



Using jobs and Macros API to create a structured, controlled and personalised LSAF environment



Stephan van Driel / SAS Consultant / PHUSE EU Connect 2021



- [illegible]

SAS Life Science Analytics Framework (LSAF)



Repository

User accounts

Containers and files

Authorization

Jobs

The screenshot shows the SAS Life Science Analytics Framework - Repository web interface. The browser address bar shows the URL. The interface has a blue header bar with the title 'SAS Life Science Analytics Framework - Repository'. Below the header is a toolbar with various icons. On the left is a sidebar with a tree view showing the 'Repository' structure, including 'Users' and 'ocs_stvand'. The main area displays a table with 2 items. The table has columns: 'T...', 'Name', 'Size', 'Modified By', 'Date Modified', 'Signed', 'Repository Version', and 'Workspace Status'. The first row shows a folder named 'Users' with a size of 0, modified by 'Trainer One' on 'Aug 25, 2021, 1:40 AM GMT+0...'. The second row is empty. The table is followed by several empty rows.

SAS Life Science Analytics Framework (LSAF)



Repository

User accounts

Containers and files

Authorization

Jobs

User Settings

Account

User Preferences

Subscriptions

User ID:

ocs_stvand

First name:

Stephan

Last name:

van Driel

Display name: *

Stephan van Driel

Department:

OCS

Email address: *

Telephone:

SYSTEM ACCESS

Last login:

Aug 31, 2021, 11:35 AM GMT+02:00

Account expiration date:

Non expiring

Authentication type:

Internal

Password expiration date:

Sep 29, 2021, 9:53 AM GMT+02:00

Days until password expires:

29

Change Password

LICENSE

License type:

Power

SAS Life Science Analytics Framework (LSAF)



Repository

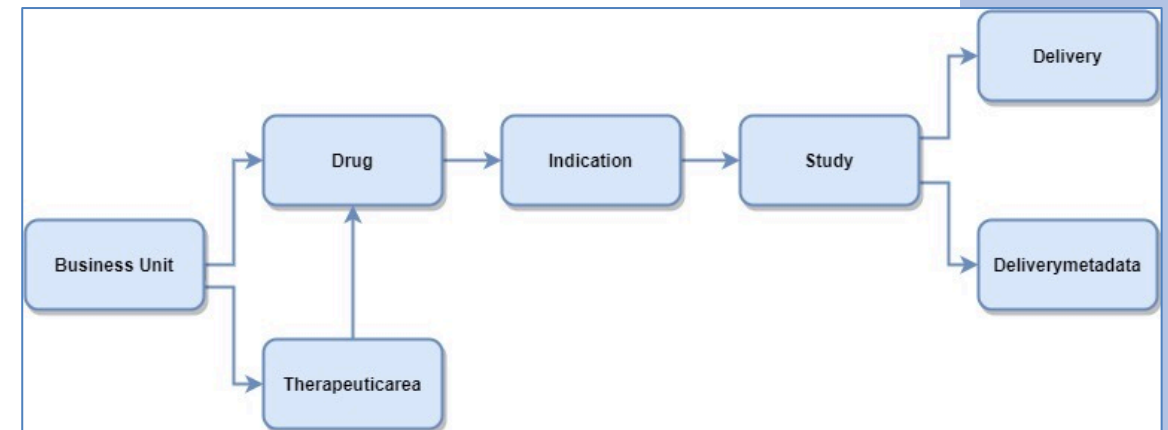
User accounts

Containers and files

Authorization

Jobs

- Container types
 - Custom Context
 - Study
 - Folder



SAS Life Science Analytics Framework (LSAF)



Repository

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Authorization

Jobs

■ Authorization

Context

- Members
- Groups
- Roles
 - Role Privileges

Context
Folder
File

- Permissions
 - Admin
 - Read
 - Properties write
 - Content write
 - Delete

Contexts	
OCS study x	
Context	Study
Details	
Members	
Groups	
Roles	
Text to filter	
Name	
OCS study_dm	
OCS study_dm_readonly	
OCS study_prg	
OCS study_prg_readonly	
OCS study_stat	
OCS study_stat_readonly	
system_admin	

