

# Migrating Between SAS Clinical Standards Toolkit™ Versions 1.5 and 1.6. Is that an African or a European Swallow\*?

Gene Lightfoot, SAS, Cary, NC, USA

**Backup all Clinical Standards Toolkit Files before proceeding**

Refer to SAS Clinical Standards Toolkit 1.6 Migration Guide for more detailed information provided by this poster. Located at:

<http://support.sas.com/documentation/cdl/en/clinstdtkmig/67424/PDF/default/clinstdtkmig.pdf>

## Customized Clinical Standards Toolkit 1.5

If Clinical Standards Toolkit 1.5 has been customized consider the following migration order

### -----The Global Standards Library (C:\cstGlobalLibrary)-----

- Install 1.6 in another location (default installation)
- **OR**
- Rename 1.5 and place 1.6 in the default location
- Register any new customized standard in 1.5 to 1.6
- Check value of StudyLibraryRootpath

### -----The Clinical Standards Toolkit Autocall Library-----

- Migrate any macros customized by the user to the 1.6 autocall library IF recommended best practices (RBP) are NOT followed (RBP – Develop customized macros in a separate folder and assign additional autocall library).

### -----The Sample Library (C:\cstSampleLibrary)-----

- Migrate changes to the 1.6 Sample Library

## Non-Customized Clinical Standards Toolkit 1.5

If Clinical Standards Toolkit 1.5 has NOT been customized then the 1.6 installation will handle the migration and the processes described below are not necessary, however, do consider the 1.6 Migration Guide as a preview to issues if you plan to customize Clinical Standards Toolkit in the future.

### -----The Clinical Standards Toolkit Migration Tools-----

For 1.6 a group of tools have been developed and provided to Clinical Standards Toolkit to facilitate the migration process. These tools are available at <http://support.sas.com/rnd/base/cdisc/cst/> under Version 1.6 -> Migration to 1.6 as Migration Tools (.zip). Key to the migration process is a set of checksum files provided in the zip file that represent an “as shipped” version of the Clinical Standards Toolkit for versions 1.5, 1.5.1, and 1.6.

## Checksum files provided by SAS

Version	Checksum File From the Root Path \cstMigration\checksums\productionchecksums\
1.5	checksums_cst15_cstframework.xml checksums_cst15_cstgblstdlib.xml checksums_cst15_cstsamplelib.xml
1.5.1	checksums_cst151_cstframework.xml checksums_cst151_cstgblstdlib.xml checksums_cst151_cstsamplelib.xml
1.6	checksums_cst16_cstframework.xml checksums_cst16_cstgblstdlib.xml checksums_cst16_cstsamplelib.xml

## Generate Checksums

The macro %cstutilgeneratechecksums is used to generate a checksum file for a given directory.

```
libname custom "<user location for generated checksum XML file>";
libname chksums "c:\cstMigration\checksums\productionchecksums";

%cstutilgeneratechecksums (
  _cstFolder=C:/myCustomGlobalLibrary,
  _cstXMLFile=%sysfunc (pathname (custom)) /checksums_cst15_myCustomGlobalLibrary.xml,
  _cstProdCode=cstgblstdlib,
  _cstLabel=CST 1.5 Custom Global Library);
```

## Compare Checksums

The macro %cstutilcomparechecksums is used to compare checksum files generated from the %cstutilgeneratechecksums macro. It is also used to compare the SAS supplied checksum files.

```
%cstutilcomparechecksums (
  _cstBaseXMLFile=%sysfunc (pathname (chksums)) /checksums_cst16_cstgblstdlib.xml,
  _cstCompXMLFile=%sysfunc (pathname (custom)) /checksums_cst15_myCustomGlobalLibrary.xml,
  _cstCompResults=work.cstlib,
  _cstOutReportPath=%sysfunc (pathname (chksums)) ,
  _cstOutReportFile=cstlib_myCustomGlobalLibrary_16.html);
```

