

DH₀₄ - Manage TFLs Development in Life Science Analytics Framework 5.3 using SAS and R code

Jean Marc Ferran, Stijn Rogiers

PHUSE US Connect 2021

Biography



DH04 - Manage TFLs Development in Life Science Analytics Framework 5.3 using SAS and R code



Jean Marc Ferran

- Principal Consultant & Owner at Qualiance
- Helps customers implementing SCEs. Works with LSAF/SAS DD since 2005
- 20 years of experience in the Life Sciences Industry
- Appointed Member of the EMA Technical Anonymisation Group and Health Canada Reference Group on Public Release of Clinical Information

Stijn Rogiers

- Pr. Industry Consultant in the SAS Global Health and Life Sciences Practice group
- Joined SAS in 2015 providing industry expertise and strategic support.
- 20 years of experience both at CRO and Pharma industry.
- Member of the European CDISC Coordinating Committee (E3C).



Agenda



Manage TFLs Development in Life Science Analytics Framework 5.3 using SAS and R code

- The Business Case
- TLF module within SAS Life Science Analytics Framework 5.3
- Life Cycle Management Prototype
- Conclusion

The Business Case



Program Life-Cycle Management in LSAF

PHUSE SDE Utrecht 2019

10. October 2019, Nutricia Research

Bjarke Mirner Klein, Director of Statistical Operations (Ferring Pharmaceuticals)
Jean-Marc Ferran, Principal Consultant (Qualiance)



Derive Validation Status

Program Status



Status	Versioned	Checked out	Program Author signed	Program Approver signed
Rejected	Yes	No	Approve	Reject
Validated	Yes	No	Approve	Approve
Not yet started*	NA	NA	NA	NA
Ongoing	Yes / No	Yes	Yes / No	Yes / No
Draft not versioned	No	No	No	No
Draft versioned	Yes	No	No	No
Ready for validation	Yes	No	Approve	No
Signed not versioned	No	No	Yes / No**	Yes / No**

* Available in Programming Plan but not in LSAF
** At least one has to be yes



Derive Validation Status

Potential Issues



Issue	Description
1	Program author signed as 'Reject'
2	Program author and program approver is the same
3	Program approver signed before program author
4	Program approver missing in Programming Plan but present in LSAF
5	Program author is missing in Programming Plan but present in LSAF
6	Programmer checked in not signed as Program author
7	Program approver has signed but program author has not signed
8	Programming Plan author is different from actual in LSAF
9	Programming Plan approver is different from actual in LSAF
10	Program not listed in Programming Plan
11	Unknown issue



