

On the Road to Becoming a Statewide ISP

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ABSTRACT

This paper discusses the technical and policy issues that West Virginia Network (WVNET) encountered when it expanded its statewide Internet dialup service through an outsourcing partnership. Although this outsourcing project is still in its infancy, much can be learned from our experiences to date.

WVNET provides dialup Internet access for state higher education. We currently serve approximately 12,000 Internet dialup modem users clustered around 28 higher education campuses statewide. A WVNET modem account holder can dial in to the Internet from any one of these locations.

Although these 28 higher education locations covered a significant portion of the state, there remained areas where there were no other ISPs, and a long-distance call was the only way to get onto the Internet. Additionally, local and state government entities were looking toward WVNET for many of the same services it has been traditionally providing for state higher education.

In late 1999, Bell Atlantic Data Solutions Group (DSG) offered to WVNET a partnership plan: DSG would assume access, engineering and management responsibilities for WVNET's Internet dialup service, while WVNET would continue to "own" its relationship with the higher education institutions. The plan called for the creation of a single, in-state toll-free telephone number with which WVNET customers could dial into the Internet. Busy lines and modems would be virtually eliminated, because calls could be load-balance across the state. It would allow us to provide unlimited access. Sounds almost too good to be true? The devil is in the details.

Keywords

Internet service provider, Internet dialup service, partnership, outsource.

1. INTRODUCTION

West Virginia Network (WVNET) was created in 1975 to provide central computing facilities and wide-area network

communications linking its "central site" computing resources in Morgantown with the campus computing systems at most of the colleges and universities throughout the state.

WVNET also provides dialup Internet access for state higher education. We currently serve approximately 12,000 Internet dialup modem users with 1,400 digital modems that are clustered around 28 higher education campuses statewide. A WVNET modem account holder can dial in to the Internet from any one of these locations.

Although these 28 higher education locations covered a significant portion of the state, there remained areas where there were no other ISPs, and a long-distance call was the only way to get onto the Internet. Additionally, local and state government entities were looking toward WVNET for many of the same services it has been traditionally providing for state higher education.

2. THE BELL ATLANTIC PROPOSAL

In late 1999, Bell Atlantic Data Solutions Group (DSG) offered to WVNET a partnership plan: DSG would assume access, engineering and management responsibilities for WVNET's Internet dialup service, while WVNET would continue to "own" its relationship with the higher education institutions. WVNET's responsibilities would consist of:

- ◆ providing tier one (first call) and tier two (referral from local campuses) help desk support
- ◆ direct dealing with its customers and clientele, and
- ◆ end-user billing

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One other factor made this proposal attractive. Developments in Internet service, such as cable modems and digital subscriber lines (DSL), are rapidly becoming available. Practically speaking, they spelled the imminent demise of traditional 56k modem service. Planners at WVNET were afraid of the ever-increasing demand for investment into a technology that may shortly become obsolete.

Bell Atlantic DSG, with all of its resources, would be in a much better position to provide for scalability into new technologies, with the possible exception of cable modems.

3. THE WVNET MODEM WORKGROUP

Once WVNET management agreed to the Bell Atlantic proposal, they turned the actual implementation over to a workgroup representing various functions, such as:

- ◆ telecommunications - the engineers and technicians responsible for WVNET's modems and communications
- ◆ help desk support - responsible for customer support and problem logging
- ◆ web support - responsible for integrating and maintaining online documentation
- ◆ account administration - responsible for the computerized user accounts
- ◆ finance and billing - responsible for account payment and billing

The manager of telecommunications chairs the workgroup. The WVNET modem workgroup meets every week to discuss various aspects of the project. Typically, a portion of the meeting is devoted to a telephone conference with the project head at Bell Atlantic DSG.

3.1 Identification of Issues

The workgroup identified a number of issues that would affect users:

- ◆ Users would have a new telephone number to dial (1-500-MYWVNET).
- ◆ The toll-free "500" area code is relatively new; many PBXs would have to be programmed to accept this number and not charge for it. This affected many campuses and hotels around the state.
- ◆ Some areas of the state are serviced by telephone companies other than Bell Atlantic. These areas would not recognize Bell Atlantic's toll-free "500" area code.
- ◆ We used the Kerberos system for our account records, whereas Bell Atlantic used a Radius system.
- ◆ The username for modem logon will now include the WVNET domain, so "username" will now have to be entered as username@wvnet.
- ◆ X2 modem protocol would no longer be supported. WVNET's modems were downward compatible with the older X2 protocol, so it was assumed that some users would not have seen the need to upgrade their modems to V90 protocol. These users would likely need assistance in obtaining and applying "flash" updates to their modems.
- ◆ An interactive "WVNET Internet Menu" would no longer be available. This menu, which was accessible by entering four carriage returns after the modem logon prompt, had allowed users to start the SLIP protocol and view their SLIP settings, change their Kerberos password, and connect to an ASCII or TN3270 host.

