

# Experiences and Lessons Learned Converting to Blaise 5

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**Abstract:** Blaise 5 offers new features for multimode data collection. This paper discusses our approach to converting an existing survey running in Blaise 4.8 in CATI and CAWI modes to Blaise 5 and distributing the survey on mobile data capture devices (iPad and smartphone). We discuss the issues encountered during the code conversion process, efficiencies introduced by converting to Blaise 5, experience with templates and layouts, and lessons learned in approaching conversion of an ongoing survey.

## I. INTRODUCTION

The initial focus for the adoption of Blaise 5 by many organizations will be the conversion of current Blaise 4.x applications to Blaise 5. These applications will vary in size, scope and mode, requiring organizations to develop Blaise 5 conversion strategies. These strategies will include areas of code conversion, modifications of converted code and the determination of target platforms; all of which will most likely be decided on an application by application basis.

Since the development of Blaise is ongoing this paper is a high level discussion of the conversion of a Blaise 4.8 application using the beta Blaise 5.0.1.553. We found some bugs but chose not to discuss them in this paper, the assumption being they will be fixed by the production release. The target mode for this conversion is web-based surveys (or CAWI) including a discussion of new features that provide mobile-app based access for iPads and iPhones.

## II. KEY DESIGN CAPABILITIES

As one moves from Blaise 4 to Blaise 5 you see dramatic changes and none more so than in the Blaise Control Centre. The Blaise 5 Control Centre provides a development environment that dynamically integrates design elements with the application code. Also known as the integrated development environment (IDE), the Control Centre contains the Source Editor, the Layout Designer and the Resource Editor.

- The Source Editor is used to author and maintain the application code.
- The Resource Editor allows for the customization of graphical elements such as fonts, texts, media, and most importantly Templates and Resource Sets which are all contained in the Resource Database.
- The Layout Designer integrates the application code with the design elements of the Resource Database.

The layout of each question in a questionnaire is made up of one or more Templates. Templates are constructed from elements such as Grids, Panels, Data Values and Response Values, to get the desired question display. Blaise 5 provides a set of predefined Templates to handle numerous common question layouts.

A Resource Set is a user defined collection of graphical elements and Templates that are used to create standard layouts within an organization. Resource Sets can be defined to provide baseline support for related categories of surveys, e.g. device types, survey modes, etc

The combination of the application code for a survey and a given Resource Set comprise a Layout Set. In this manner, a single survey's application code can be combined with one or several Resource Sets (e.g., one for a web browser and one for an iPad).

This new feature within Blaise 5, the separation of the survey application code from the presentation and formatting specification, provides new flexibility for deploying a survey for use by different devices and modes with minimum recoding and ease of maintenance.

### III. CONVERSION FROM BLAISE 4 TO BLAISE 5

The application we chose to convert was a multimodal (CATI/CAWI), household survey. We concentrated on the CAWI modifications necessary to produce a working Blaise 5 application since the target platform was the web.

#### A. General Steps

The Blaise 4 to 5 Source Converter tool was the starting point for the code conversion of our application. All that was needed were a few simple parameters entered into the Blaise 4 to 5 Converter dialog, Figure 1