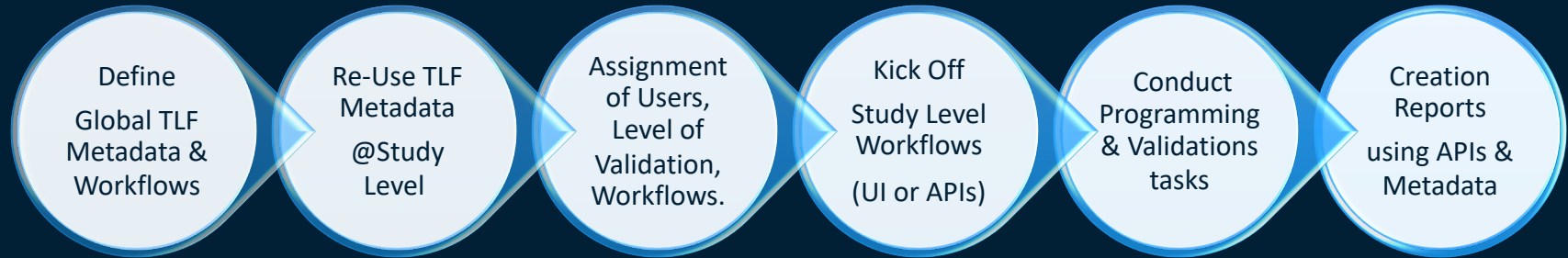
Ferring Study Dashboard



Program	Title	Current Version	Programmer	Programmer edge (frequency)	Validator	Validator edge (frequency)	Validator edge (frequency)	Validator edge (frequency)	Validation Date	Total Versions	Status	Last Validated Version
ca0_coversheet.asx	Create coversheet	1.1	an	Approve	10Sep2019:09:18:41	an	Approve	10Sep2019:09:20:38	10Sep2019:09:20:38	1	Validated	1.1
ca0_dj_adm.asx	Copy required ACDI datasets from the	1.2	an	Approve	10Sep2019:09:18:41	an	Approve	10Sep2019:09:20:38	10Sep2019:09:20:38	1	Validated	1.2
ca1_adm.asx	Address Event	1.1	an	Approve	08Sep2019:08:11:57	an	Approve	08Sep2019:11:45:34	08Sep2019:11:45:34	1	Validated	1.1
ca1_adm.asx	Disposition	1.1	gph	Approve	08Sep2019:11:19:51	an	Approve	08Sep2019:12:37:28	08Sep2019:12:37:28	1	Validated	1.1
ca1_adm.asx	Pregnancy	1.1	an	Approve	08Sep2019:11:17:29	an	Approve	08Sep2019:12:37:28	08Sep2019:12:37:28	1	Validated	1.1
ca2_adm.asx	Pregnancy Loss	1.1	an	Approve	08Sep2019:11:17:29	an	Approve	08Sep2019:12:37:28	08Sep2019:12:37:28	1	Validated	1.1
ca2_adm.asx	Neonate	1.1	an	Approve	08Sep2019:08:11:57	an	Approve	08Sep2019:11:45:34	08Sep2019:11:45:34	1	Validated	1.1
ca2_adm.asx	Early pregnancy loss - subjects with	1.0	an	Approve	08Sep2019:12:19:59	an	Approve	08Sep2019:13:37:00	08Sep2019:13:37:00	1	Validated	1.0
ca2_adm.asx	On-going pregnancy - Full Analysis Set	1.0	gph	Approve	08Sep2019:12:34:35	an	Approve	08Sep2019:13:37:00	08Sep2019:13:37:00	1	Validated	1.0
ca2_adm.asx	Neonate health at 4 weeks after birth	1.0	an	Approve	08Sep2019:12:19:59	an	Approve	08Sep2019:13:37:00	08Sep2019:13:37:00	1	Validated	1.0
ca2_adm.asx	Neonate health at 4 weeks after birth	1.0	an	Approve	08Sep2019:12:19:59	an	Approve	08Sep2019:13:37:00	08Sep2019:13:37:00	1	Validated	1.0
ca2_adm.asx	Neonate health at 4 weeks after birth	1.0	an	Approve	08Sep2019:12:19:59	an	Approve	08Sep2019:13:37:00	08Sep2019:13:37:00	1	Validated	1.0
ca2_adm.asx	Neonate health at 4 weeks after birth	1.0	an	Approve	08Sep2019:12:19:59	an	Approve	08Sep2019:13:37:00	08Sep2019:13:37:00	1	Validated	1.0
ca2_adm.asx	Neonate health at 4 weeks after birth	1.0	an	Approve	08Sep2019:12:19:59	an	Approve	08Sep2019:13:37:00	08Sep2019:13:37:00	1	Validated	1.0

Flow of activities

Overview



Global - TLF Metadata

LSAF 5.3 and the TLF module

Global TLF Metadata (1/3)

General Study TLFs

13 TLFs

☐	Results	Enable Auto Flow * 	Section 	Type * 	Identifier * 	Name * 	Description	SAS program name	Title_1	Title_2	Title_3	Title_4
☐	0	No 	1 - Subject Dis...	Table 	1	Subject Dispo	All Randomized	SubjectDisposition.sas	Table 1.0	Subject Disp	Number (%)	
☐	0	No 	2 - Protocol V...	Table 	2	Protocol Vio	Intent-to-Treat	ProtocolViolations.sas	Table 2.0	Protocol Viol	Number (%)	
☐	0	No 	3 - Pill Compli...	Table 	3	Pill Complia	Intent-to-Treat	PillCompliance.sas	Table 3.0	Pill Compliar	Number (%)	
☐	0	No 	4 - Demograp...	Table 	4	Demographi	Intent-to-Treat	DemographicCharacte	Table 4.0	Demographi	Number (%)	
☐	0	No 	5 - Clinically ...	Table 	5	Clinically Sig	Intent-to-Treat	PreexistingConditions	Table 5.0	Clinically Sig	Number (%)	
☐	0	No 	6 - Vital Signs...	Table 	6	Vital Signs a	Intent-to-Treat	VSatRandomization.si	Table 6.0	Vital Signs a		
☐	0	No 	7 - Summary ...	Table 	7	Summary of	Intent-to-Treat	PriorMedications.sas	Table 7.0	Summary of	By WHO-Dr	Nur
☐	0	No 	7 - Summary ...	Table 	7.1	Summary of	Intent-to-Treat	ConcomitantMedicatio	Table 7.1	Summary of	By WHO-Dr	
☐	0	No 	8 - Summary ...	Table 	8	Summary of	Intent-to-Treat	AdverseEvents.sas	Table 8.0	Summary of	By MedDRA	
☐	0	No 	8 - Summary ...	Table 	8.1	Summary of	Intent-to-Treat	DiscontinuationAdvers	Table 8.1	Summary of	By MedDRA	
☐	0	No 	9 - Summary ...	Table 	9	Summary of	Intent-to-Treat	SeriousAdverseEvent:	Table 9.0	Summary of	By MedDRA	
☐	0	No 	9 - Summary ...	Table 	9.1	Listing of Inc	Intent-to-Treat	SeriousAdverseEvent:	Table 9.1	Listing of Inc		
☐	0	No 	10 - Subject ...	Table 	10	Subject Rep	Intent-to-Treat	ReportedSymptoms.si	Table 10.0	Subject Rep	Number (%)	

