Converting to Blaise 4.8 for CATI and CAWI Surveys

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Blaise 4.8 introduced new features, such as a revised computer-assisted telephone interviewing (CATI) call scheduler, a revamped version of Blaise Internet Services (Blaise IS) and a client/server method of data manipulation and storage. This paper will review the experience of Mathematica Policy Research, Inc. (MPR) in implementing Blaise 4.8 for operational surveys.

In addition to the challenges converting from Blaise 4.7 to Blaise 4.8, the conversion enabled us to switch to a new network operating system, which made it possible for us to implement a new internet authentication system and upgrade to new internet and data storage/CATI servers. This conversion to Blaise 4.8 also required us to adjust some of our operational procedures for installing and maintaining instruments in production.

1. Background

The core survey data collection goals at MPR are to find tools that enable us to collect data as efficiently as possible, especially in a multimode (CATI, computer-assisted web interviewing [CAWI], computer-assisted data entry [CADE], computer-assisted personal interviewing [CAPI]) environment and meet the ever-changing data collection requirements of our clients. With advances in computer technologies and architecture, changing thoughts in the area of survey methodology, and the speed with which respondents learn and accept technology changes in their day-to-day lives, meeting these goals is a never-ending challenge.

Ideally, every company relying on data collection software has the goal of a unimode instrument capable of handling multimode surveys while collecting data in one centralized database in real time. Previous to Blaise 4.8, MPR made great strides in this direction, but we did not rely on Blaise IS to fulfill this goal. As Blaise 4.8 was being released for beta testing, we decided to take a hard look at Blaise IS. Previous versions of Blaise IS could not handle a significant number of concurrent users, nor did they meet MPR's criteria of utilizing a multimode, real-time shared database.

MPR hoped to move forward from Blaise 4.7 to 4.8 for several other reasons. First, we wanted to replace an older CAWI product called C2B (from the University of Tillburg, Netherlands) that was no longer supported, used older technology, was getting harder for us to maintain, and had programming and security limitations. Next, we felt MPR would benefit by utilizing some the new features in 4.8, such as Client/Server-based communications, improvements to the CATI suite of programs, and possibly utilizing a more robust version of DataLink, which would enable us to centralize our data into a common SQL database. Lastly, MPR needed to replace its existing internet survey authentication system (iChain from Novell) due to the high cost of maintaining that system. This change presented us with the opportunity to upgrade to the Microsoft/ASP.Net solution of Full Content Protection (FCP) for our security and authentication needs.

2. Preliminary Goals

Our first goal in testing Blaise 4.8 was to determine if it was capable of meeting MPR's current interviewing needs. We initially started by testing the out-of-the-box examples Statistics Netherlands (SN) provided to see if we could run them within our current environment. We built upon these tests by adapting some of our existing programs to work under 4.8.

If Blaise 4.8 passed our initial tests, we planned to look for upcoming projects to run under this version. We found three projects targeted for production that provided us with the chance to test a CATI-only survey as well as one with CATI and CAWI in the same instrument. Over the next few months, with these three projects in mind, we began to set up the infrastructure necessary to move forward and begin testing Blaise 4.8.

3. Laying the Foundation

Before starting, we sought input and backing from our Survey Division and senior staff within our Survey Information Services (SIS) group, while consulting with staff within our Computer and Network Services (CaNS) Group and our Computer Assisted Interviewing Support Group (CAISG). As we reviewed our existing systems and programming standards, the advice and assistance from these groups help to determine what we could keep in place and what absolutely needed to change with the migration to 4.8.

We hoped that most of the applications MPR had developed over the years (our overnight processing, interviewer and supervisor CATI menu system, CAPI systems, shell programs for developing instruments, and so on) would not need to change with 4.8; however, we knew the areas of hardware, security, and our network would absolutely need to change.