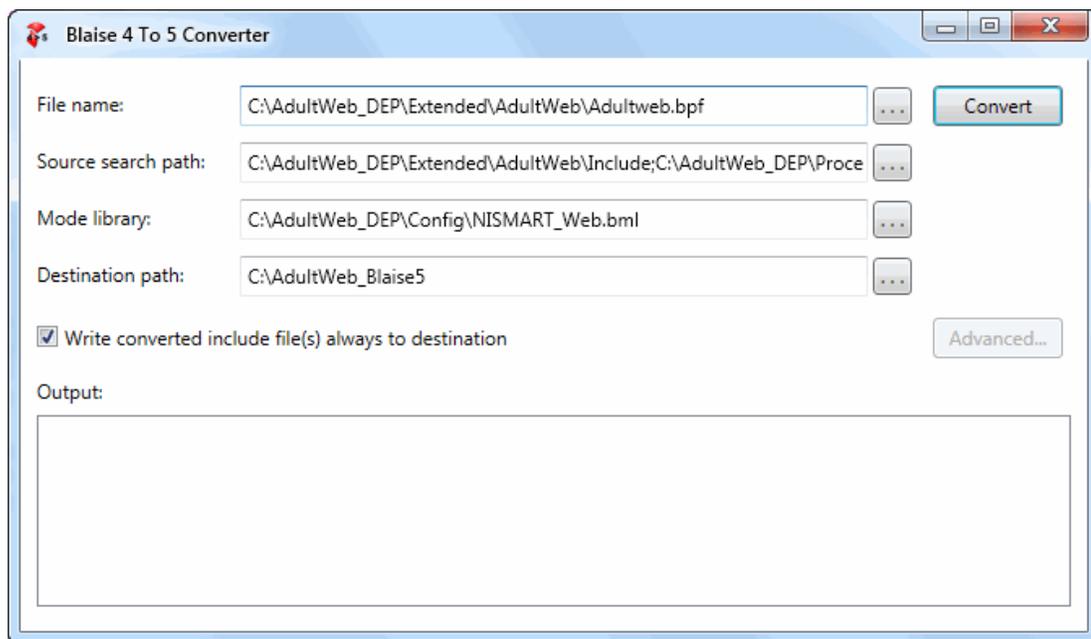


Figure 1

For the 'File name:' we chose to use the .bpf although we could have used the .bla. In the 'Source search path:' we selected folders containing include files, type libraries, procedures and configuration files.

The converter will then make the changes necessary to run the application under Blaise 5. We found that some Blaise 4 keywords such as NEWPAGE, NEWLINE and NEWCOLUMN were commented out in the new Blaise 5 code and identified as such in the Output of the Source Converter. Other Blaise 4

keywords such a LAYOUT and related keywords such as BEFORE, AT, GRID and FIELDPANE, were not commented out and were preserved. The LAYOUT and related keywords are not listed in the Output of the Source Converter. In addition to the Output of the Source Converter, we found a Blaise4to5.log file containing additional warnings and listing of created Blaise 5 files from Blaise 4 files with the new Blaise 5 file extensions.

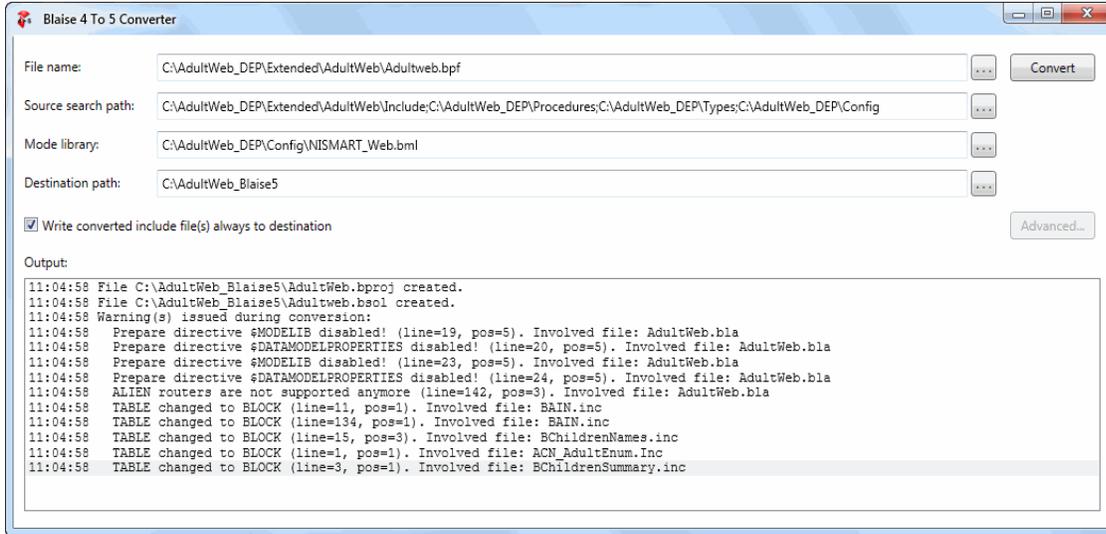


Figure 2

As you can see in Figure 2 the solution and project files were created. The Modelib and Datamodel Properties prepare directives were disabled and commented out in the source; while the Alien router and calls to it remain in the source. Lastly, the Blaise 4 keyword TABLE is replaced in the source with the BLOCK keyword.

Our application used prepare directives, \$MESSAGE, \$IFDEF, \$IFNDEF, \$ELSE and \$ENDIF, to distinguish between CATI and CAWI code and these directives were converted. In addition the conditional define from the Blaise 4 Project Options was carried over to the Blaise 5 source.

## B. Lessons Learned

Once the conversion process was completed we had a Blaise 5 program that could have run without further intervention. However, after preparing the application in Blaise 5, we found that a number of warning messages were generated reflecting the keywords ignored by the parser.



Figure 3

The warning messages, as shown in Figure 3, for items such as the Layout and alien procedures and their calls can be removed. Be aware that removing items that cause warning messages is an iterative process. If you prefer a cleaner set of code, we recommend you remove those items from the Blaise 4 code which are ignored by the parser or commented out by the converter.

## IV. SUBSEQUENT MODIFICATIONS

During conversion Blaise 5 will assign a layout to each question based on the Modelib. It will also use defaults for the number of items on a page, the number of displayed columns for a response, style settings, master page and Resource Set.