Configurable Global TLF Metadata

LSAF 5.3 and the TLF module

Global TLF Metadata (2/3)

General Study TLFs

13 TLFs

☐	Title_3	Title_4	Title_5	Footnote_1	Footnote_2	Footnote_3	Footnote_4	Footnote_5	Footnote_6	Footnote_7	Footnote_8	F
☐	Number (%)			[1] Randomized	[2] ITT Subjects	[3] Modified ITT	[4] Subject 1480					
☐	Number (%)			Note: Only one								
☐	Number (%)			[1] First pill shou	[2] Second pill s							
☐	Number (%)											
☐	Number (%)			Note: A clinically								
☐												
☐	By WHO-Drt	Number (%)		Note: Prior Medi								
☐	By WHO-Drt			Note: Concomit								
☐	By MedDRA			Note: Subjects r								
☐	By MedDRA			Note: Subjects r								
☐	By MedDRA			Note: Subjects r								
☐				[1] Maximum Int	[2] Action Taken	[3] Drug Relatec	[4] Outcome: Re					
☐	Number (%)			Note: Percentag								

Configurable Global TLF Metadata

LSAF 5.3 and the TLF module

Global TLF Metadata (3/3)

General Study TLFs
13 TLFs

☐	Footnote_7	Footnote_8	Footnote_9	Footnote_10	Output	Job	Location	Due Date	Level of Validation	Utility Job 1	Utility Job 2
☐					+	-	+			/PhUSE2 +	+
☐					+	-	+			+	+
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Study Level - TLF Metadata

Incl. assignment of users/user groups

Incl. level of validation

Life Cycle Management Prototype



Define your Study-Level TLF Metadata (re-use from global/previous study) (1/3)

All sections

Standard type: Analysis Standard model: Analysis Standard Base standard name: ADaM

11 TLFs

☐	Results	Enable Auto Flow	Section	Type	Identifier	Name	Description	SAS program name	Title_1	Title_2	
☐	2	Yes		Table	RD.Table_14-3.01	Table 14-3.01	Primary Endpoint An...	Table 14-3.01	Primary Endpoint Analysis...	- Summary at ...	
☐	1	Yes		Table	RD.Table_14-5.02	Table 14-5.02	Incidence of Treatm...	Table 14-5.02	Incidence of Treatment E...	by Treatment ...	
☐	1	Yes		Table	RD.Table_14-6.02	Table 14-6.02	Incidence of Treatm...	Table 14-6.02	Incidence of Treatment E...	by Treatment ...	
☐	0	Yes		Table	RD.Table_14-6.03	Table 14-6.03	Incidence of Treatm...	Table 14-6.03	Incidence of Treatment E...	by Treatment ...	
☐	0	Yes		Table	RD.Table_14-6.04	Table 14-6.04	Incidence of Treatm...	Table 14-6.04	Incidence of Treatment E...	by Treatment ...	
☐	0	Yes		Table	RD.Table_14-6.05	Table 14-6.05	Incidence of Treatm...	Table 14-6.05	Incidence of Treatment E...	by Treatment ...	
☐	0	Yes		Table	RD.Table_14-6.06	Table 14-6.06	Incidence of Treatm...	Table 14-6.06	Incidence of Treatment E...	by Treatment ...	
☐	0	Yes		Table	RD.Table_14-6.07	Table 14-6.07	Incidence of Treatm...	Table 14-6.07	Incidence of Treatment E...	by Treatment ...	
☐	0	Yes		Table	RD.Table_14-6.08	Table 14-6.08	Incidence of Treatm...	Table 14-6.08	Incidence of Treatment E...	by Treatment ...	
☐	0	Yes		Table	RD.Table_14-6.09	Table 14-6.09	Incidence of Treatm...	Table 14-6.09	Incidence of Treatment E...	by Treatment ...	
☐	0	Yes		Table	RD.Table_14-6.10	Table 14-6.10	Secondary Endpoint...	Table 14-6.10	Secondary Endpoint Analy...	by Treatment ...	

