Blaise Instrument Extensions with Alien Routers and Manipula

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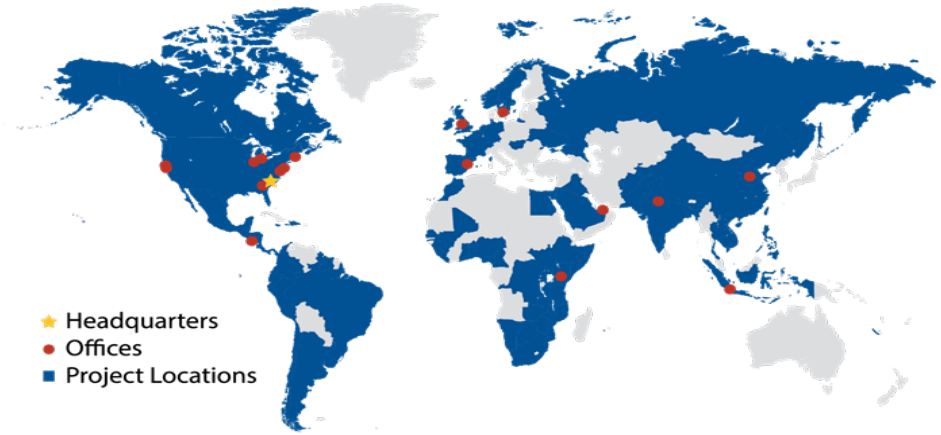

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Outline

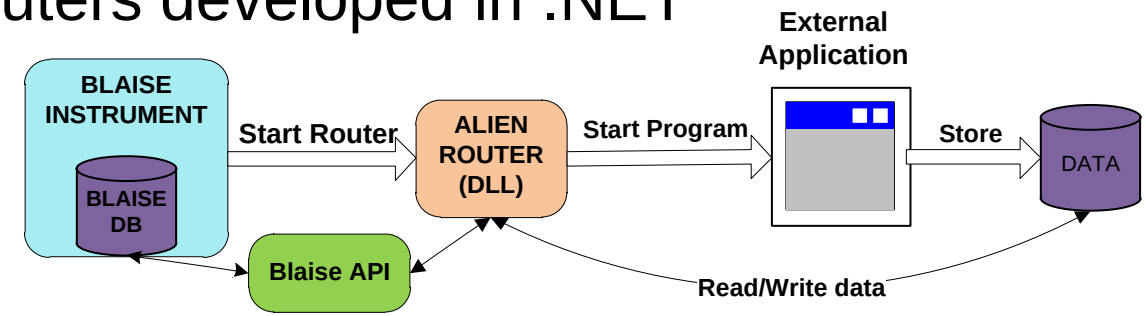
- Data protection on the Field Interviewer laptops
- Use of external applications during the interviews
- Extending Blaise Instruments with Alien routers and Manipula to:
  - Collect sensitive data like Social Security Number (SSN)
  - Call external application (DocMan) to electronically obtain respondent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

Data Protection on Field Interviewer Laptops

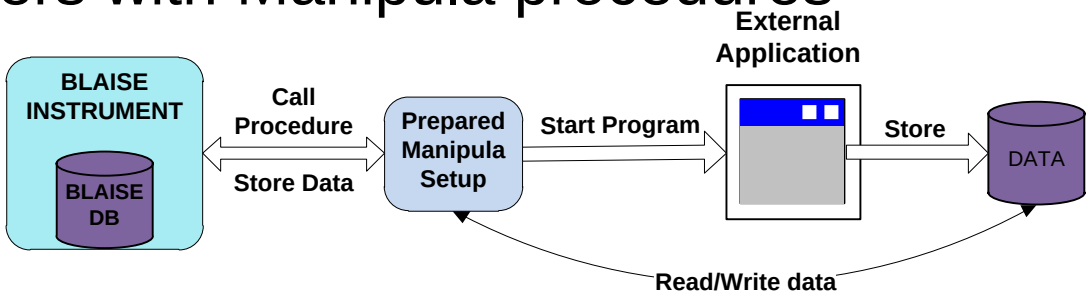
- Check Point Full Disk Encryption installed on all RTI field interviewer laptops
- Files for transfer to RTI are encrypted by the Case Management System (CMS)
- Files with sensitive information are encrypted during the interview on the laptops