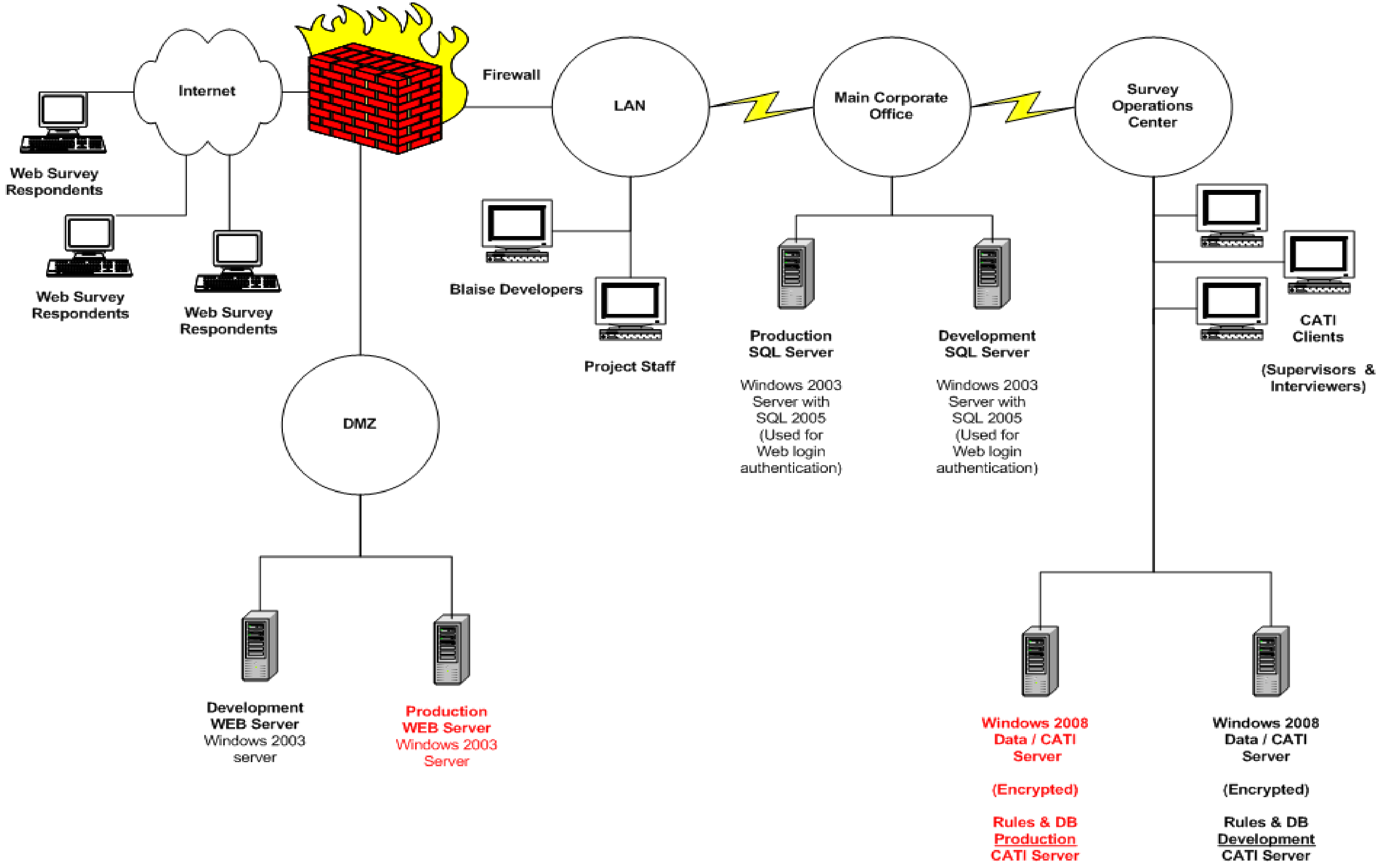
We assembled a team to look at each of these areas and started to put the puzzle pieces in place as we met on a regular basis.

4. Hardware and Infrastructure Changes

The move to Blaise 4.8 presented MPR with an opportunity to upgrade various systems and hardware. Our existing data collection servers had reached the end of their maintenance contracts; the change to Blaise 4.8 helped facilitate a move toward the latest technology and helped us become more consistent on the data collection side with MPR's goal of being a full "Microsoft shop."

Because we were making hardware changes, we wanted to move toward the latest version of Windows Server software available for our data servers, as this would provide us with built-in encryption of data at rest. Any version of Windows Server prior to Windows Server 2008 would require MPR to purchase a third-party application to provide encryption of data at rest. Because we wanted to go to Windows Server 2008, we had some minor concerns about Blaise 4.8 functioning properly as this new operating system had been publicly available for only a few months. Through testing on our development machines running Windows Server 2008 and consultations with SN, we were quickly able to determine Blaise 4.8 would be able to run in the Windows Server 2008 environment and we began to purchase, install, configure, and test the hardware and software necessary to get 4.8 into production.

The figure on the next page shows the current hardware and infrastructure put into place for data collection using Blaise 4.8 in the CAWI and CATI environments at MPR. During the planning and early testing phase, we went through several variations of this as we fine-tuned our system.


