Blaise Instrument Extensions with Alien Routers and Manipula

International Blaise Users Conference, October 2016

Lilia Filippenko, Chris Carson, Orin Day, and Mai Nguyen
Outline

- Data protection on the Field Interviewer laptops
- Use of external applications during the interviews
- Extending Blaise Instruments with Alien routers and Manipula to:
  - Collect sensitive data like Social Security Number (SSN)
  - Call external application (DocMan) to electronically obtain respondent signatures
  - Download GPS data into Blaise database
- Conclusion
Data Protection on Field Interviewer Laptops

- Check Point Full Disk Encryption installed on all RTI field interviewer laptops

- Files for transfer to RTI are encrypted by the Case Management System (CMS)

- Files with sensitive information are encrypted during the interview on the laptops
Use of External Applications

- RTI uses features of Blaise to call external applications during the interview since 2004
- Two most common approaches:
  - Alien routers developed in .NET
  - Alien routers with Manipula procedures
1. Blaise datamodel
   - Define special FIELDS
   - Add call to Alien router in RULES

2. Manipula setup
   - Define meta identifier
   - Add procedure referenced in the datamodel

3. Procedure in Manipula setup
   - Use GETVALUE to get data (optional)
   - Use RUN to start external application
   - Use PUTVALUE to write data back (optional)
Collecting SSN Outside of Blaise Interview: Data Entry During the Interview

Encryption

```
55555555.4_2016_9_17_21_42_55.txt
55555555 /VC+zlURUtgxnUvvz1J6rg==
```
Collecting SSN Outside of Blaise Interview: Implementation in Blaise Instrument – Step 1

- Define block BSSN4

```plaintext
BLOCK BSSN4 {Used to enter SSN outside Blaise }
FIELDS
    SSN4 ""/"The last 4 digits of Social Security number": STRING[4]
ENDBLOCK
```

- Define SSN4 field as block BSSN4

```plaintext
SSN4
"We are committed to protecting the confidentiality of all the information you give us. What are the last four digits of your Social Security Number?"
: BSSN4
```

- Define DataEntry Alien router that calls procedure DataEntry in Manipula setup and specifies meta identifier name

```plaintext
ROUTER BLOCK.DataEntry
   ALIEN('AHPSRouter.msu /KMyMeta=$dictionaryname', 'DataEntry')
```

- In RULES use ROUTER method instead of ASK on SSN4 block

```plaintext
SSN4.DataEntry
CHECK SSN4.SSN4 = NONRESPONSE OR SSN4.SSN4 = '0000'
    "PLEASE RE-ENTER THE LAST 4 DIGITS OF SOCIAL SECURITY NUMBER."
```
Use reserved word VAR instead of the meta identifier

```
USES
  mymeta (VAR)
```

Define a file with INTERCHANGE settings set to SHARED to read/write data from/to the current form

```
TEMPORARYFILE mydata:mymeta
SETTINGS
  INTERCHANGE=SHARED
```

Specify a dialog with a box to enter data and buttons to use

```
DIALOGBOX SSNDialog4 "ENTER SSN"
  SIZE = (330,100)
  CONTROL UserSSN4
    LABEL = ('&SSN: ',24,18)
    POSITION = (120,9)
    DISPLAY = Yes
    STATUS = 'Please enter SSN'
  BUTTON Buttons
    CAPTION = 'OK'
    VALUE = Okay
  BUTTON Buttons
    CAPTION = 'Cancel'
    VALUE = Cancel
```

Add procedure DataEntry to enter SSN and call encryption program
Procedure to collect SSN in Manipula setup (abbreviated version)

PROCEDURE DataEntry
AUXFIELDS
  CaseID : STRING[8]
INSTRUCTIONS
  IF (ROUTERSTATUS=BLRSSPREADIT) THEN
    FieldName := uppercase(ACTIVEFIELD)
    CaseID := mydata.GETVALUE('main_case.zrid')
    {Show Dialog in DEP}
    SSNDialqg4
    {... more code to validate data entered ...}
  IF BUTTONS = Okay THEN
    {Call external program and pass caseID and SSN for encryption}
    Reslt:= RUN('AHPStools.exe_Crypto'+' '+CaseID+''+UserSSN4)
    IF Reslt=0 THEN
      IF (FieldName = 'SSN9.SSN9') THEN
        mydata.PUTVALUE('SSN9.SSN9', '000000000')
      ELSEIF (FieldName = 'SSN4.SSN4') THEN
        mydata.PUTVALUE('SSN4.SSN4', '0000')
      ENDIF
      {Move to a next field in the interview}
      SETALIENROUTERACTION(BLRANEXTQUESTION)
    ELSE
      {... more code ...}
    ENDIF
  ELSE
    {return to the same field }
    SETALIENROUTERACTION(BLRAEDITQUESTION)
  ENDIF
ENDPROCEDURE
Executable with option Crypto called from the Manipula setup:

- Uses FIPS 140-2 compliant encryption method to encrypt data
- Uses project specific encryption key
- Creates a text file for each case ID and saves it on the laptop ready for transmission

Executable is used at RTI for decryption when needed
The same Blaise/Manipula procedure is used for:

- Calling external application (DocMan) to electronically obtain respondent signatures
- Downloading GPS Data into Blaise Database
DocMan – RTI’s Document Management System

- Replaces hardcopy documents with electronic versions
- Removes the need for shipping documents
- Resides on the field interviewer laptop
- DocMan provides mechanisms for:
  - Obtaining digital signatures using a USB signature pad (ePad) on consent forms
  - Gathering scanned paper forms using a USB portable scanner
  - Encrypting the forms
  - Electronically transmitting the completed forms
Blaise and DocMan

- Call to DocMan during the Blaise interview

- Working with DocMan
  - Field Interviewer selects the form that has status “Ready to Sign”
  - “Sign the Form” – opens Word document to sign by respondent
  - Respondent reviews the Form and signs it on e-Pad
  - Field Interviewer confirms that form was completed correctly and status changes to “Complete”
  - “Quit” returns to the Blaise interview
Download GPS Data - Field Implementation

- Requirement - use GPS unit to capture geo-coordinates
- GPS data logger - records time, date, speed, and GPS location

- Field Interviewer uses Blaise Observations Module to download latitude and longitude coordinates
- Manipula setup saves geo-coordinates into Blaise Database
Download GPS Data - Data Logger Application

- Uses GPSBabel free software to transfer data in CSV and KML formats from the DG-100 to the laptop
- Copies files in a folder on the laptop so they are available for transmission with other data
- Reads a .csv file to find geo-coordinates where interview took place

KML file in Google Earth
Tools to process data:

- **SAS® Proc Geocode** - used to return latitude and longitude coordinates of a physical street address.
- **Google Maps API** provides multiple comprehensive services including Mapping, Directions, Places and Geolocation.

SAS® Geocode report to find problem cases.
Conclusion

- External applications have become a common requirement on many studies and Blaise has more than one way to implement them.

- We find that the use of an alien router and a Manipula setup that redirects execution is the simplest and most efficient solution: it reduces development time and is easier to debug and test.

- RTI has used this approach extensively for projects that need new innovations to accomplish their goals and to accommodate increased levels of data security.
More Information

Lilia Filippenko
lfilippenko@rti.org

Chris Carson
cpc@rti.org

Orin Day
oday@rti.org

Mai Nguyen
mnguyen@rti.org