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



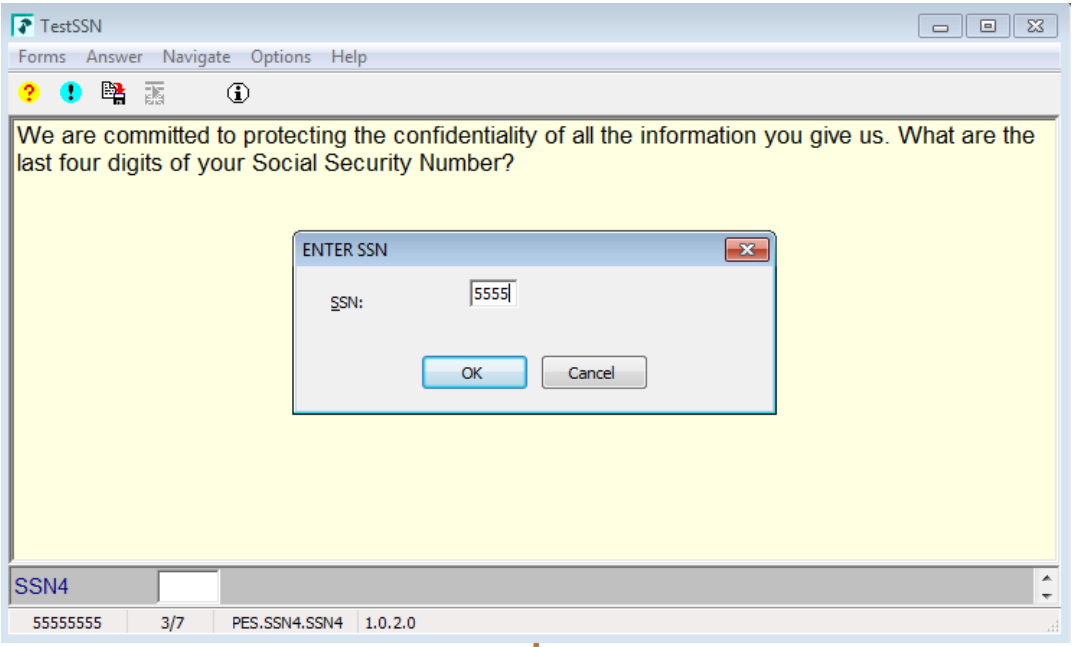
  - Alien routers with Manipula procedures



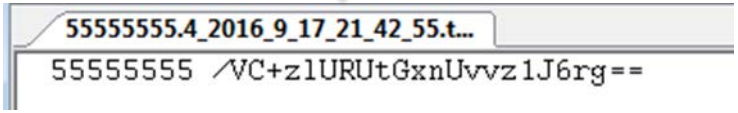
Alien Router and Manipula to Call External Applications

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



Collecting SSN Outside of Blaise Interview: Implementation in Blaise Instrument – Step 1

- Define block BSSN4

```
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

```
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

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

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

```
SSN4.DataEntry
CHECK SSN4.SSN4 = NONRESPONSE OR SSN4.SSN4 = '0000'
    "PLEASE RE-ENTER THE LAST 4 DIGITS OF SOCIAL SECURITY NUMBER."
```

Collecting SSN Outside of Blaise Interview: Implementation in Manipula Setup – Step 2

- 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

Collecting SSN Outside of Blaise Interview: Implementation in Manipula Setup – Step 2 (con't)

- Procedure to collect SSN in Manipula setup (abbreviated version)

```
PROCEDURE DataEntry
AUXFIELDS
  CaseID : STRING[8]
INSTRUCTIONS
  IF (ROUTERSTATUS=BLRSPREEDIT) THEN
    FieldName := uppercase(ACTIVEFIELD)
    CaseID := mydata.GETVALUE('main_case.zrid')
    {Show Dialog in DEP}
    SSNDialog4
    {... 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
  ENDIF
ENDPROCEDURE
```

Collecting SSN Outside of Blaise Interview: Data Encryption – Step 3

- 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

Other Examples of External Applications

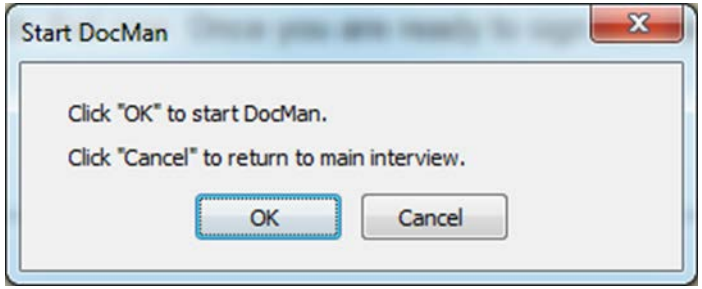
- The same Blaise/Manipula procedure is used for:
  - Calling external application (DocMan) to electronically obtain respondent signatures
  - Downloading GPS Data into Blaise Database