Permissions ?	
Users or Groups	
Owner	
Members	
Administrators (Business Unit)	
OCS (Drug)	
OCS study_dm (Study)	
OCS study_dm_readonly (Study)	
OCS study_prg (Study)	
OCS study_prg_readonly (Study)	
OCS study_stat (Study)	
OCS study_stat_readonly (Study)	
system_admin (Study)	
Permissions	
Admin	✓
Read	✓
Properties Write	○
Content Write	✗
Delete	✓

SAS Life Science Analytics Framework (LSAF)



Repository

User accounts

Containers and files

Authorization

Jobs

- LSAF Job
 - SAS (or R) program(s)
 - Input
 - Output

The screenshot shows the SAS Life Science Analytics Framework (LSAF) Workspace interface. The title bar reads "SAS® Life Science Analytics Framework - Workspace". The left sidebar contains a "Jobs" section with a sub-tab "Job folder setup.job". The main area displays the configuration for this job. On the left, there is a sidebar with "Details", "Programs", "Parameters", "Publish Setup", and "Check-in". The "Details" tab is active. The configuration fields are: "Name: *" with the value "Job folder setup.job"; "Location:" with the value "/Hands-On_Demos/OCS/OCS LS Process flows/OCS study/production/programmers"; "Documentation:" with the value "Study folder setup.job."; "Logs Location:" with the value "." and a "Browse..." button; "Results Location:" with the value "." and a "Browse..." button; and "Manifest Location:" with the value "." and a "Browse..." button. At the bottom left of the configuration area is a "Set All" button. On the right side of the configuration area, there is a context menu with the following options: "Run", "Run and populate >", "Schedule", and "Test run".



Jobs

- Job parameters (Global SAS macros)

[illegible]

SAS Life Science Analytics Framework (LSAF)