The remainder of this section will describe some of the subsequent modification we made to our application.

### A. Layouts

Blaise 5 provides the flexibility to create customized views through the use of layout instructions which Blaise 4 did not offer.

After running the application, as it was initially converted, we noted a number of different field layouts we needed to change. The first item we changed was the number of columns displayed for enumerations. The default is two columns, as shown in Figure 4, and we wanted our default to be one column.

**Adult Web Instrument (2.21.307.012)**

Welcome to the National Study about Children. You have been sent the link to this survey because we mailed a short questionnaire to your address and your household answered and gave your name.

Continue

According to your household's answers to our questionnaire, children age 18 or younger live or have lived in your household in the past 12 months, that is, since ^gp0. Is this correct?

Yes  No

According to your household's answers in our questionnaire, ^gp1 takes care of the children most of the time. Is this correct?

Yes  No

Are you ^gp1?

Yes  No

Next

Figure 4

To set the global default number of columns to one we changed the 'Arrangement' property in the Resource Database to one column using the Resource Editor, Figure 5.

The screenshot shows the Resource Editor interface. On the left is a tree view of templates, and on the right is a properties panel for the selected 'Answer List Area'.

**Left Panel (Templates):**

- ▲ Templates (106)
  - ▶ Master Page Templates (5)
  - ▶ Intro Page Templates (1)
  - ▶ Receipt Page Templates (1)
  - ▶ Error Page Templates (1)
  - ▶ Field Pane Templates (16)
  - ▲ Data Value Templates (6)
    - AnswerList
    - SpecialAnswerGrid
    - SingleResponseValue
    - OptionList
    - DropDownList
    - StripedOptionList
  - ▶ Category Templates (8)
  - ▶ Special Answer Templates (7)
  - ▶ Response Value Templates (7)
  - ▶ Table Templates (14)
  - ▶ Row Templates (4)
  - ▶ Row Header Templates (4)

**Right Panel (Properties):**

Properties Events

**Answer List Area**

Arrangement	1 Column
ColSpan	1
ColumnIndex	0
DefaultTemplates	(Collection) <input type="checkbox"/>
DesignHeight	100 <input type="checkbox"/>
DesignWidth	400 <input type="checkbox"/>
Name	answerListArea
ReserveSpace	False <input type="checkbox"/>
RowIndex	0
RowSpan	1
Visibility	Visible <input type="checkbox"/>

Figure 5

The result of the change is shown in Figure 6.

**Adult Web Instrument (2.21.307.012)**

Welcome to the National Study about Children. You have been sent the link to this survey because we mailed a short questionnaire to your address and your household answered and gave your name.

Continue

According to your household's answers to our questionnaire, children age 18 or younger live or have lived in your household in the past 12 months, that is, since ^gp0. Is this correct?

Yes  
 No

According to your household's answers in our questionnaire, ^gp1 takes care of the children most of the time. Is this correct?

Yes  
 No

Are you ^gp1?

Yes  
 No

**Next**

Figure 6

The next change is to questions that are used for informational purposes such as welcome screen, interviewer instructions and closing text. Blaise 5 displays as its default not only the question text but also the response. As shown in Figure 6, there is a 'Continue' response associated with the welcome statement.

We wanted to remove the 'Continue' response because the question is used for informational purposes only and to reduce keystrokes. To remove the 'Continue' we changed the FieldPane from 'Vertical' to 'QuestionTextOnly' as shown in Figure 7.