<b>Base Directory: C:\cstGlobalLibrary (2014-02-18T17:50:31)</b> <b>Compare Directory: C:\cstGlobalLibrary_1.5customized (2014-08-27T13:18:37)</b> <b>SAS Production Code: cstgblstdlib</b>			
Missing Files			
File	Checksum (CST 1.6)	Checksum (CST 1.5 Custom Global Library)	Result
build/buildinfo.xml	8f3b3ef922b290d6b456a2616b74f9fe		File not found in COMP
logs/transactionlog.sas7bdat	b3bb3dd544998fa66fd0aa7a27c1124c		File not found in COMP
schema-repository/cdisc-definexml-2.0.0/define-extension.xsd	d8dbafc9a4bd307afc85403c1581ad43		File not found in COMP

Driver Program: compare\_checksums.sas

## Compare Registered Controlled Terminology

The macro %cstutilcompareregisteredct is used to compare changes or differences in the standardsubtypes data set for registered Clinical Standards Toolkit controlled terminology releases.

```
libname newct 'C:\cstGlobalLibrary\standards\cdisc-terminology-1.6\control';
libname oldct 'C:\cstGlobalLibrary15\standards\cdisc-terminology-1.5\control';
%cstutilcompareregisteredct(
  _cstBaseCT=oldct.standardsubtypes,
  _cstNewCT=newct.standardsubtypes,
  _cstRptType=DATASET,
  _cstRptDS=work.CTchanges,
  _cstOverwrite=Y);
```

	Name of standard	Standard version	Name of standard	Version of standard	message	actual
1	CDISC-TERMINOLOGY	CDISC-CDASH	NCL_THESAURUS	201310	New CT package found in newct.standardsubtypes but not found in oldct.standardsubtypes	CDISC-TERMINOLOGY, CDISC-CDASH, NCL_THESAURUS, 201310
2	CDISC-TERMINOLOGY	CDISC-SDTM	NCL_THESAURUS	201310	New CT package found in newct.standardsubtypes but not found in oldct.standardsubtypes	CDISC-TERMINOLOGY, CDISC-SDTM, NCL_THESAURUS, 201310
3	CDISC-TERMINOLOGY	CDISC-SEND	NCL_THESAURUS	201310	New CT package found in newct.standardsubtypes but not found in oldct.standardsubtypes	CDISC-TERMINOLOGY, CDISC-SEND, NCL_THESAURUS, 201310

## Compare Code Lists

The macro %cstutilcomparecodelists is used to compare changes or differences between SAS code lists.

```
libname newct 'C:\cstGlobalLibrary\standards\cdisc-terminology-1.6\cdisc-sdtm\current\formats';
libname oldct 'C:\cstGlobalLibrary15\standards\cdisc-terminology-1.5\cdisc-sdtm\current\formats';

%cstutilcomparecodelists(
  _cstFileType=DATASET,
  _cstBaseCT=oldct.cterms,
  _cstNewCT=newct.cterms,
  _cstCompareCL=Y,
  _cstCLVar=codelist,
  _cstCompareCLI=Y,
  _cstCLValueVar=cdisc_submission_value,
  _cstRptType=_CSTRESULTSDDS);
```

	Result identifier	Sequence number within resultseq	Source data	Resolved message text from message file	Result severity (e.g., warning, error)	Problem detected? (0=no, otherwise yes)	Actual value observed
2	CST0200	1	CSTUTILCOMPARECODELISTS	Codelist found in oldct.cterms but not found in newct.cterms	Info	1	Codelist=AGESPAN
3	CST0200	2	CSTUTILCOMPARECODELISTS	Codelist value found in oldct.cterms but not found in newct.cterms	Info	1	Codelist=AGESPAN,Value=ADOLESCENT (12-17 YEARS)
4	CST0200	3	CSTUTILCOMPARECODELISTS	Codelist value found in oldct.cterms but not found in newct.cterms	Info	1	Codelist=AGESPAN,Value=ADULT (18-65)
5	CST0200	4	CSTUTILCOMPARECODELISTS	Codelist value found in oldct.cterms but not found in newct.cterms	Info	1	Codelist=AGESPAN,Value=CHILDREN (2-11 YEARS)
6	CST0200	5	CSTUTILCOMPARECODELISTS	Codelist value found in oldct.cterms but not found in newct.cterms	Info	1	Codelist=AGESPAN,Value=ELDERLY (> 65)