Life Cycle Management Prototype

Define your Study-Level TLF Metadata (re-use from global/previous study) (2/3)

All sections

Standard type: Analysis Standard model: Analysis Standard Base standard name: ADaM

11 TLFs

☐	User Assignment 1	User Assignment 2	User Assignment 3	User Assignment 4	User Assignment 5	Output	Job
☐	Jean-Marc Ferran (qua_jmf)	Stijn Rogiers (sbxsro)	Stijn Rogiers (sbxsro)				/PhUSE2020/Dru...
☐	Stijn Rogiers (sbxsro)	Jean-Marc Ferran (qua_j...	Jean-Marc Ferran (qua_jmf)				/PhUSE2020/Dru...
☐	Kevin Clark (keclar)	Adam LaManna (adlama)	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...
☐	Preetesh Parikh (prpari)	Ben Bocchicchio (bebocc)	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...
☐	Adam LaManna (adlama)	Sandeep Juneja (sajune)	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...
☐	Sandeep Juneja (sajune)	Kevin Clark (keclar)	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...
☐	Ben Bocchicchio (bebocc)	Preetesh Parikh (prpari)	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...
☐	Preetesh Parikh (prpari)	Ben Bocchicchio (bebocc)	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...
☐	Adam LaManna (adlama)	Sandeep Juneja (sajune)	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...
☐	Adam LaManna (adlama)	Sandeep Juneja (sajune)	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...
☐	Jean-Marc Ferran (qua_jmf)	Stijn Rogiers (sbxsro)	Sandeep Juneja (sajune)				/PhUSE2020/Dru...

Programmer,
Validator
and Reviewer
Assignment

Life Cycle Management Prototype

Define your Study-Level TLF Metadata (re-use from global/previous study) (3/3)

All sections

Standard type: Analysis Standard model: Analysis Standard Base standard name: ADaM

11 TLFs

☐	User Assignment 3	User Assignment 4	User Assignment 5	Output	Job	Location	Due Date	Level of Validation	Utility Job 1
☐	Stijn Rogiers (sbxsro)				/PhUSE2020/Dru...			QC Review	/PhUSE2020/Drug0...
☐	Jean-Marc Ferran (qua_jmf)				/PhUSE2020/Dru...			QC Review	/PhUSE2020/Drug0...
☐	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...			QC Review	/PhUSE2020/Drug0...
☐	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...			QC Review	/PhUSE2020/Drug0...
☐	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...			QC Review	/PhUSE2020/Drug0...
☐	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...			QC Review	/PhUSE2020/Drug0...
☐	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...			QC Review	/PhUSE2020/Drug0...
☐	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...			QC Review	/PhUSE2020/Drug0...
☐	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...			Self-Verification	/PhUSE2020/Drug0...
☐	Ben Bocchicchio (bebocc)				/PhUSE2020/Dru...			Self-Verification	/PhUSE2020/Drug0...
☐	Sandeep Juneja (sajune)				/PhUSE2020/Dru...			Self-Verification	/PhUSE2020/Drug0...