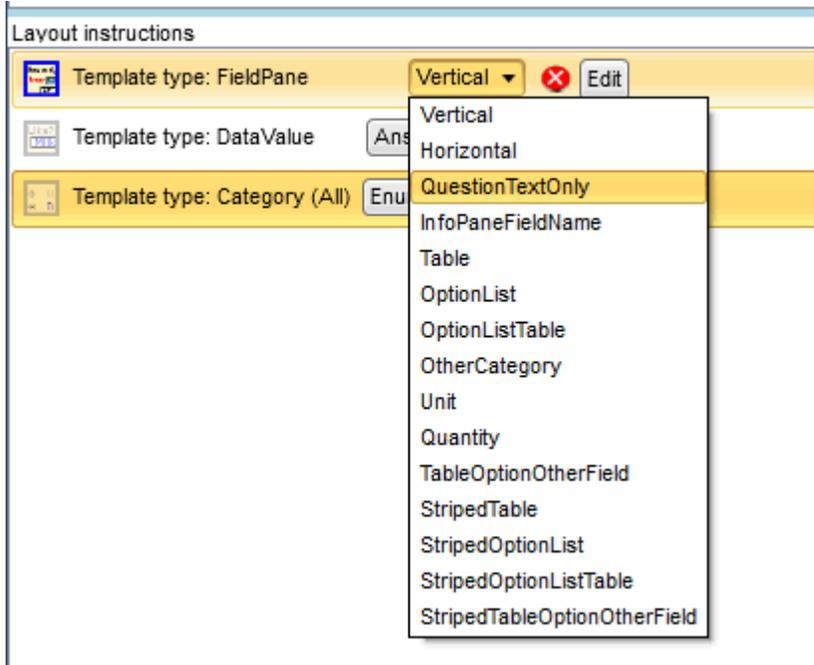


Figure 7

This question’s corresponding structure is pictured in Figure 8. The icon next to the field name AIN.auxWebIntroduction denotes the assigned ‘QuestionTextOnly’ template.

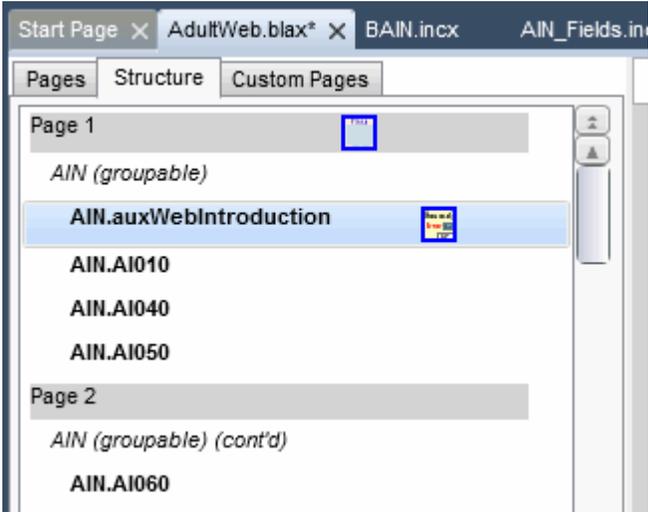


Figure 8

This resulted in the 'Continue' response no longer being displayed as shown in Figure 9.

**Adult Web Instrument (2.21.307.012)**

Welcome to the National Study about Children. You have been sent the link to this survey because we mailed a short questionnaire to your address and your household answered and gave your name.

According to your household's answers to our questionnaire, children age 18 or younger live or have lived in your household in the past 12 months, that is, since ^gp0. Is this correct?

Yes  
 No

According to your household's answers in our questionnaire, ^gp1 takes care of the children most of the time. Is this correct?

Yes  
 No

Are you ^gp1?

Yes  
 No

**Next**

Figure 9

Another change we made was to make an enumerated list into a dropdown list. In this example, Figure 10, we wanted to change the month of a date of birth.

**Adult Web Instrument (2.21.307.012)**

Girl  
 Don't know  
 Rather not answer

What is ^gp0[pChildPointer]'s birthdate?

*ENTER MONTH*

JANUARY  
 FEBRUARY  
 MARCH  
 APRIL  
 MAY  
 JUNE  
 JULY  
 AUGUST  
 SEPTEMBER  
 OCTOBER  
 NOVEMBER  
 DECEMBER  
 Don't know  
 Rather not answer

**Previous** **Next**

Figure 10

To create the dropdown we changed the DataValue Template from the default 'AnswerList' to 'DropDownList' as shown in Figure 11.

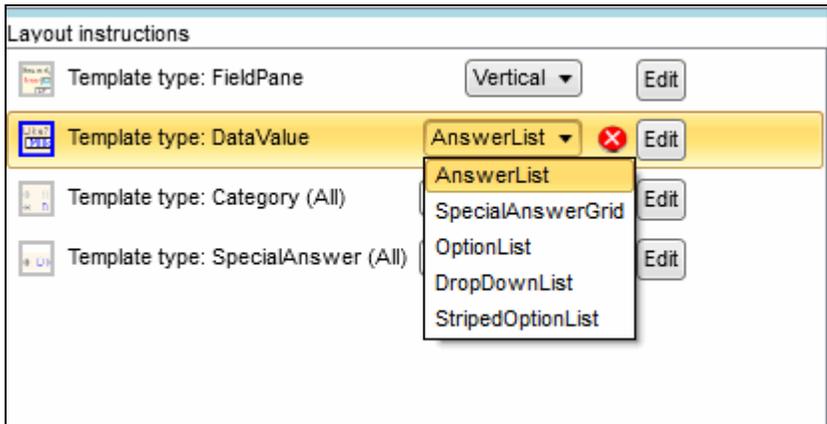


Figure 11

This resulted in the enumerated list being changed to a dropdown list, Figure 12.