Repository

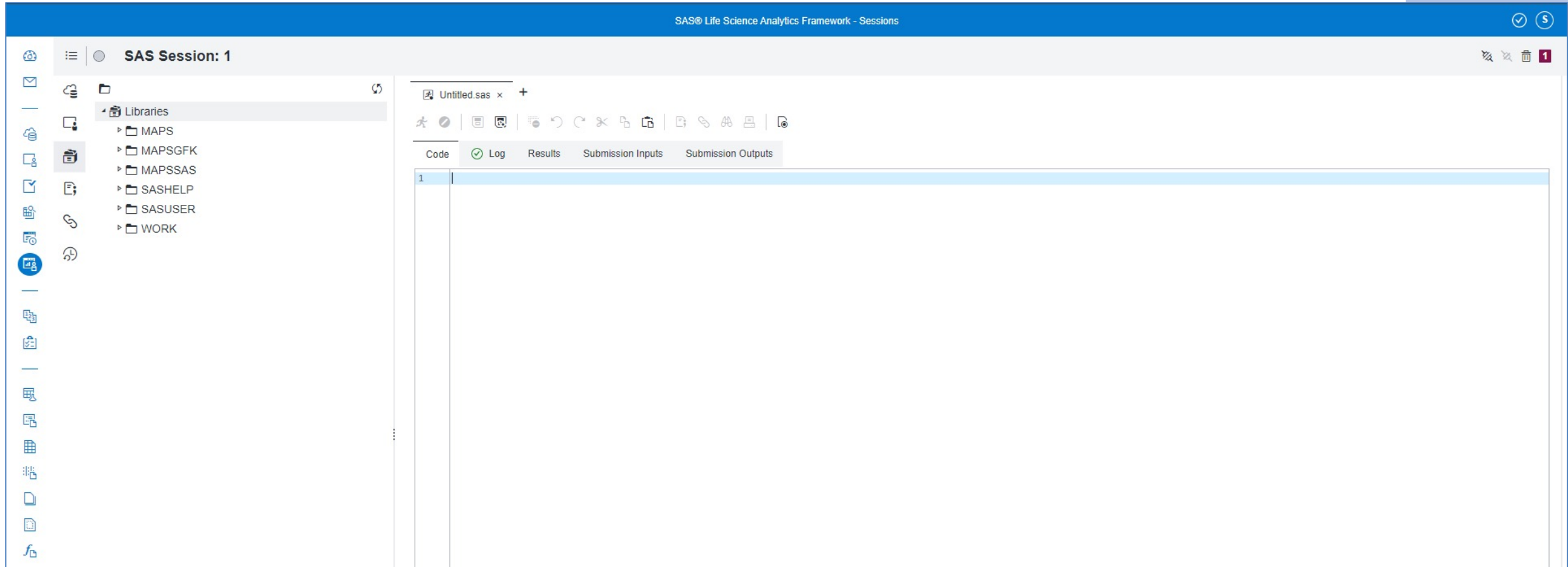
User accounts

Containers and files

Authorization

Jobs

■ SAS Session in LSAF





SAS Life Science Analytics Framework (LSAF)

Repository

User accounts

Containers and files

Authorization

Jobs

- SAS Macro API
 - Macro API 2.4 currently has 283 macros.
 - LSAF SAS Session or PC SAS

LSAF Version	Java API Client	Macro API	API Release Notes	LSAF Release Notes
SAS® Life Science Analytics Framework 5.3/5.3.x	Java API 2.4 Client	Macro API 2.4	Java API 2.4 Release Notes Macro API 2.4 Release Notes	LSAF 5.3.1 Release Notes LSAF 5.3 Release Notes
SAS® Life Science Analytics Framework 5.2/5.2.x	Java API 2.3 Client	Macro API 2.3	Java API 2.3 Release Notes Macro API 2.3 Release Notes	LSAF 5.2.3 Release Notes LSAF 5.2.2 Release Notes LSAF 5.2.1 Release Notes LSAF 5.2 Release Notes
SAS® Life Science Analytics Framework 5.2	Java API 2.2.1 Client	Macro API 2.2.1	Java API 2.2.1 Release Notes Macro API 2.2.1 Release Notes	LSAF 5.2 Release Notes
SAS® Life Science Analytics Framework 5.1.x	Java API 2.2 Client	Macro API 2.2	Java API 2.2 Release Notes Macro API 2.2 Release Notes	LSAF 5.1.2 Release Notes LSAF 5.1/5.1.1 Release Notes

Examples:

- `%lsaf_createfolder`
- `%lsaf_getproperties`
- `%lsaf_exportstandard`
- `%lsaf_exportstudycodelists`
- `%lsaf_exists`
- `%lsaf_existsinworkspace`
- `%lsaf_resetpassword`
- `%lsaf_getprocessdefsbytype`

LSAF environment setup



1. Design LSAF environment
2. Describe manual setup tasks
3. Develop jobs

The screenshot displays the LSAF environment setup interface. On the left, a file tree shows the hierarchy: Repository > CRO > OCS > OCS indication > OCS study. Under 'OCS study', there are folders for 'data', 'metadata', 'production', 'staging', and 'tools'. The 'tools' folder is expanded, showing 'system tools' and 'utility tools'. On the right, a table lists 6 items, with the second item, 'Folder setup indication.job', highlighted. The table has columns for a checkbox, a 'T...' icon, and a 'Name' column.

☐	T... ↑	Name
☐		Create user account.job
☒		Folder setup indication.job
☐		Folder setup study.job
☐		Folder setup system or utility tool.job
☐		process flow setup data transfer.job
☐		Update user access.job