DocMan – RTI's Document Management System

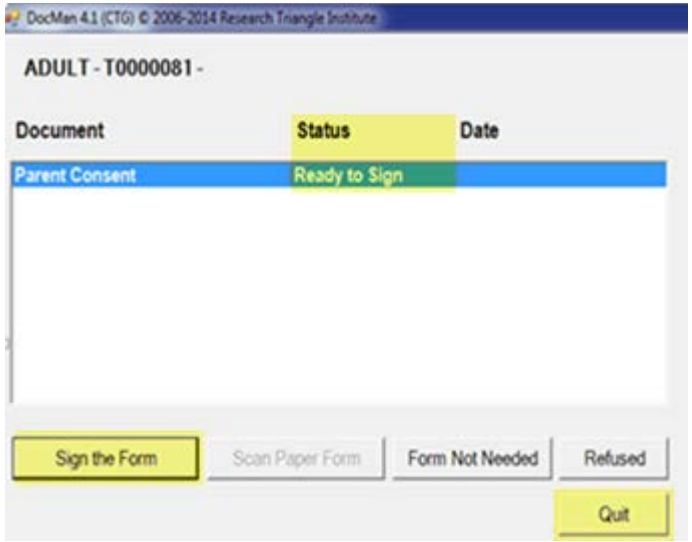
- Replaces hardcopy documents with electronic versions
- Removes the need for shipping documents
- Resides on the field interviewer laptop
- DocMan provides mechanisms for:
  - Obtaining digital signatures using a USB signature pad (ePad) on consent forms
  - Gathering scanned paper forms using a USB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

Blaise and DocMan

- Call to DocMan during the Blaise interview



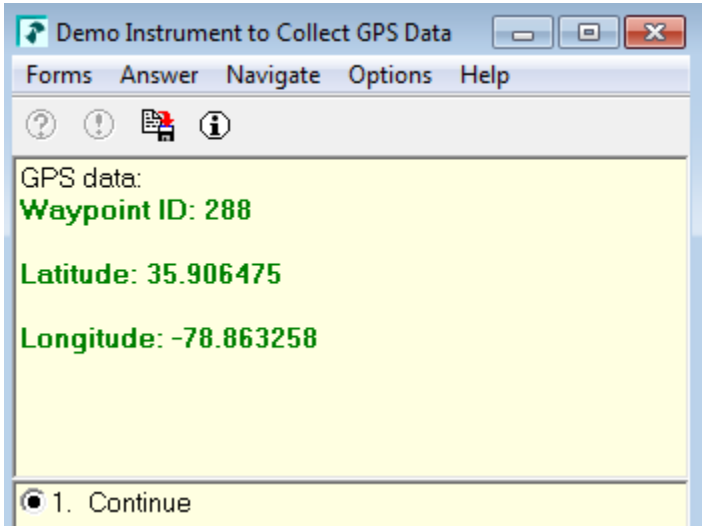
- Working with DocMan
  - Field Interviewer selects the form that has status “Ready to Sign”
  - “Sign the Form” – opens Word document to sign by respondent
  - Respondent reviews the Form and signs it on e-Pad
  - Field Interviewer confirms that form was completed correctly and status changes to “Complete”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