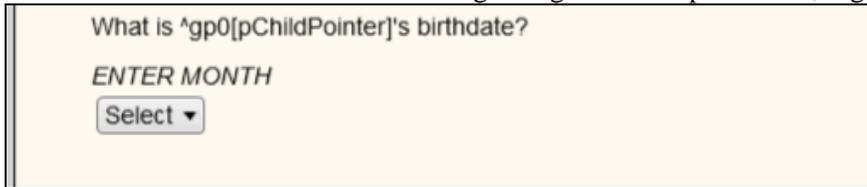


Figure 12

Blaise 5 gives you the ability to change the look of a question by modifying any of the "standard" Templates. In the Resource Editor, you can make a copy of the standard template you want to modify and use this as a starting point. How to make the very detailed formatting modifications is beyond the scope of this paper but can be found in the Blaise 5 Help.

## B. Tables

The concept of tables is to place fields on a page in a structured view. Depending on the instrument's structure some fields (arrayed blocks) lend themselves to be a table. After the conversion you'll notice in the Layout Structure, blocks and arrays will have the term '(groupable)' denoting that they are eligible to be displayed in a table format. In our case an example of this type of table would be a child roster as shown in Figure 13.

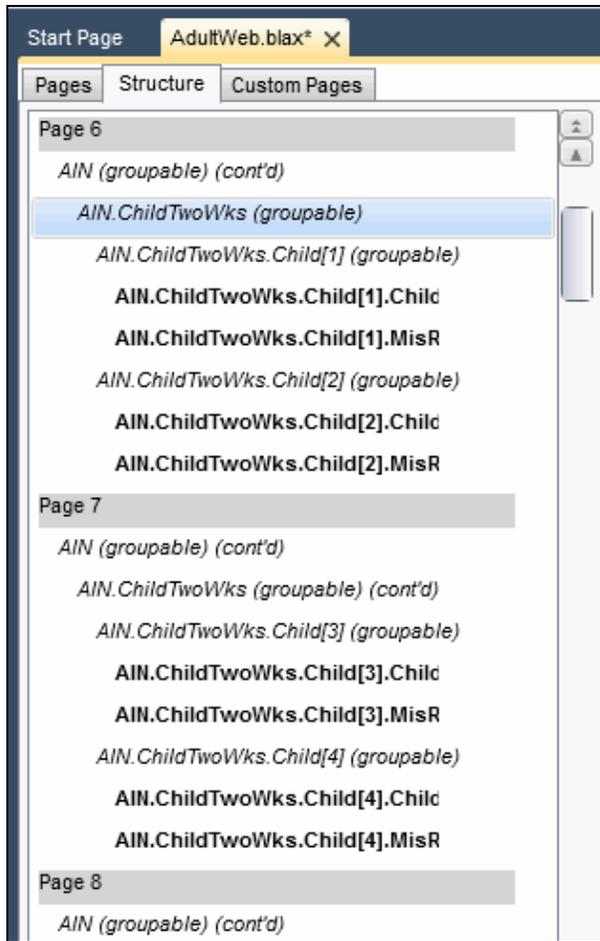


Figure 13

Figure 14 shows the default page layout before assigning any layout instructions to the Structure of Figure 13. You'll notice that the page layout displays the questions vertically with the question over the response field. This is the default layout for all questions in Blaise 5.

### Adult Web Instrument (2.21.307.012)

Please provide a name, initials, or a nickname for all the children 18 years old or younger who have lived in your household for at least 2 weeks in a row since ^gp0.

ENTER ^gp1 CHILD'S NAME.

If you want to delete a child from the table check the delete row box corresponding to the child you want to delete.

^gp3

Please provide a name, initials, or a nickname for all the children 18 years old or younger who have lived in your household for at least 2 weeks in a row since ^gp0.

ENTER ^gp1 CHILD'S NAME.

If you want to delete a child from the table check the delete row box corresponding to the child you want to delete.

^gp3

Figure 14

To create the child roster table we first highlighted the 'AIN.ChildTwoWks (groupable)', Figure 13, in the Structure and then selected the 'Table: Default' grouping, Figure 15.

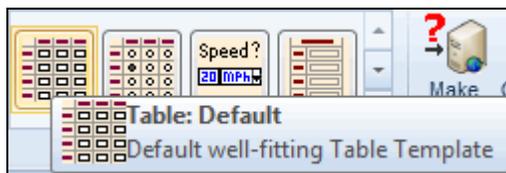


Figure 15

These actions resulted in a change to the Layout Structure, Figure 16. The Layout Structure now has the notation of 'TableGroup' and each member of the table has the notation 'TableRow'.