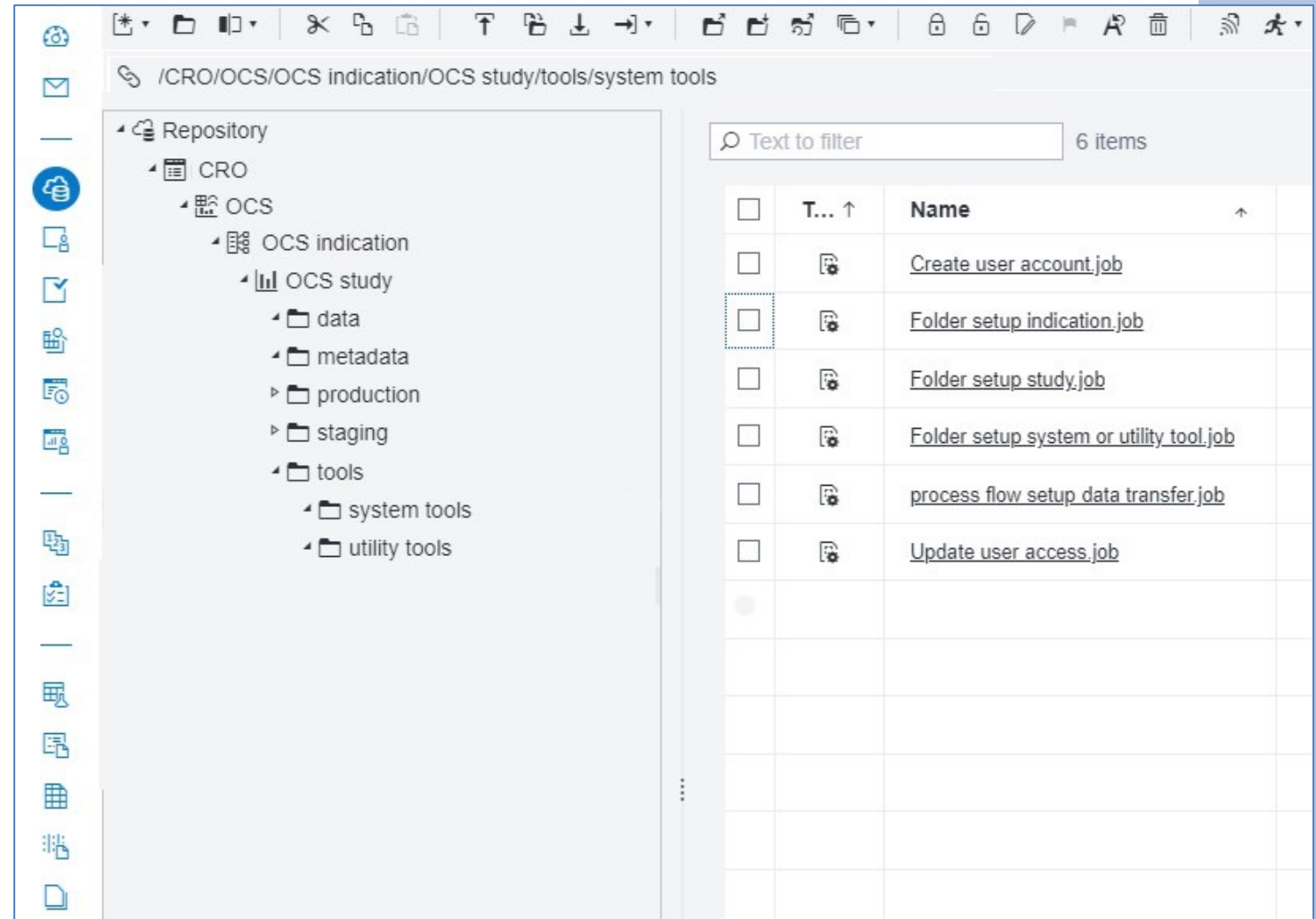
LSAF environment setup



1. Design LSAF environment
2. Describe manual setup tasks
3. Develop jobs

Benefits of Jobs:

- Structured
- Controlled
- Personalised
- Faster
- Less LSAF knowledge needed
- Less chance of human errors



Examples of Jobs



- System tools
 - User account setup
 - Folders setup
 - Process flows setup
 - User access
- Utility tools
 - Copying / Moving files
 - Converting files
 - Checking files