Level of
Validation

Life Cycle Management Prototype

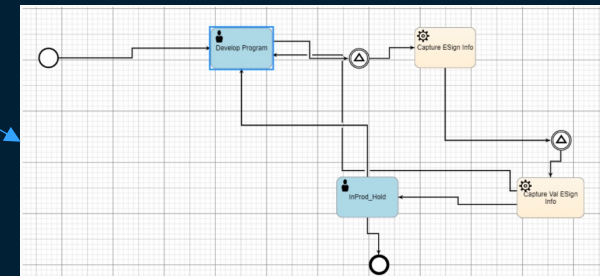
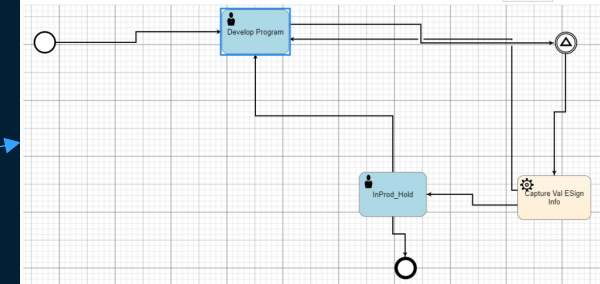
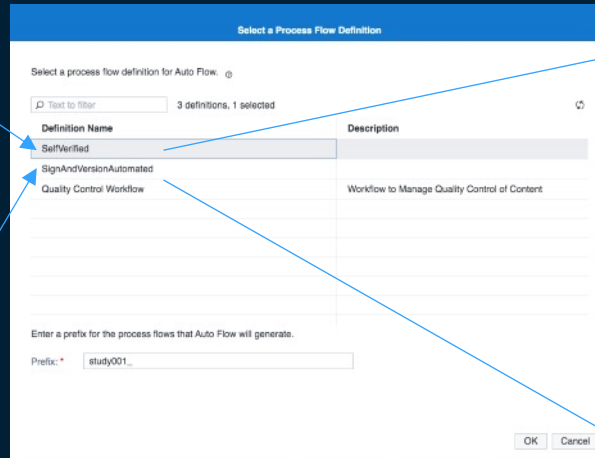
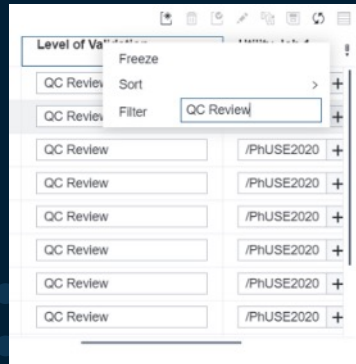
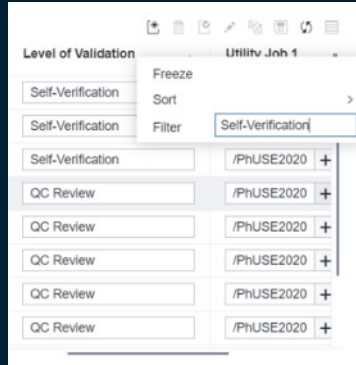
Export TLF Metadata using APIs

```
program_complete_status_report.sas  create_studymetadata.sas x +
Code Log Results Submission Inputs Submission Outputs
20
21 %lsaf_getstudyid(LSAF_PATH=&lsafstudy);
22 %put &_lsafStudyId;
23
24 %lsaf_getstudystandards(
25   lsaf_studyid=%str(&_lsafStudyId_),
26   sas_dsname=work.lsafgetstudystandards
27 );
28
29 data _null_;
30   set work.lsafgetstudystandards end=end;
31   call symputx('modelid' || strip(put(_n_,8.)), modelid);
32   call symputx('standardname' || strip(put(_n_,8.)), name);
33   call symputx('basestandardname' || strip(put(_n_,8.)), basestandardname);
34   call symputx('basestandardversion' || strip(put(_n_,8.)), basestandardversion);
35   if end then call symputx('nstandards', _n_);
36 run;
37
38 %macro export_metadata(location);
39
40   %local i base_std;
41
42   %do i = 1 %to &nstandards;
43
44     %put &i &&modelid&i &&basestandardname&i &&standardname&i &&basestandardversion&i;
45
46     %let base_std = %lowcase(&&basestandardname&i);
47
48     %lsaf_exportstudydetails(
49       lsaf_studyid=%str(&_lsafStudyId_),
50       lsaf_location=&location,
51       lsaf_path=%str(&lsafstudy/Dev/metadata/&base_std/studydetails),
52       lsaf_overwrite=1
53     );
54
55
56     %if &location=WORKSPACE %then %do;
57       %lsaf_exportstudytablestows(
58         lsaf_studyid=%str(&_lsafStudyId_),
59         lsaf_basestandardname=&&basestandardname&i,
60         lsaf_modelid=%str(&&modelid&i))
```

Study Level Workflows

Life Cycle Management Prototype

Create Workflows for each Output using AutoFlow (or API) functionality



Development of workflows done in Eclipse
(bpmn standard is required)

Life Cycle Management Prototype

Create Workflows for each Output using AutoFlow (or API) functionality

<

Different Workflow
for each
Level of Validation

Life Cycle Management Prototype

Automated actions triggered from e-Signature using Jobs within Workflow

SAS Life Science Analytics Framework - Process Flow

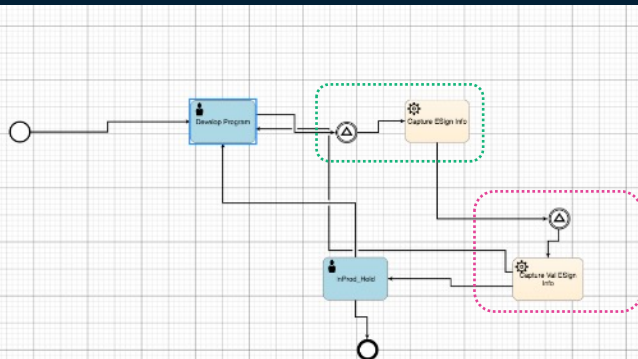
study001_Table 14-3.01

Details
Flow Setup
Process Data
Current
Completed
Attachments

List Diagram

Text to filter 6 items, 1 selected

ID	Name	Type	Details	Due Date	Priority	Complexity
A_Develop_Program	Develop Program	User	Jean-Marc Ferran		Medium	Medium
B_1_ESign_File	ESign File	Intermediate Event-Signal	/PHUSE2020/Drug001/IND001/Study001/Devprograms/Tab			
B_2_RunJob	Capture ESign Info	System Job Wait	read_pl_metadata_int_prog.job			
D_1_Val_ESign	SignalCatchEvent	Intermediate Event-Signal	/PHUSE2020/Drug001/IND001/Study001/Devprograms/Tab			
D_2_Val_RunJob	Capture Val ESign Info	System Job Wait	read_pl_metadata_oc_prog.job			
E_Hold	IntProd_Hold	User	Stijn Rogiers		Medium	Medium