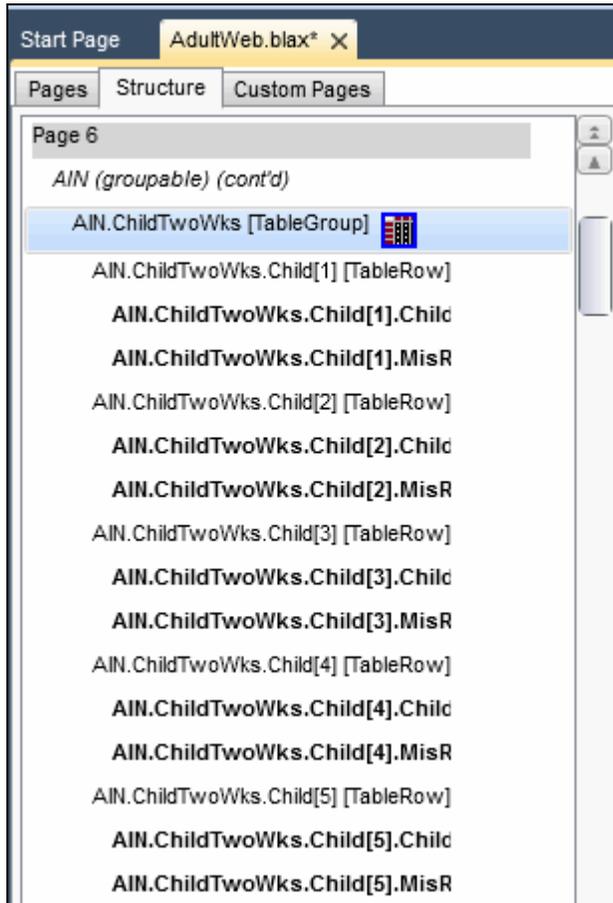


Figure 16

The result of adding the layout instruction, 'Table: Default', is we now see the child table displayed in a roster format, Figure 17.

**Adult Web Instrument (2.21.307.012)**

	Who Lived in Home Two Weeks in Row	Delete Child?
AIN.ChildTwoWks.Child[1]	<input type="text"/>	<input type="checkbox"/> ^gp3
AIN.ChildTwoWks.Child[2]	<input type="text"/>	<input type="checkbox"/> ^gp3
AIN.ChildTwoWks.Child[3]	<input type="text"/>	<input type="checkbox"/> ^gp3
AIN.ChildTwoWks.Child[4]	<input type="text"/>	<input type="checkbox"/> ^gp3
AIN.ChildTwoWks.Child[5]	<input type="text"/>	<input type="checkbox"/> ^gp3

^DispChildChildrenListed there any other children 18 years old or younger who live or have lived in your household part-time under a shared custody arrangement, but did not live in your household for 2 weeks in a row?

Yes  
 No  
 Don't know  
 Rather not answer

How many children live or have lived in your household part-time under a shared custody arrangement, but did not live in your household for 2 weeks in a row?

Figure 17

When working with tables we need to distinguish between 'Groupable' and the Group instruction. 'Groupable' refers to the contents of blocks and arrays being put into a table format; as opposed to using the Group instruction to manually group related fields which will then be displayed in a horizontal or table like fashion.

### C. Grouping

The concept of Grouping is new in Blaise 5. The Blaise 5 Group instruction allows you to tie together related fields in order to allow a horizontal or tabular display and/or a special behavior on the screen. Phone number, full name and date of birth are prime examples of fields that would be grouped.

In our example the first grouping we did was for the child's date of birth. In the source we grouped the date of birth fields, month, day and year and their applicable rules using the Group instruction, Figure 18.

```

GROUP ChildDOBGroup "What is ^HHChildrenNames.ChildrenNames.Person[pChildPointer].ChildFName's
birthdate?"
  FIELDS
  ChildBirthMonth (AIN2460)
  {What is ^HHChildrenNames.ChildrenNames.Person[pChildPointer].ChildFName's birthdate?}
  "<NEWLINE><I>ENTER MONTH</I>"
  : TMonth,DK,RF
  ChildBirthDay (AIN2480)
  "<I>ENTER DAY</I>"
  : TDay,DK,RF {T11_31}
  ChildBirthYear (AIN2500)
  "<I>ENTER YEAR</I>"
  : TYear,DK,RF {T11990_2015}
  RULES
  ChildBirthMonth
  IF ChildBirthMonth = RESPONSE AND ChildBirthMonth <> EMPTY THEN
    DoBMonthInteger := ORD(ChildBirthMonth)
    IF (ChildBirthMonth.ORD = 4) OR (ChildBirthMonth.ORD = 6) OR (ChildBirthMonth.ORD = 9) OR
(ChildBirthMonth.ORD = 11) THEN
      ValidDay29 := '29'
      ValidDay30 := '30'
      ValidDay31 := ""
    ELSEIF (ChildBirthMonth.ORD <> 2) THEN
      ValidDay29 := '29'
      ValidDay30 := '30'
      ValidDay31 := '31'
    ELSE
      ValidDay29 := '29'
      ValidDay30 := ""
      ValidDay31 := ""
    ENDIF
  ENDIF
  ChildBirthDay
  ChildBirthYear
ENDGROUP

```

Figure 18

In our application we wanted the DOB question text to appear across all three fields. In order to this we moved the question text from the month field to the Text component in the Group instruction.