The screenshot shows the 'system tools' interface within the OCS study environment. The left sidebar displays a hierarchical tree structure under the path '/CRO/OCS/OCS indication/OCS study/tools/system tools'. The tree includes folders for 'data', 'metadata', 'production', 'staging', and 'tools'. The 'tools' folder is expanded, showing sub-folders for 'system tools' and 'utility tools'. The main panel on the right displays a table of 6 items, each with a checkbox, a 'T...' column, and a 'Name' column. The items are listed as follows:

☐	T... ↑	Name ↑
☐		Create user account.job
☐		Folder setup indication.job
☐		Folder setup study.job
☐		Folder setup system or utility tool.job
☐		process flow setup data transfer.job
☐		Update user access.job



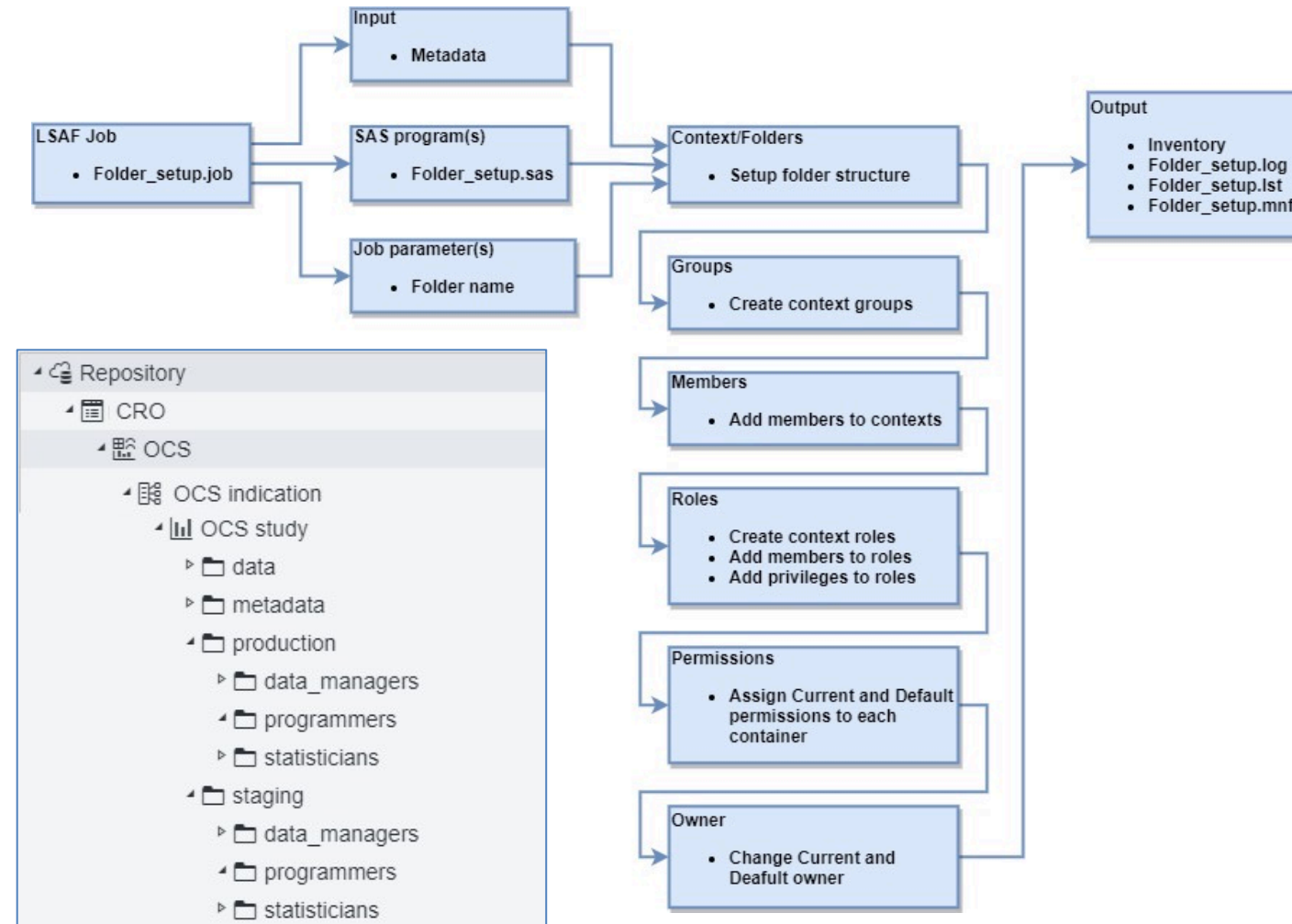
Examples of Jobs - System tools

1. Folders setup
 - Containers
 - Groups
 - Members
 - Roles
 - Permissions
 - Owner
2. User account setup
 - Details
 - Account
 - User Privileges
3. Process flow setup
 - Process flow instance
 - Candidates
 - Job locations
 - Job info
 - Job parameters
 - Notification messages
 - Notification recipients
 - Activate process flow
4. User access
 - Add/remove users or groups to contexts as member
 - Add/remove users or groups to groups



Examples of Job - Folder Setup

1. Folders setup
 - Containers
 - Groups
 - Members
 - Roles
 - Permissions
 - Owner





Examples of Job - Folder Setup

- Metadata
 - Input parameters
 - Folder structure
 - Create groups
 - Create roles
 - Add role members
- Job parameters
 - *businessunit*
 - *drug*
 - *indication*
 - *study*

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
		level_1	level_2	level_3	level_4	level_5	level_6	level_7	level_8	level_9	level_10	system_admin	XstudyX_dm_readonly	XstudyX_stat_readonly	XstudyX_prg_readonly	XstudyX_dm	XstudyX_stat	XstudyX_prg
1	Type																	