SAS Life Science Analytics Framework - Properties

Table 14-3.01.sas

Properties

Name: Table 14-3.01.sas

Description: ProdReady

Content type: application/vnd.sas

Type: SAS Program

Size: 2.02 KB

Version: -

Created by: Ben Bocchicchio

Programs are automatically moved from Dev to Prod and Description (status) is updated

Life Cycle Management Prototype

Workflow documents reason for changes after validation

SAS® Life Science Analytics Framework - Process Flows

study001__Table 14-6.09

Details
Flow Setup
Process Data
Current
Completed
Attachments

List Diagram

Text to filter 1 item, 1 selected

Status	ID	Name	Type	Assignee	Due Date	Priority	Complexity
☒	E_Hold	InProd_Hold	User	Jean-Marc Ferran		Medium	Medium

Complete Task

ID: E_Hold

Name: InProd_Hold

Comment:

Actual hours: 0

Completion Data

Choose2: *
ReDefine Specific...
(none)
End
ReDefine Specifications

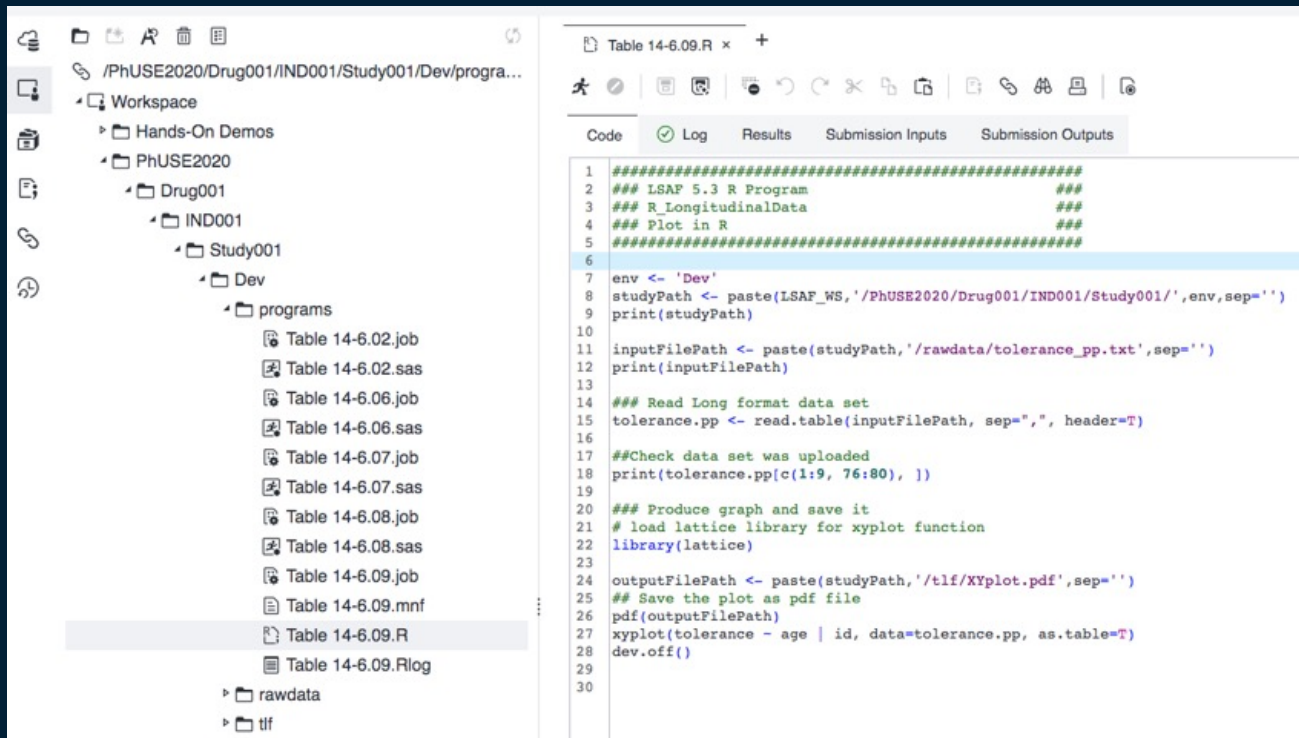
Complete Cancel

SAS & R programs integrated

Full traceability & reproducibility

Life Cycle Management Prototype

R programs and jobs can be integrated and follow same Life-Cycle Management



The screenshot displays the SAS Life Cycle Management Prototype interface. On the left is a file explorer showing a workspace structure:

- Workspace
 - Hands-On Demos
 - PhUSE2020
 - Drug001
 - IND001
 - Study001
 - Dev
 - programs
 - Table 14-6.02.job
 - Table 14-6.02.sas
 - Table 14-6.06.job
 - Table 14-6.06.sas
 - Table 14-6.07.job
 - Table 14-6.07.sas
 - Table 14-6.08.job
 - Table 14-6.08.sas
 - Table 14-6.09.job
 - Table 14-6.09.mnf
 - Table 14-6.09.R** (selected)
 - Table 14-6.09.Rlog
 - rawdata
 - tif