## Compare Autocall Macros

The macro %cstutilcompareautocallmacros creates a list of the contents of each of the two macro libraries and compares the two for any differences or changes.

```
%cstutilcompareautocallmacros(
  _cstBasePath=C:\Program
Files\SASHome\SASFoundation\9.4\cstframework_1.5customized\sasmacro,
  _cstNewPath=C:\Program Files\SASHome\SASFoundation\9.4\cstframework\sasmacro,
  _cstRptType=_CSTRESULTSDDS,
  _cstOverwrite=N);
```

Contents of Results data set

	message	resultseverity	keyvalues
21	New macro (cstutilxmlvalidate.sas) not found in C:\Program Files\SASHome\SASFoundation\9.4\cstframework_1.5customized\sasmacro	Info	Macro name=cstutilxmlvalidate.sas
22	Old macro (cstutilwriteresultsintro.sas) not found in C:\Program Files\SASHome\SASFoundation\9.4\cstframework\sasmacro	Info	Macro name=cstutilwriteresultsintro.sas
23	New macro parameter(s) detected for: cst_createtablesfordatastandard.sas - see work.macrodiffs.	Info	Macro name=cst_createtablesfordatastandard.sas
24	New macro parameter(s) detected for: cstutil_deletedataset.sas - see work.macrodiffs.	Info	Macro name=cstutil_deletedataset.sas

Continuation of listing

name	parameter	baseSig	newSig
cst_createtablesfordatastandard.sas	_cstWhereClause	%macro cst_createtablesfordatastandard( _cstStandard=, _cstStandardVersion=, _cstOutputLibrary=, _cstResultsOverrideDS=, _cstNumObs=0 ) / des = 'CST: Creates tables from registered referencemetadata.';	%macro cst_createtablesfordatastandard( _cstStandard=, _cstStandardVersion=, _cstOutputLibrary=, _cstWhereClause=, _cstResultsOverrideDS=, _cstNumObs=0 ) / des = 'CST: Creates tables from registered referencemetadata.';
cstutil_deletedataset.sas	_cstLogging	%macro cstutil_deletedataset( _cstDataSetName= ) / des='CST: Delete a SAS data set';	%macro cstutil_deletedataset( _cstDataSetName=, _cstLogging=0, _cstLoggingDS= ) / des='CST: Delete a SAS data set';
cstutil_deletedataset.sas	_cstLoggingDS	%macro cstutil_deletedataset( _cstDataSetName= ) / des='CST: Delete a SAS data set';	%macro cstutil_deletedataset( _cstDataSetName=, _cstLogging=0, _cstLoggingDS= ) / des='CST: Delete a SAS data set';

## Compare Property Files

The macro %cstutilcompareproperties translates property files into SAS data sets for comparison to identify any changes or differences.

```
%cstutilcompareproperties (
  _cstBasePath=C:\cstGlobalLibrary\standards\cdisc-sdtm-3.1.3-
  1.6\programs\initialize.properties,
  _cstNewPath=C:\cstGlobalLibrary\standards\cdisc-sdtm-3.2-
  1.6\programs\initialize.properties);
```

```
NOTE: [CSTLOGMESSAGE.CSTUTILCOMPAREPROPERTIES] The following properties differ between the two property files:
Property values different between BASE and NEW. Name: | _cstStandardVersion Base Value: 3.1.3 New Value: 3.2
```

## Compare Folder Hierarchy

The macro %cstutilcomparefolderhierarchy can compare folders, files or data sets to determine any changes or differences.

```
%cstutilcomparefolderhierarchy(
  _cstBaseFolder=C:\cstGlobalLibrary,
  _cstBaseVersion=1.6,
  _cstCompFolder=C:\cstGlobalLibrary\5custom,
  _cstCompVersion=1.5,
  _cstRptDiff=work.foldercomp,
  _cstRptDiffType=FOLDER,
  _cstOverwrite=y,
  _cstOutReportPath=C:\,
  _cstOutReportFile=globallibrarydiff15.htm);
```