Internet
Web Survey Respondents
Web Survey Respondents
Web Survey Respondents
Firewall
LAN
Blaise Developers
Project Staff
Main Corporate Office
Production SQL Server
Windows 2003 Server with SQL 2005 (Used for Web login authentication)
Development SQL Server
Windows 2003 Server with SQL 2005 (Used for Web login authentication)
Survey Operations Center
CATI Clients
(Supervisors & Interviewers)
DMZ
Development WEB Server Windows 2003 server
Production WEB Server Windows 2003 Server
Windows 2008 Data / CATI Server
(Encrypted)
Rules & DB Production CATI Server
Windows 2008 Data / CATI Server
(Encrypted)
Rules & DB Development CATI Server

5. Testing CAWI and CATI

Stress testing of Blaise Internet instruments—making sure the Blaise 4.8 system could handle our anticipated loads—was a major consideration for MPR. The inability to handle multiple surveys with numerous concurrent users would have been a deal breaker for the company moving forward with Blaise 4.8 into production.

MPR utilized a load-testing tool that simulates real-world internet data collection that requires little human interaction. Web Performance Suite (Web Performance Inc., www.webperformanceinc.com) was the software used to put Blaise 4.8's IS components and our production equipment under stress. After numerous load sessions conducted on our newly implemented infrastructure, as well as on the systems at SN, we were able to replicate up to 250 concurrent internet users reaching a CAWI instrument without putting much stress on our system. Toward the end of our load-testing period, which included 250 concurrent internet sessions while simultaneously having staff perform CATI testing using the same Blaise data set, we were confident we could easily handle more than 250 concurrent internet users within our infrastructure and not have an effect on CATI as well. We felt confident the system was sufficiently robust to handle the anticipated loads our production surveys might encounter and scalable to add new hardware if performance became a problem.

Some of the manual tests we did with Blaise 4.8 targeted the aesthetics and functionality of Blaise instruments for both CAWI and CATI. We tested to make sure CATI functioned within our new infrastructure, while utilizing our existing programs and menu system. These passed our initial testing with minor changes. We also made sure we could program our internet surveys to MPR standards, that we could get screens to appear as they had appeared in other CAWI packages we use at MPR, and that the functionality of our surveys also performed to our standards. Staff members were asked to test internally and externally to MPR utilizing a variety of browsers at various connection speeds. In our browser testing, we found few major deal breakers and we provided SN with our findings. They made any improvements necessary to support as many of the top browsers as possible.

For our final step in this process, we took a test project, programmed it entirely in Blaise 4.8, and tied it into our new FCP internet authentication piece. We again stress tested everything, proving that we could take a survey from authentication to completion without any errors from the instrument or the internet or data servers.

6. The Importance of Meetings

MPR staff met to discuss the pros and cons of moving from version 4.7 to 4.8 before we started to move forward with Blaise 4.8 testing. Discussions were not limited to our CAISG staff members, who work with the Blaise suite on a regular basis; they included our CaNS Group as well as staff from our Survey Division.

Areas examined during these initial meetings included the number and types of changes we expected to make in our normal Blaise programming; expected upgrades to or replacements of existing data and internet servers; how to bring staff up to speed on new features and changes; and the types of changes we would need to make to our overall interviewing infrastructure for CATI, CAPI, and CAWI instruments.

When MPR made the final commitment to Blaise 4.8, we scheduled regular meetings with CAISG and CaNS staff involved in the transition and sent a memorandum to all Survey and Information Technology staff outlining our plans over the next several months during our transition. At initial meetings between CAISG and CaNS, we discussed the plans for the transition, what each group would be responsible for, time lines for acquiring new hardware, testing the systems and software, and ultimately when we would need to be in production.

Our groups met on a weekly basis to discuss the prior week's progress, to raise questions, and to discuss the problems found as we added new pieces to the puzzle. This enabled us to brainstorm how best to leverage the change from 4.7 to 4.8 into other areas involving existing systems or servers that we might not have had the opportunity to change.

As the months progressed and the pieces fell into place, we decided to meet less frequently. Weekly meetings became monthly, until we were approximately five months into production when we decided to meet on a quarterly basis and expand the scope from Blaise-related topics to all things involving computer-assisted interviewing.

Having these regularly scheduled group meetings and making sure to set goals and agendas for each meeting helped smooth the transition and keep everyone involved up to speed and thinking about the overall goal of getting Blaise 4.8 into production. A side benefit to these regular meetings was that it helped each group involved understand the overall challenges faced by other groups in maintaining our corporate computing infrastructure as well as the challenges of multimode data collection.

In conjunction with the internal meetings with MPR staff, we also had numerous conference calls and email exchanges with several members of the staff at SN. We discussed issues we found in our testing of the Blaise 4.8 system and worked with them to make improvements that we felt would benefit not only MPR, but the Blaise community as a whole.

A tool that was extremely helpful in our meetings with SN was "GoTo Meeting" (http://www.gotomeeting.com). Using it, we were able to show SN staff exactly what the issues were, as if they were sitting in our offices. This tool also enabled SN staff to take control of a session if they wanted to dig further into the problem. All parties could quickly discuss issues without having to rely on lengthy email exchanges or phone calls, making for productive use of the limited time we had when both our offices were operating within our normal working hours.

