers.

Results from March Test

An experiment at a GSA Telework Center demonstrated that it is difficult if not unfeasible for DOS teleworkers to use the center if they need high-speed connections to the SBU network. Each agency appears to have different requirements, so that center support must be customized for each user. Some agencies have customized workstations and provide agency support for workers who regularly use the center. Workers from other agencies, such as DOS, will only be able to use telework centers through slow, dialup capabilities due to the tight configurations of SBU equipment provided.

Appendix B: Report Testing at the Laurel Lakes, MD Telework Center

- C. Christian (IRM/BPC/EDIP), 1 November, 2004

Results

The Laurel Telework Center was visited for one day, using the SDDI laptop. Laurel offered untranslated (not NATted service) but only using a specific configuration. The SDDI laptop did not work upon initial setup (using DHCP). The laptop was modified with a specific configuration including IP address, subnet mask, Gateway and DNS server. (Note that users will need to have their laptop preconfigured to the telework center they intend to use, including the specific IP address). The laptop performed similarly to experiences with other broadband connection: the applications available through Citrix are not connected immediately and the user needs to try several times to get applications (Outlook, Internet Explorer, Microsoft Office Suite, etc.) to load.

No dropouts were experienced throughout the day and the laptop could be left idle for at least 20 minutes without disconnecting. Performance was slow at first, due to a background task running upon initial connection to the Citrix server.

No printing or output to any external device was possible, since the user cannot load necessary drivers or software associated with output devices.

Comment

The laptop worked in the nominal fashion after the network configuration was properly entered. This represents a partial solution in that a teleworker can use the Laurel Telework center and possibly the Waldorf center under the same management, with the caveat that an agreement on which days the State employee will use the center must be made. Further, the teleworker must have the network connection configured for the day of visit. Users currently cannot accomplish this configuration themselves. The configuration may change from visit to visit (to accommodate teleworkers from other agencies), so the laptop will need to be modified ahead of time each instance if the arrangement changes at the center.

Laurel, like other telework centers, does have a few computers and cubicles set up by other agencies. These computers and connections are provided by the agency (such as FDA) and locked down. No other teleworkers can use these machines and the agency schedules day to day use of the machines for its employees.

Appendix C: General Services Administration Telework Centers

1. MARYLAND

Bowie/Thurgood Marshall Library
www.tc.bowiestate.edu
Bowie State University
14000 Jericho Park Road, Bowie MD 20715
POC: Joyce Larrick
(301) 860-4939 FAX (301) 352-4513
Monthly Fee for full-time use: \$500.00
1 day per week: \$100.00 monthly fee

Frederick
www.ibasys.net/telework.htm
7340 Executive Way, Suite
Frederick, MD 21704
POC: Tonita Hickey
(301) 698-2700 FAX (301) 696-2848
Monthly Fee for full-time use: \$500.00
1 day per week: \$100.00 monthly fee

Hagerstown
www.wc-link.org/telework/
14 North Potomac Street, Suite 200
Hagerstown, MD 21740
POC: Mary Bray
(301) 745-5601 FAX (301) 745-5700
Monthly Fee for full-time use: \$500.00
1 day per week: \$100.00 monthly fee

Southern Maryland
www.telecommutesomd.org
POC: Tammey Ussery
(301) 934-7628 FAX (301) 934-7675

Calvert Center
110 S. Solomon's Island Rd.
Prince Frederick, MD 20678

Waldorf InTeleWork Center
128 Smallwood Village Shopping Center
Waldorf, MD 20602

Laurel Lakes
13962 Baltimore Avenue
Laurel, MD
POC: Beatrice Mouapi
(301) 470-0560

Monthly Fee for full-time use: \$540.00
1 day per week: \$108.00 monthly fee

VIRGINIA

Northern Virginia
www.nocommute.org
POC: Darryl Dobberfuhl
(703) 367-3000 FAX (703) 367-0126

FairfaxCity
4031 University Drive; 1st Floor
Fairfax, VA 22030

Herndon
768 Center Street
Herndon, VA 22070

Loudoun Co. (Sterling)
100 Carpenter Street; Ste 103
Sterling, VA 20166

Monthly Fee for full-time use: \$520.00
1 day per week: \$104.00 monthly fee

Manassas
www.nocommute.org
9500 Godwin Drive Building 105
Manassas, VA 22110
POC: Darryl Dobberfuhl
(703) 367-3000 FAX (703) 367-0126

Monthly Fee for full-time use: \$520.00**
1 day per week: \$1040.00 monthly fee**

Fredericksburg

www.nocommute.org

POC: Jennifer Alcott

(540) 710-5001 FAX (540) 710-5004

Spotsylvania

Massaponax Outlet Center

4956 Southpoint Parkway

Fredericksburg, VA 22407

Stafford County

24 Onville Road, Suite 201

Stafford, VA 22554

Monthly Fee for full-time use: \$520.00

1 day per week: \$104.00 monthly fee

Woodbridge

www.nocommute.org

13546 Minnieville Road

Woodbridge, VA 22192

POC: Jennifer Alcott

(540) 710-5001 FAX: (540) 710-5004

Monthly Fee for full-time use: \$980.00

1 day per week: \$196.00 monthly fee

Winchester

NetTech Center of Winchester

www.nettechcenter.net

2281 Valley Avenue

Winchester, VA 22601

POC: Linda Whitmer

(540) 678-1909 FAX (540) 678-1939

Monthly Fee for full-time use: \$545.00**

1 day per week: \$109.00 monthly fee

WEST VIRGINIA

Jefferson County/BizTech

www.jctc.org

150 Burr Boulevard

Kearneysville, WV 25430

POC: Nieltje Gedney

(304) 728-3051 FAX (303) 728-3068

Monthly Fee for full-time use: \$770.00

1 day per week: \$154.00 monthly fee