The rules in the Group instruction were taken from the Rules section in the application. Inserted in place of the rules in the Rules section of the application is the Group Identifier, ChildDOBGroup.

As a result of grouping the month, day and year fields, they are now termed a 'Group' in the Layout Structure, Figure 19.

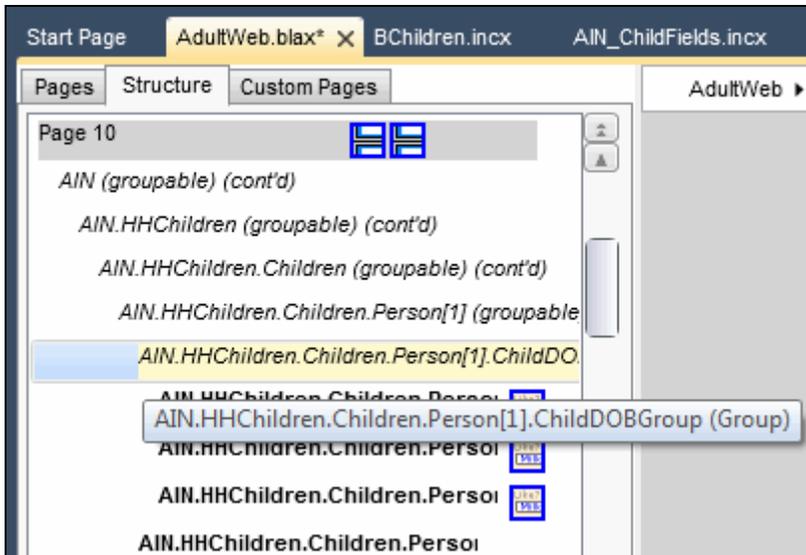


Figure 19

In order to get the fields to display horizontally we needed to apply a template to the group. We selected the 'Table: Abreast' from the Grouping templates in the ribbon which resulted in the three DOB fields being aligned horizontally, Figure 20.

The screenshot shows a web instrument form titled 'Adult Web Instrument (2.21.307.012)'. The form contains a question: 'What is 'gp9[pChildPointer]'s birthdate?'. Below the question are three dropdown menus labeled 'ENTER MONTH', 'ENTER DAY', and 'ENTER YEAR'. Below the dropdowns are radio button options for 'Yes', 'No', 'Don't know', and 'Rather not answer'. At the bottom of the form are 'Previous' and 'Next' buttons.

Figure 20

Our final step was to replicate the DOB layout across the other DOB instances in the array. This was done by “Promoting” the DOB Group. We first used the ‘Promote instruction scope to block’ to promote the month, day and year fields. Next we promoted the Group using the ‘Promote instruction scope to block’ to replicate the layout across instances, Figure 21.

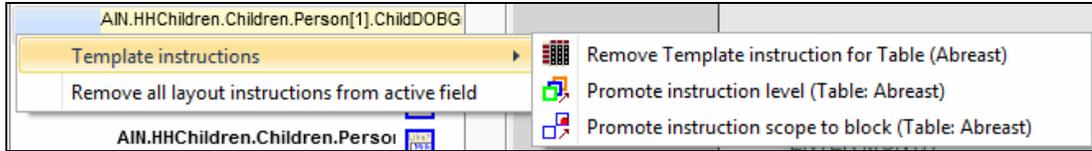


Figure 21

As another example of grouping we grouped alike questions to form a table. We grouped the questions similar to the date of birth questions but without a Rules section. Then using the ‘Table: OptionList’ from the Groupings on the Ribbon, the table was created, Figure 22.

**Adult Web Instrument (2.21.307.012)**

Has \*Childidentifier lived in any of the following places for at least 2 weeks in a row in the last 12 months?

	Yes	No	Don't know	Rather not answer
a. Camp	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Boarding School	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. Juvenile Detention Center	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. Mental Health Facility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Hospital or Medical Facility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. Foster Care	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Any other place?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What other place has \*Childidentifier lived for at least 2 weeks in a row in the last 12 months?

Please describe:

Previous

Next

Figure 22

## **D. Lessons Learned**

1. We found that the Source Converter will automatically insert line breaks (<newline>) at the beginning of the line being new lined. However, if you need to add subsequent line breaks be sure to place them at the beginning of the new line. Adding the break at the end of the previous line instead of at the beginning of the new line will result in a blank space as the first character in the new line.
2. While testing our application we observed that questions displayed contrary to their conditional statements and that fill strings did not fill until we selected the next page. Answers to a question can influence the visibility or the value of subsequent questions. If these questions are on the same page it is desirable that the page gets refreshed as soon as a new value is entered. Therefore, the fields must be designated as a 'critical' field.