7. Successes

As we finalized this paper, MPR has six instruments in production using Blaise 4.8. Of these six, three have been in production, or recently completed production, over the past nine months. Some of the highlights of these projects follow.

- A project with a sample size of approximately 18,000 potential respondents collected more than 11,000 completed surveys in CATI, CAWI, and CADE modes. Two-thirds of the completed surveys were via CAWI.

- A project with a sample size of approximately 3,300 potential respondents collected slightly more than 1,800 completed surveys in CATI and CAWI modes. The overwhelming majority of completed surveys (approximately 82 percent) were via CAWI.

- A CATI-only project with a sample size of approximately 13,000 collected more than 7,500 completed surveys.

With the conversion of our Blaise CAWI surveys to Blaise IS 4.8.1, along with the FCP login authentication, we have noticed the number of calls and emails to MPR project internet help desks has significantly decreased. Most of the interaction between respondents and those staffing the help desks has been for project-specific issues rather than for the systems- or browser-related issues that seemed to pop up with regularity on the surveys run with iChain and C2B. This has significantly reduced the amount of time CAISG staff spends investigating internet-related issues for projects, saving them money.

8. Issues

Moving to Blaise 4.8.1 has not been all sunshine and happiness, as MPR has experienced its share of "bleeding edge" moments. We expected there would be some bumps in the road along the way and it is impossible to anticipate every possibility when trying out updated software for the first time in a production environment. Some issues we attributed to the learning-curve; others were issues with the software itself that required revisions by SN with new builds MPR needed to put immediately into production.

We found the majority of issues prior to starting projects in production; however, call scheduler issues were found when CATI was involved and have been or are being addressed by SN. The issues that MPR found included: CATI specification file settings were not working; daybatches did not exclude cases as they should have; cases were incorrectly redelivered to interviewers; ToWhom groups were not set properly and cases were delivered to the wrong interviewers; time zone adjustments had been made incorrectly; and interviewers were not being prompted before the next case was automatically delivered by the CATI scheduler. Almost the entire set of internet-related issues presented themselves during our testing and development phases. MPR had a larger concern for Blaise IS 4.8 after we scrapped using previous versions of Blaise IS that were not ready for real-time multimode production use. For that reason we concentrated the large majority of our testing efforts on CAWI rather than CAPI or CATI, where we anticipated finding fewer issues.

Some of the other problems we encountered while in production were loss of survey data due to Blaise application programming interface (Blaise API) and CATI service failures, learning to deploy new instruments carefully (it took time for CAISG staff to get used to waiting for Blaise services to release files or how to work easily around it by “killing” connections made to the database), getting up to speed on Blaise Internet (each new build of Blaise brought with it changes and we were learning on the fly), and we needed to rethink our philosophy on the installation of the Blaise suite to our CAISG developers; previously we had loaded everything a developer needed from our network in one central location, but now we needed to install Blaise 4.8 on individual desktops.

9. Conclusion

Moving to Blaise 4.8 was not without its struggles. The planning we put into place, the testing we did before going into production, following up on issues with SN and Blaise Services at Westat, and the cooperation and understanding of MPR staff were instrumental in successfully getting several surveys up and running without retraining Blaise end users. In the long run we feel MPR will be better positioned to meet the challenging needs of our clients.

We are still experiencing a few problems, but they are becoming less prevalent with each new build of Blaise 4.8. Not everything we anticipated being a major challenge at the beginning of this process turned out to be an issue. For example, before converting to Blaise 4.8 almost all staff at MPR loaded the Blaise applications they needed from a network drive, excluding CAPI surveys. Because the installation of the Blaise suite now follows the Microsoft style of installing all applications locally, we were concerned MPR support staff might have to install the entire Blaise suite on individual machines. This would be a nightmare to maintain for the number of users we have, but SN had already thought about this for several of the Blaise applications and tools. We can still load DEP.EXE or Manipula.EXE from a network drive by installing a set of Microsoft XML dll’s on individual users’ machines. This enables us to load selected pieces of the Blaise suite from our network. Another example was with the encryption of data at rest. We thought this might be a major task to undertake, but with Windows Server 2008 it turned out to be a very simple task after all.

Two of the major achievements of this transition were being able to rid MPR of older internet technologies and moving toward our corporate goal of being a complete “Microsoft shop.”

Our process of evaluating the tools available in Blaise 4.8.1 and how MPR can leverage them to meet the ever-changing needs of data collection will continue as we build upon our successes. A goal for MPR over the coming months will be to look at adding generic .boi files to instruments which could enable us to centralize survey data into SQL databases and potentially provide us better real-time access to data itself.