Download GPS Data - Field Implementation

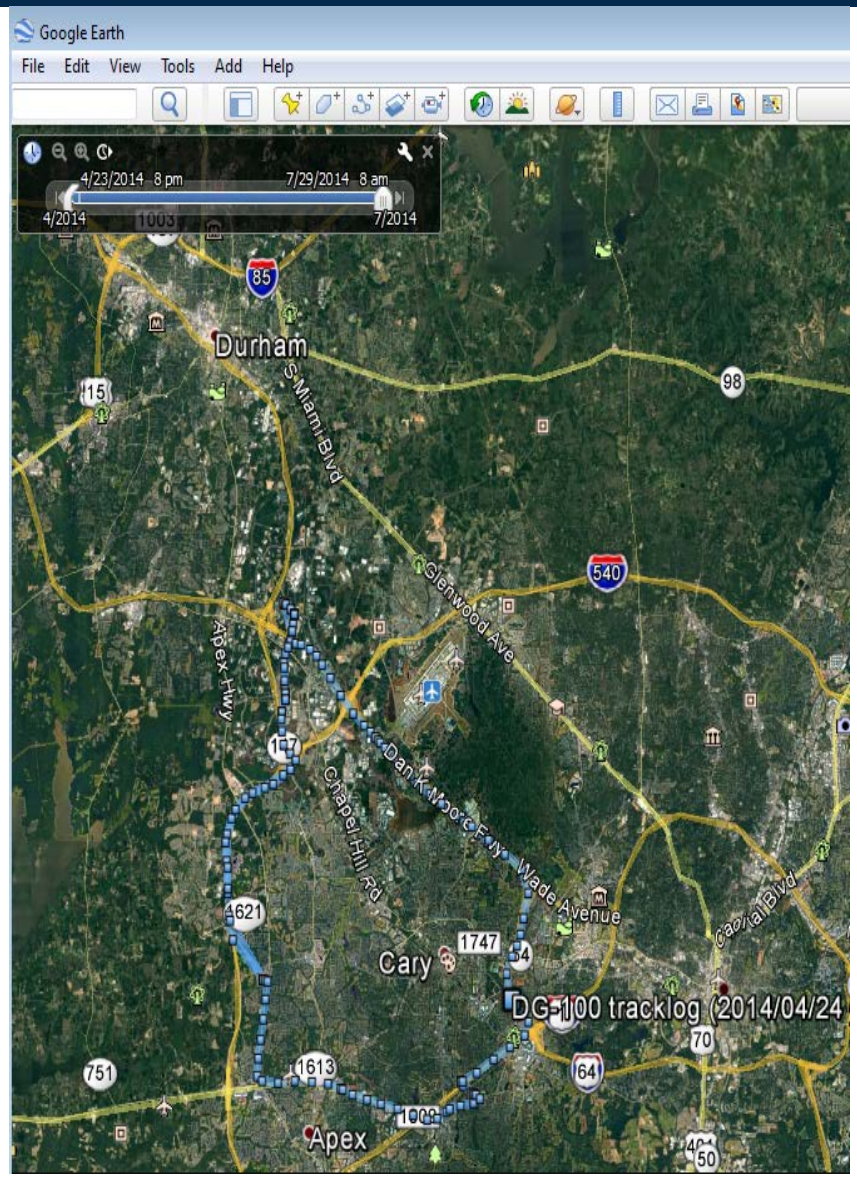
- Requirement - use GPS unit to capture geo-coordinates
- GPS data logger - records time, date, speed, and GPS location

- 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

Use of GPS Readings for Field Interview Verification

- 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

Res_ID	Street Address	Matched Address	Match Metho	Match Status	Matc Score	lat1	long1	Captured Lat	Captured Long	Calculate Distance	Haversin Distance	Notes	Interview Comp Date
F9992533	40635 COUNTY ROAD 580 E		ZIP	ZIP match	15	0.85206	-1.5709	0.861013278	-1.564250277	40.6928	40.6108	ZC	12/3/2015
F9996053	54980 GRT OAKS CIR S		ZIP	ZIP match	15	0.89339	-1.44709	0.886626491	-1.451509617	29.7405	29.6781	ZC	9/29/2015
F9993733	408 N JEFFERSON ST	408 N Jefferson St	Street	Found	80	0.85559	-1.5669	0.861012876	-1.564251883	22.8936	22.8579	AD ZC NM DP TS	12/2/2015
F9994543	509 FRENCH ST	509 N French St	Street	Found	55	0.76011	-1.37035	0.762146956	-1.376745751	22.2734	22.1831	AD ZC NM NODPA TS	12/16/2015
F9993163	664 POTTER RD		ZIP	ZIP match	15	0.6969	-1.5524	0.699640833	-1.550463363	12.6629	12.6518	ZC	11/18/2015
F9994973	10413 EBENFLO RD	10413 Ebenflo Rd	Street	Found	65	0.68125	-1.55138	0.681670749	-1.554907233	12.1612	12.1088	AD ZC NM TS	10/31/2015
F9991023	215 Hickory Ave NE Box 1122		ZIP	ZIP match	15	0.76438	-1.61564	0.917157448	-1.613917828	12.0523	12.0252	ZC	9/30/2015
F9990363	17546 N TRUMONT LN	17546 N Trumont Ln	Street	Found	80	0.81981	-1.5503	0.82048956	-1.551351265	4.24	4.2266	AD ZC NM DP TS	10/7/2015

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

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