

## **$\tau$ -ARGUS release notes version 4.1.0**

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### **1 Introduction**

$\tau$ -ARGUS is a software package that has been developed by Statistics Netherlands. The aim of  $\tau$ -ARGUS is to protect tables to safeguard the privacy of the underlying respondents. Although Statistics Netherlands (Anco Hundepool and Peter-Paul de Wolf) is the main developer, many others have contributed, like Sarah Giessing (Destatis), Luisa Franconi (IStat) and ONS. Also valuable contributions have been made by JJ Salazar (University of Tenerife), Jordi Castro (Technical University of Barcelona) and several others. Also without the financial support by Eurostat and the EU via various projects  $\tau$ -ARGUS would not have been possible. The need to extend the development team and the retirement of Anco Hundepool have led to the decision to make  $\tau$ -ARGUS an Open Source project.

We expect that this way the future of  $\tau$ -ARGUS is secured in the Open Source community also after the retirement of Anco. Also the financial European support is only to be expected when  $\tau$ -ARGUS is Open Source. Eurostat has initiated the project to support this transition. As a side effect we also want to make  $\tau$ -ARGUS platform independent. We aim at a version of  $\tau$ -ARGUS that will run on the familiar Windows platform, but also on LINUX.

The current version of  $\tau$ -ARGUS is the latest outcome of this project.

In this note we will briefly describe the current state of affairs.

### **2 Structure**

The aim of the project was to rewrite  $\tau$ -ARGUS and make it an Open Source project. The current version of  $\tau$ -ARGUS is based on a Visual Basic user interface and C/C++ DLLs for the computational hard parts. Also several pieces of the functionality is provided by separate program like GHMiter (Fortran) and the Audit(Pascal), Network-Solution(C++) and CTA(C++). For solving the optimality problems in Cell Suppression, CTA, Rounding and the Audit we used high quality commercial solvers like XPress and CPLEX. We will continue to do so, but with the open source version also free solvers are available in  $\tau$ -ARGUS. We expect that in many cases for small and not too complex tables the free solvers will give satisfactorily results, but for larger complex tables the commercial solvers will still be needed.

In principle the structure remained the same, but we had to replace the Windows dependent Visual Studio (VB and C++) parts by Open solutions. So we have chosen Java for building the User interface and an Open C++ compiler for building the C++ DLLs. The Audit routine has been adapted to Lazarus, the Open Source Pascal compiler. The Hypercube method was adapted such that it is now possible to compile under Windows as well as under Linux.

### **3 Functionality**

When using this open source version of  $\tau$ -ARGUS we assume that you are familiar with the old  $\tau$ -ARGUS.

In principle the functionality of the new  $\tau$ -ARGUS will be the same as the old  $\tau$ -ARGUS. The main difference is that in the old  $\tau$ -ARGUS the main window was an overview of unsafe cells per spanning variable and code. We had the impression that this information was hardly used and now the table itself is the main window.

## 4 The new GUI

As this version has been built with Java, the look and feel will be a bit different, but the structure is the same. Also the progress info windows will have a different look. Due to the structure requirements of Java we had to design them differently.

### 4.1 The new main window

The new central window in  $\tau$ -ARGUS is similar as the window under “View Table” in the old  $\tau$ -ARGUS.

Most of the buttons are the same as in the old  $\tau$ -ARGUS. However the “Save Table” and the “Select Table” buttons are no longer there, as these options are now directly available from the main menu.

CTA is new in this version of  $\tau$ -ARGUS. Two different versions are available. A simple direct one, calling the CTA procedure with some standard parameters and an “expert” version. The expert version opens a new window giving a lot of options.

The rounding procedure is now available for Xpress, Cplex and Open Solvers.

### 4.2 Files menu

Under Files you will see the menu-items for “Open microdata”, “Open Table”, “Open Table set”, “Open Batch process” and “Exit”. After “Open Table set” (for linked tables) you will see the “Specify Table Meta” only once, but it will be applied to all tables.

But the remaining functionality is the same.

### 4.3 Specify Menu

Under “Specify” we have two menu-items “Metadata” and “Tables”.

“Metadata” will open the window to specify and adapt the metadata. The specification of the RDA file has not changed, so old RDA file should still work. Also the window to adjust the metadata has not been changed.

The “Tables” window is different depending on the type of input, similar as the old  $\tau$ -ARGUS.

But in both cases the same functionality is available as in the old  $\tau$ -ARGUS.

### 4.4 Modify Menu

Only the menu items “Select Table” and “Linked Tables” are available as “View table” is no longer needed. “Select tables” is obvious. The linked tables option now always automatically builds the ‘cover table’ so the window has been simplified. Only the buttons to start the protection (via Modular or Hypercube) are available.

### 4.5 Output menu

The same 4 menu items are available, “Save Table”, “View report”, “Generate Apriory”, “Write Batchfile”

All these 4 menu items have the same functionality as in the old  $\tau$ -ARGUS.

## 4.6 Help menu

The same 4 menu items are available, “Content”, “News”, “Options” and “About”.

“Content” should open a help system. It was not really working in the old  $\tau$ -ARGUS and it has not yet been implemented in the new  $\tau$ -ARGUS. In certain windows it is possible to get content sensitive help by pressing F1.

“News” opens a file with information about the recent developments in  $\tau$ -ARGUS.

“Options” opens a window to specify a few parameters. New here is the option to select a free solver for Modular, Optimal, CTA, Rounder and Audit. One of the advantages of the new  $\tau$ -ARGUS is that apart from the traditional solvers CPLEX and Xpress we can use a free Open Solver. Maybe this is not as powerful as the other ones, but at least we have made a start. The colour boxes have not (yet) been implemented.