	BASE Folder name	COMP Folder name	Result
1	C:\cstGlobalLibrary\logs		Folder present in Base only
2	C:\cstGlobalLibrary\schema-repository\cdisc-definexml-2.0.0		Folder present in Base only
3	C:\cstGlobalLibrary\schema-repository\cdisc-odm-1.3.2		Folder present in Base only
4	C:\cstGlobalLibrary\standards\cdisc-definexml-2.0.0-1.6\control		Folder present in Base only
5	C:\cstGlobalLibrary\standards\cdisc-definexml-2.0.0-1.6\formats		Folder present in Base only
6	C:\cstGlobalLibrary\standards\cdisc-definexml-2.0.0-1.6\macros		Folder present in Base only
7	C:\cstGlobalLibrary\standards\cdisc-definexml-2.0.0-1.6\messages		Folder present in Base only
8	C:\cstGlobalLibrary\standards\cdisc-definexml-2.0.0-1.6\metadata		Folder present in Base only
9	C:\cstGlobalLibrary\standards\cdisc-definexml-2.0.0-1.6\programs		Folder present in Base only
10	C:\cstGlobalLibrary\standards\cdisc-definexml-2.0.0-1.6\stylesheet		Folder present in Base only
11	C:\cstGlobalLibrary\standards\cdisc-definexml-2.0.0-1.6\templates		Folder present in Base only
12	C:\cstGlobalLibrary\standards\cdisc-definexml-2.0.0-1.6\validation\control		Folder present in Base only
13	C:\cstGlobalLibrary\standards\cdisc-sdtm-3.2-1.6\control		Folder present in Base only
14	C:\cstGlobalLibrary\standards\cdisc-sdtm-3.2-1.6\macros		Folder present in Base only
15	C:\cstGlobalLibrary\standards\cdisc-sdtm-3.2-1.6\messages		Folder present in Base only
16	C:\cstGlobalLibrary\standards\cdisc-sdtm-3.2-1.6\metadata		Folder present in Base only
17	C:\cstGlobalLibrary\standards\cdisc-sdtm-3.2-1.6\programs		Folder present in Base only
18	C:\cstGlobalLibrary\standards\cdisc-sdtm-3.2-1.6\templates		Folder present in Base only
19	C:\cstGlobalLibrary\standards\cdisc-sdtm-3.2-1.6\validation\control		Folder present in Base only
20		C:\cstGlobalLibrary\15custom\standards\cdisc-terminology-1.5\cdisc-cdash\201104Extended\formats	Folder present in Comp only
21		C:\cstGlobalLibrary\15custom\standards\cdisc-terminology-1.5\cdisc-cdash\201104\formats	Folder present in Comp only
22	C:\cstGlobalLibrary\standards\cdisc-terminology-1.6\cdisc-cdash\201312\formats		Folder present in Base only
23	C:\cstGlobalLibrary\standards\cdisc-terminology-1.6\cdisc-qs\201312\formats		Folder present in Base only
24	C:\cstGlobalLibrary\standards\cdisc-terminology-1.6\cdisc-qs\current\formats		Folder present in Base only
25		C:\cstGlobalLibrary\15custom\standards\cdisc-terminology-1.5\cdisc-sdtm\201104\formats	Folder present in Comp only
26	C:\cstGlobalLibrary\standards\cdisc-terminology-1.6\cdisc-sdtm\201312\formats		Folder present in Base only
27		C:\cstGlobalLibrary\15custom\standards\cdisc-terminology-1.5\cdisc-send\201201\formats	Folder present in Comp only
28	C:\cstGlobalLibrary\standards\cdisc-terminology-1.6\cdisc-send\201312\formats		Folder present in Base only
29		C:\cstGlobalLibrary\15custom\standards\cst-framework-1.5\customautocall	Folder present in Comp only
30	C:\cstGlobalLibrary\xsl-repository\DEFINE\XML\2.0.0\export		Folder present in Base only
31	C:\cstGlobalLibrary\xsl-repository\DEFINE\XML\2.0.0\export\config		Folder present in Base only
32	C:\cstGlobalLibrary\xsl-repository\DEFINE\XML\2.0.0\import		Folder present in Base only
33	C:\cstGlobalLibrary\xsl-repository\DEFINE\XML\2.0.0\import\config		Folder present in Base only