The following is a discussion of how the modem workgroup dealt with these and other issues.

4. THE DEVIL IS IN THE DETAILS

WVNET management agreed to Bell Atlantic's proposal for a partnership, and they created a WVNET modem workgroup comprised of various staff representatives. Although aware of a variety of issues that would complicate the project, the workgroup did not anticipate the proverbial devil in the details.

4.1 The Toll-free 500 Number

A statewide toll-free number has great potential to expand WVNET's geographic range of coverage. There are, however, a number of notable exceptions:

1. The toll-free number is a service of Bell Atlantic, and it is not available in a number of territories supported by independent telephone companies.
2. The toll-free number works only within the state of West Virginia. A number of state higher education institutions are close to the state line. Legitimate customers who happened to live across the state line would be adversely affected by a change to the 500 number.
3. Institutional PBXs within Bell Atlantic dialing areas needed to be programmed to allow for the use of the newly available 500 number. This included not only higher education campuses but also a large number of hotels and conference centers around the state.

4.1.1 Independent Territories and Out of State Calls

The first two points caused us a great deal of consternation, because we have existing customers who are either in "independent" territories or live over the state line. Initially, it was assumed that WVNET would devise its own plan to accommodate these users.

We investigated the possibility of purchasing a number of dialup lines for key locations. The hope was that we could set up lines that would automatically forward a call to one of the regional hubs. Lines and modems are typically allocated in ratios of one line per either seven or ten users. Unfortunately, we saw that cost would have quickly become prohibitive if we wanted to provide an adequate number of long-distance lines from an independent territory to one of Bell Atlantic's central offices.

WVNET informed DSG that this issue could cause us to reconsider the entire plan. After some research, however, DSG technicians came up with a plan for what they called "Ten Digit Redirect." [2] Ten Digit Redirect uses the same "Advanced Intelligent Network" (AIN) database technology that drives the 500 number concept. The plan would work as follows:

1. Customers in Independent territories would be given a plain old telephone number (POTS, in communications parlance) for their modem to dial.
2. This POTS number is then routed to a Bell Atlantic central office that has Ten Digit Redirect capability.
3. The central office with the Ten Digit Redirect capability routes the call through the AIN database.
4. The AIN database looks up the ten-digit POTs number and translates it to 500-MYWVNET, where the customer obtains dialup Internet access.

This plan for Ten Digit Redirect worked successfully when tested, and it has become an important feature in implementing

WVNET's statewide Internet dialup service. Customers in non-Bell Atlantic territories and in areas immediately outside of the state, who had local dial plans for access, would not be negatively impacted by the change in our dialup Internet service.

As a matter of record, two schools in the southern part of West Virginia -- Bluefield State College and Concord College -- are so deep in independent territory (Citizens Telecom) that we deemed it expedient to maintain our original modem pools there for at least the time being. We modified the logon procedure to use the new "username@wvnet" format, so that it would be transparent to users under the new system.

4.1.2 PBX Issues

The remaining issue -- that of institutional PBXs -- required a less technical approach. While on in-state travel, some of our own WVNET staff have incurred long-distance charges from using the 500 number at various hotels. At our request, Bell Atlantic prepared a second mailing to notify PBX customers that they should reprogram their local exchanges to allow for 500 number calls and not bill for them.

To date, however, the results of this effort have been less than satisfactory. It appears that many hotels follow Newton's first law with regard to inertia: "An object at rest tends to remain at rest unless the object is acted upon by an outside force." In these cases, the outside forces were customers who had long-distance charges added to their hotel bills.

In at least one case, we also met with unanticipated resistance from a hotel, which thought the free, unlimited use of a 500 number on their PBX would monopolize their finite number of lines to the outside world.

4.2 Migrating the Account Database

We would have to migrate our user records to Bell Atlantic's Radius system. Security for the old modem accounts was under Kerberos, which encrypts all user passwords so that we couldn't simply copy passwords from one system to another. We operated under the assumption that most users would not have bothered to change their original modem passwords. This would have entailed their having to enter a special terminal session in order to make the change. Our current accounting system did keep a record of the initial modem password, so we migrated the original passwords to the Radius system.