“About” opens a simple about box.

## 5 Changes with respect to the “old” $\tau$ -ARGUS

While rewriting the source code, some changes were made:

- The <APRIORI> keyword in a batch-file (\*.arb) is now:  
<APRIORI> (“Filename”, TableNumber, “Separator”, Ignore, Expand)  
That is, the Separator should now be enclosed in double-quotes and two parameters are added:  
“Ignore” to control “Ignore incorrect lines” (1 = ignore, 0 = do not ignore)  
“Expand” to control “Expand for trivial levels” (1 = ignore, 0 = do not ignore)

Example:

```
<APRIORI> (“D:\Argus\Test\Exmaple.hst”, 1, “;”, 1, 0)
```

- The <WRITETABLE> keyword in a batch-file (\*.arb) has different options:  
<WRITETABLE> (TableNumber, OutputType, ParameterString, “Filename”)  
with  
OutputType  
1. CSV  
2. CSV for pivot table  
3. Code-Value  
4. SBS  
5. Intermediate  
6. JJ-format  
ParameterString  
Corresponds to the check-boxes in the “Save Table” window, with “+” for on and “-” for off  
AR: Add Audit Results (default -)  
AS: Add Status (default -)  
FL: Variable names on First Line (default + for OutputType 2, - for other OutputTypes)

HI: Use holding info (default -)  
HL: Add hierarchical levels to the SBS file (default -)  
QU: Embed spanning variables in Quotes (default +)  
SE: Suppress empty cells (default -)  
SO: Status Only in intermediate format (default -)  
TR: Remove trivial levels in JJ format (default -)

Example:

```
<WRITETABLE> (1,2,AS+QU-, "D:\Argus\Test\Example.csv")
```

## 6 Installation

### 6.1 System requirements

The binaries are tested on a Windows 7 machine (32 bit) and a Linux machine (32 bit) with Ubuntu 14.

You will need to have Java 1.7 (or later) installed. Note that both jdk1.7.0 and jre7 are versions of Java 1.7.

Please note that a 32 bit installation of Java is needed for the precompiled Windows binaries. It is possible to have a 32 bit and a 64 bit version of Java installed on the same machine.

**NB:** Make sure when running  $\tau$ -ARGUS that the 32 bit JVM is used! The distributed binary will not run in a 64 bit JVM!

### 6.2 Installation instructions

The new  $\tau$ -ARGUS requires no longer a complex installation procedure. Just unzip the file into a directory where you have read, write and execute permission. In case you own an Xpress license that makes use of an xpr-file, you should copy that file into the directory where the new  $\tau$ -ARGUS is installed.

Then run the TauargusOS.bat file (possibly you'll need to adjust paths in that batch-file).

Experienced users know that  $\tau$ -ARGUS stores various parameters in the registry. The new  $\tau$ -ARGUS does the same, but the parameters are not copied from the previous  $\tau$ -ARGUS-installation

### 6.3 License information

When making use of the OEM Xpress license (license for using Xpress in  $\tau$ -ARGUS only), a new license can be obtained from FICO. It is supposed to be a normal license, with an accompanying agreement (to be signed by the NSI) that it will only be used as part of  $\tau$ -ARGUS.

For the use of SCIP and Soplex as free solver, a license agreement has been signed for all NSIs.

## 7 Feedback

Any feed-back on this Open Source version is highly appreciated. Please send your remarks, comments or wishes to the general mailbox [argus@cbs.nl](mailto:argus@cbs.nl) or to Peter-Paul de Wolf at [pp.dewolf@cbs.nl](mailto:pp.dewolf@cbs.nl).

We are especially interested in

- Bug reports
- Workarounds for bugs/strange behavior
- Wishes for future development

Your feedback will be used to improve the Open Source version of  $\tau$ -ARGUS. It may lead either to bug-fixes in the next release or your remarks will be added to a “wish-list”, containing suggestions for improvements after the end of the current project, when the software is released to the Open Source community.

Whenever reporting bugs, please provide a working example, so we can more easily try to replay your issue.

Note that we will try to update the casc-website (<http://neon.vb.cbs.nl/casc/tau.htm>) with your feedback, so others can profit from your remarks as well (especially the workarounds).

## 8 Version history

Changes with respect to version 4.0.3 (beta):

- Added Linux support (all approaches should work under Linux)
- Included possibility to use SPSS datafile as microdata input
- Included help functionality (use of F1-key)
- Some bug fixes

Changes with respect to version 4.0.2 (beta):

- Improved CTA support
- Distance and Frequency available as costs in batch
- Improved error handling and error messages
- Some bug fixes

Changes with respect to version 4.0.1 (beta):

- Cell suppression with network-approach is now possible
- Rounding is now possible with Xpress, Cplex <sup>1</sup>and Open Solver
- One dimensional tables are now possible
- It is now possible to use <freq> as response variable in a batch-file (\*.arb)

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<sup>1</sup> Note that the current Cplex license restricted to  $\tau$ -ARGUS use is not fit for the rounding procedure.

- The command <APRIORY> in a batch-file (\*.arb) now has two additional parameters
- When no missing-codes are specified in the meta-data, there will be no missing-codes in the displayed table
- Files mentioned in batch/meta-files are assumed to reside in the same directory of the batch/meta-file. If not, the complete directory-path should be specified.
- Colour of “manual unsafe” is changed
- Some minor bug fixes