In our application we needed to designate the month of the child's date of birth to be critical so that the appropriate dropdown display of days matched the month selected. For instance April required a display of 30 days, January required 31 and February required 29. We found that we also needed to designate birth year to be critical so as to calculate the child's age and to trigger the leap year edit.

3. After converting the application we found that only one layout set was created which was named 'Interviewing1'. It uses the Browser Resource Set. You will have to add other Layout Sets for your target platforms which include the assignment of a Resource Set from the Resource Database. This is in contrast to when you code a new datamodel in Blaise 5 where a Layout Set is provided for each of the seven resources sets currently supported by Blaise 5.

## **V. DISTRIBUTING BLAISE 5 TO MOBILE PLATFORMS**

There are two approaches within Blaise 5 that can be adopted to develop a survey for us on mobile devices. The first is to make the survey web interface mobile aware by using Adaptive or Responsive design techniques. The second is to build native mobile applications that are deployed to the device through the respective App store. The native applications are developed using tools and SDK's of the particular mobile platforms – iOS, Android or Windows 8. There are also mobile application development frameworks which allow for the application to be developed using one framework but be deployed to all the platforms (with some modifications). Statistics Netherlands is developing iOS and Android apps that are part of the product offering and will be supported and further developed as fully functioning interfaces.

Mobile websites are universally accessible, less expensive to develop and maintain and can be accessed by all mobile devices that have a browser. The issue of dealing with deployment to app store and certifications is avoided with a mobile web application.

There are lots of articles and books on designing web sites for mobile devices but our discussion will focus on taking our Blaise 5 instrument designed for a regular PC browser or a Windows desktop and with the addition of a few layout sets, make it compatible for mobile devices like an iPhone, iPad and Android Tablets.

While this paper focused on the conversion of a Blaise 4 application to Blaise 5 we took the added steps of installing it on a Blaise 5 web server along with Statistics Netherlands' Trade survey. We used an updated version of the Blaise app written by Statistics Netherlands for demonstration at FedCASIC.

As mentioned earlier in the Background section Blaise 5 uses Layout Sets (a combination of application code and Resource Set templates) to define the look and feel of a web application on a particular type of device. Blaise 5 provides some standard platform Resource Sets for:

- Windows Desktop
- Browser
- iPhone
- iPad Portrait
- iPad Landscape
- AndroidTabletPortrait
- AndroidTabletLandscape

The approach taken to make the Blaise 5 survey mobile aware is by using an Adaptive design principle – Which involves using different Resource Sets or UI layouts to suit different types of mobile device browsers. The application detects the type of device from which the request is coming from and uses the appropriate resource set. These designs fall into three basic styles, one for the desktop, one for mobile and one for tablets.

These styles are easily done in Blaise 5 and offer benefits such as:

- The user experience is the same across all devices
- Using the same application code across all platforms.
- Same links work across all devices
- Flexibility for future devices

We took our converted application Blaise 5 application and added layouts for an iPad, iPhone and a 7” Android tablet. When the Blaise 5 survey is accessed from any one of these devices, the application renders the correct type of layout to fit the screen size of the device. Similarly layouts for the Portrait and Landscape modes of a particular device like an iPad can also be added.

## **VI. CONCLUSIONS**

Westat's process to convert a working Blaise 4 IS instrument to Blaise 5 spanned a number of Blaise 5 versions. As each version was released and bugs were fixed and templates were added or updated we would rerun the Source Converter. This conversion worked smoothly. We did not have to modify any Blaise 4 code prior to running through the Source Converter. However in post conversion, there was some coding to group fields to allow for custom displays. The standard templates provided in Blaise 5.0.1.553 covered the majority of layouts we required in our application.

As we moved past the actual conversion process we discovered a few not so obvious benefits of Blaise 5. We found that Blaise 5 provides greater flexibility to customize page layouts for our application. As we make changes to the layout, they are instantly applied in the Layout Designer which saves time and effort since we didn't have to run the application to verify the changes. Based on our experience we anticipate staffing requirements for converting Blaise 4 applications to Blaise 5 would be less than staffing needed to write new Blaise 5 code.

Though our target platform was the browser, we tested our application on other platforms including the iPad and iPhone. We were able to run our application on both the iPhone and iPad using the Statistics Netherlands Blaise app.

It is anticipated that future releases of Blaise 5 would include features such as the use of Alien Procedures, incorporating hyperlinks in question text and the ability to duplicate Layout Sets to customize for specific platforms.