The "devil in the details" in this case turned out to be the contractors assigned by DSG to work with us. They provided us with a practical Web interface for dealing with individual account entries. Unfortunately, however, the PC and the mainframe cultures have some basic differences. It has taken a great deal of time and explanation to convince them of our need to deal with 12,000 account records in automated batch processes.

Each higher education campus has its own access to their portion of faculty and student computer and modem accounts. All accounts are then processed and updated by automatic nightly batch jobs. The problem has been in working out a mechanism where the batch job could automatically send updates to DSG's accounting system and back again. To date, our database administrator is manually loading mainframe records to a PC and then FTPing them to the DSG database.

4.3 User Notification

We needed to notify all 12,000 of our customers of the changes (see 3.1 above) to their Internet dialup modem service. We prepared a letter into which we merged the user's mailing address, along with their modem account username and original password. The letter discussed:

- ◆ Statewide toll-free dialup capability, with caveats about independent phone company areas and PBXs
- ◆ Alternative local numbers for the customer's region
- ◆ Lifting of usage limits on all accounts and increased Web space
- ◆ The need to enter the domain, @wvnet, to the username, as well as their original password
- ◆ Sole support for PPP and PAP, and the elimination of the interactive "WVNET Internet Menu"
- ◆ A pointer to the help desk Web page with step-by-step instructions for setting up the new connection
- ◆ A warning about the need for V.90 protocol
- ◆ A deadline for when the old modem service will be discontinued
- ◆ A prominently placed warning that WVNET does not assume any liability for long distance charges that a customer may incur by accessing our service.

At this writing, there are still thousands of users yet to be notified, and we have not yet reached the deadline for the discontinuation of the old modem service. In addition, there are widespread faculty and staff users at several schools who are unknown to us -- the local administrations pay for and control their accounts, so notification of these changes must be done by the schools.

Another detail to be faced is the return of students for the fall semester. Many of these students will have kept their original accounts, for we suspend these accounts for the summer if they're not used during that time. Whenever we reactivate a student account, we'll have to tell them about all of the chances that occurred during the summer.

5. LESSONS LEARNED

WVNET's recent partnership with Bell Atlantic had some particularly rough periods during the implementation of this project. Without getting into gritty details, we can offer the following advice to anyone wishing to walk in our footsteps.

5.1 Test Everything

Follow President Reagan's dictum: Trust but verify. One of the most important lessons we learned was to take nothing for granted. Every ten-digit redirect had to be tested and verified. Simultaneous multiple logins were supposed to be disabled; actual tests showed they weren't. Traceroutes showed an inordinate number of hops being taken from certain locations in the state. Respect Murphy's law.

5.2 Monitor Connection Activity

Bell Atlantic provided us with Web page access to RASAR, Bell Atlantic Data Solutions Group's on-line Remote Access Service Accounting and Reporting system. This Web page has provided

us with useful information, like error log reports and connection reports.

Monitoring connection reports has showed us how many people were trying the new system, and the error logs told us whether they were getting online successfully. Another report shows the time a user has spent online and whether they had exited or lost their carrier.

Our help desk studies the connection logs to proactively call users who appear to be having numerous unsuccessful logon attempts.

5.3 Set Realistic Target Dates

We began this project in the late fall of 1999 with the expectation that we would have everything in place by the end of the following spring semester. In addition, our monitoring of connection activity told us that a substantial number of users weren't converting right away. The deadline for cutoff of the old dialup modems was too far away to impress most users with the need to convert their logon procedure. Conversion rates improved when we fibbed and told users that they had only a month or less to change over.

5.4 Phase-in the Implementation

Implementing a statewide dialup number is similar to switching on the power to a building. Turning on that master switch for the first time can cause an overload. By converting to the toll-free

dialup on a school-by-school basis, Bell Atlantic had time to assure that each region had an adequate number of communications trunks to support the increased user load. This not only avoided embarrassing outages, but it also helped to regulate the volume of problems that our help desk and technicians faced, allowing them to more easily determine and resolve problems.

Staff testing alone couldn't help us to catch all of the details. Implementing the changeover on a school-by-school basis also gave us a chance to learn from our earlier experiences. We were able to improve on the wording and presentation of our announcement letters and modify target dates to improve compliance.

6. REFERENCES

- [1] Smith, Mike. "Bell Atlantic First to Offer Internet Providers and Businesses Single-Number Access." 22 March, 2000. <http://www.ba.com/proactive/newsroom/release.vtml?id=21363> (28 June, 2000).
- [2] Brown, Pamela K. "Ten Digit Lookup Test Plan for Dial Internet Access Customers." Bell Atlantic Data Solutions Group IP Advanced Network Services memorandum (11 May, 2000)