## Copy a folder

The macro %cstutilcopyfolderhierarchy is used to copy a folder, subfolders, and all content to another area and provides useful options such as itemization of the folders and contents, summarization of the actions performed, and creating a new folder structure but without the content.

```
%cstutilcopyfolderhierarchy(
  _cstSourceFolder=\\d78398\public\cstGlobalLibrary,
  _cstNewFolder=C:\cstGlobalLibrary15,
  _cstFolderDS=work.folders,
  _cstFileDS=work.files,
  _cstBuildFoldersOnly=N);
```

## SAS Log listing

NOTE: [CSTLOGMESSAGE] 191 folders were created.  
 NOTE: [CSTLOGMESSAGE] 1049 files were copied.

## Contents of generated SAS data set

	path	filename	fileextension
1	\\d78398\public\cstGlobalLibrary\logs	transactionlog.sas7bdat	sas7bdat
2	\\d78398\public\cstGlobalLibrary\metadata	availabletransforms.xml	xml
3	\\d78398\public\cstGlobalLibrary\metadata	standardlookup.sas7bdat	sas7bdat
4	\\d78398\public\cstGlobalLibrary\metadata	standards.sas7bdat	sas7bdat
5	\\d78398\public\cstGlobalLibrary\metadata	standardsasreferences.sas7bdat	sas7bdat
6	\\d78398\public\cstGlobalLibrary\schema-repository\cdisc-crtdds-1.0.0	define-extension.xsd	xsd
7	\\d78398\public\cstGlobalLibrary\schema-repository\cdisc-crtdds-1.0.0	define-ns.xsd	xsd
8	\\d78398\public\cstGlobalLibrary\schema-repository\cdisc-crtdds-1.0.0	define-1-0-0.xsd	xsd
9	\\d78398\public\cstGlobalLibrary\schema-repository\cdisc-ct-1.0.0	controlledterminology-extension.xsd	xsd
10	\\d78398\public\cstGlobalLibrary\schema-repository\cdisc-ct-1.0.0	controlledterminology-ns.xsd	xsd
11	\\d78398\public\cstGlobalLibrary\schema-repository\cdisc-ct-1.0.0	controlledterminology1-0-0.xsd	xsd

## Tools to Migrate Source Metadata from CRT-DDS 1.0.0 to Define-XML 2.0.0

To provide an example of migrating CRT-DDS 1.0.0 source metadata to Define-XML 2.0.0 source metadata, SAS supplies the `migrate_crtdds_to_definexml_adam.sas` and `migrate_crtdds_to_definexml_sdtm.sas` driver programs.

Note: Be aware that the study source metadata files created should not be considered ideal Define-XML 2.0.0 implementations for production use. Although the SAS tools provide a good starting point and a way to explore Define-XML 2.0.0 metadata, the files have limitations. In particular, the set of ValueList definitions and WHERE clauses are converted from value-level metadata definitions in CRT-DDS 1.0 that have limitations.

### Driver Programs:

User changes to the following driver programs will probably be required:

```
migrate_crtdds_to_definexml_adam.sas  
migrate_crtdds_to_definexml_sdtm.sas
```

Outputs are the following SAS data sets: `source_study`, `source_columns`, `source_values`, `source_documents`, and `source_codelists`

\*My sincerest apologies to Monty Python! ( <http://www.youtube.com/watch?v=lilIW-ovx0Y> )

### References:

The following website can be accessed by all customers to get the most recent documentation and white papers.

<http://support.sas.com/rnd/base/cdisc/cst/index.html>

The Clinical Standards Toolkit 1.6 Migration guide documentation is located at:

<http://support.sas.com/documentation/cdl/en/clinstdtktmig/67424/PDF/default/clinstdtktmig.pdf>