On the right is a code editor titled "Table 14-6.09.R x +". It contains the following R code:

```

1 #####
2 ### LSAP 5.3 R Program
3 ### R LongitudinalData
4 ### Plot in R
5 #####
6
7 env <- 'Dev'
8 studyPath <- paste(LSAP_WS, '/PhUSE2020/Drug001/IND001/Study001/', env, sep='')
9 print(studyPath)
10
11 inputFilePath <- paste(studyPath, '/rawdata/tolerance_pp.txt', sep='')
12 print(inputFilePath)
13
14 ### Read Long format data set
15 tolerance.pp <- read.table(inputFilePath, sep=",", header=T)
16
17 ##Check data set was uploaded
18 print(tolerance.pp[c(1:9, 76:80), ])
19
20 ### Produce graph and save it
21 # load lattice library for xyplot function
22 library(lattice)
23
24 outputFilePath <- paste(studyPath, '/tlf/XYplot.pdf', sep='')
25 ## Save the plot as pdf file
26 pdf(outputFilePath)
27 xyplot(tolerance ~ age | id, data=tolerance.pp, as.table=T)
28 dev.off()
29
30
  
```

R programs and jobs can be integrated and follow same Life-Cycle Management

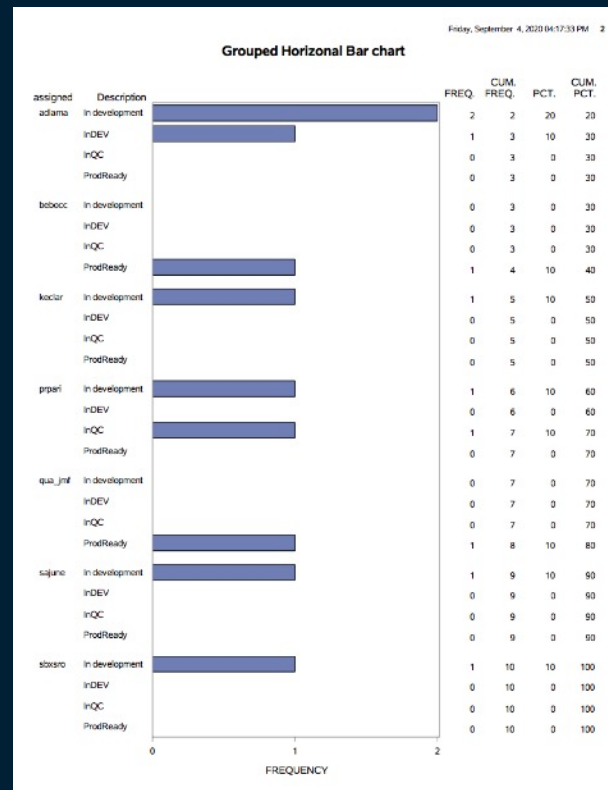
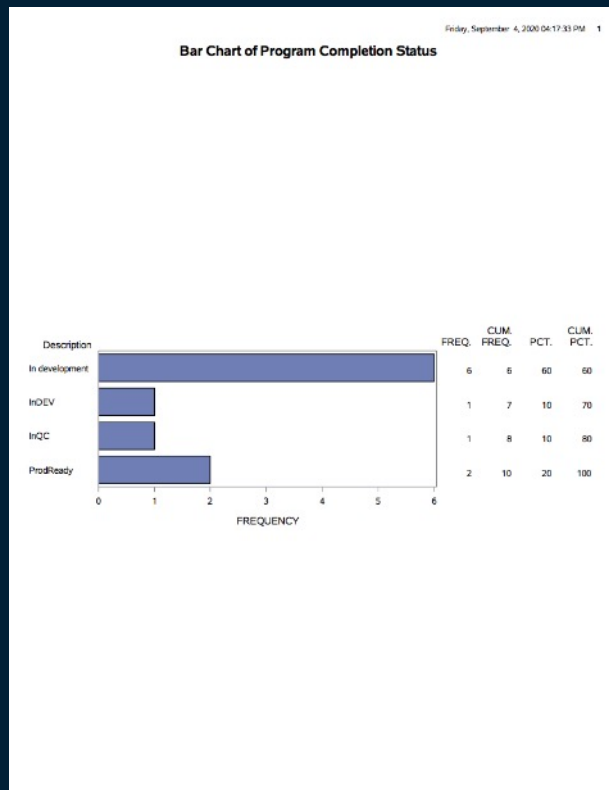
Action Status Detail			
Action:	Run workspace job Table 14-6.09.job		
Summary:	Processed 3 items. 3 successfully, 0 with warnings and 0 with errors.		
Note:	Job completed successfully.		
Started:	Sep 10, 2020, 7:06 PM GMT+02:00		
Ended:	Sep 10, 2020, 7:06 PM GMT+02:00		
 (0)  (0)  (3)  (0)  (0)			
Status	Name	Location	Detail
	Job setup		Completed successfully.
	Table 14-6.09.R	/PhUSE2020/Drug001/IND001/St...	Completed successfully.
	Job post-processing		Completed successfully.

Creation of Reports

Leveraging APIs and Metadata

Life Cycle Management Prototype

Reporting using the APIs



Life Cycle Management Prototype

Reporting using the APIs (Example code)

program_complete_status_report.sas x +

Code Log Results Submission Inputs Submission Outputs

```
1 libname rpt_data "&_sasws_/PhUSE2020/Drug001/IND001/Study001/Dev/metadata/adam/";
2
3 %let loop =0;
4
5 data temp(keep=name assigned);
6   set rpt_data.adam_tlf nobobs=nobs;
7   r_loc = tranwrd(job, 'sdd://', '');
8   r_loc2 = tranwrd(r_loc, '%', ' ');
9   name = strip(program_name) || ".sas";
10  assigned = tranwrd(user_assignment_1, "User::", '');
11 run;
12
13
14 %lsaf_getchildren( lsaf_path=PhUSE2020/Drug001/IND001/Study001/Dev/programs, sas_dsname=work.lsafGetChildrenD, lsaf_recursive=1 );
15
16 data prg_d(keep= name version description lastmodifiedby);
17   set work.lsafGetChildrenD;
18   where strip(itemType) = "sas:sasprogram" and iscontainer ne 1;
19   location = 'DEV';
20 run;
21
22 %lsaf_getchildren( lsaf_path=PhUSE2020/Drug001/IND001/Study001/Prod/programs, sas_dsname=work.lsafGetChildrenP, lsaf_recursive=1 );
23
```

Conclusion

Conclusion



Manage TFLs Development in Life Science Analytics Framework 5.3
using SAS and R code

Conclusion



Manage TFLs Development in Life Science Analytics Framework 5.3 using SAS and R code

- TLF module can be used for planning purpose AND to capture outputs metadata.
 - ✓ TLF module can be configured
 - ✓ Export output metadata to a SAS dataset (using API or UI) to support the reporting of each TLF

Conclusion



Manage TFLs Development in Life Science Analytics Framework 5.3 using SAS and R code

- TLF module can be used for planning purpose AND to capture outputs metadata.
- **It is possible to manage outputs supported by both SAS and R code**
 - ✓ Integrated within SAS Life Science Analytics Framework; no need to work outside system for dev. nor execution
 - ✓ Traceability and Reproducibility for both SAS and R programs

Conclusion



Manage TFLs Development in Life Science Analytics Framework 5.3 using SAS and R code

- TLF module can be used for planning purpose AND to capture outputs metadata.
- It is possible to manage outputs supported by both SAS and R code
- **Setting up of Workflows can be automated using APIs and tailored to each company's internal process**
 - ✓ Workflow can be triggered on eSign activities & trigger next steps accordingly (e.g. move from DEV to PROD area)
 - ✓ It is possible to document after the validation state is reached any reason for change (e.g. change of specs)

Note: It is not possible to write back into the TFL module. Custom reporting is still required. Work in progress.

Documentation for your reference

LSAF APIs



SUPPORT



SUPPORT / SAMPLES & SAS NOTES

SUPPORT

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- Check Problem Status
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 - Search Problem Notes

Usage Note 65943: SAS® Life Science Analytics Framework Macro API 2.3 - Release Notes

Details Downloads About **Rate it**

The SAS® Life Science Analytics Framework Macro API 2.3 is available for use with SAS® Life Science Analytics Framework Java API 2.3.

The table below summarizes the enhancements for this release.

For a detailed list of added and modified macros, see the SAS® Life Science Analytics Framework Macros 2.3 Changes Spreadsheet located on the Downloads tab of this SAS Note.

Functional Area	Description
	Updated all macros that produce a data set to set the default data set name if the user sets the parameter to blank.
AuditService	New service with macro to support audit history query functionality.
AuthenticationService	Created new service for existing macros that support connection to an LSAF session. Macros now associated with this service: - lsaf_login - lsaf_logout
GlobalPrivilegeService	Macros added: lsaf_getuserswithglobalprivilege
JobService	Macros added: - lsaf_getjobrunasowner - lsaf_setjobrunasowner
JobSubmissionService	Macros added: - lsaf_getjobmanifestinfo - lsaf_getjobmanifestinputs

<https://support.sas.com/kb/65/943.html>

<https://support.sas.com/kb/57/862.html>



*Thank you for your
great contribution @
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Any Questions ?

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