2	businessunit	XbusinessunitX										ARPCD/ARPCD	-R---/	-R---/	-R---/	-R---/	-R---/	-R---/
3	drug		XdrugX									ARPCD/ARPCD	-R---/	-R---/	-R---/	-R---/	-R---/	-R---/
4	indication			XindicationX								ARPCD/ARPCD	-R---/	-R---/	-R---/	-R---/	-R---/	-R---/
5	study				XstudyX							ARPCD/ARPCD	-R---/	-R---/	-R---/	-R---/	-R---/	-R---/
6	folder					data						ARPCD/ARPCD	-R---/-R---	-R---/-R---	-R---/-R---	-R---/-R---	-R---/-R---	-R---/-R---
7	folder					metadata						ARPCD/ARPCD	-R---/-R---	-R---/-R---	-R---/-R---	-R---/-R---	-R---/-R---	-R---/-R---
8	folder					production						ARPCD/ARPCD	-R---/	-R---/	-R---/	-R---/	-R---/	-R---/
9	folder						data_managers					ARPCD/ARPCD	-R---/-R---			-RPC-/RPCD		
10	folder						statisticians					ARPCD/ARPCD		-R---/-R---			-RPC-/RPCD	
11	folder						programmers					ARPCD/ARPCD			-R---/-R---			-RPC-/RPCD
12	folder					staging						ARPCD/ARPCD	-R---/	-R---/	-R---/	-R---/	-R---/	-R---/
13	folder						data_managers					ARPCD/ARPCD	-R---/-R---			-RPC-/RPCD		
14	folder						statisticians					ARPCD/ARPCD		-R---/-R---			-RPC-/RPCD	
15	folder						programmers					ARPCD/ARPCD			-R---/-R---			-RPC-/RPCD
16																		
17																		
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31																		
32																		



Examples of Job - Folder Setup

Containers

Groups

Members

Roles

Permissions

Owner

	A	B	C	D	E	F	G
		level_1	level_2	level_3	level_4	level_5	level_6
1	Type						
2	businessunit	XbusinessunitX					
3	drug		XdrugX				
4	indication			XindicationX			
5	study				XstudyX		
6	folder					data	
7	folder					metadata	
8	folder					production	
9	folder						data_managers
10	folder						statisticians
11	folder						programmers
12	folder					staging	
13	folder						data_managers
14	folder						statisticians
15	folder						programmers
16							



Examples of Job - Folder Setup

Containers

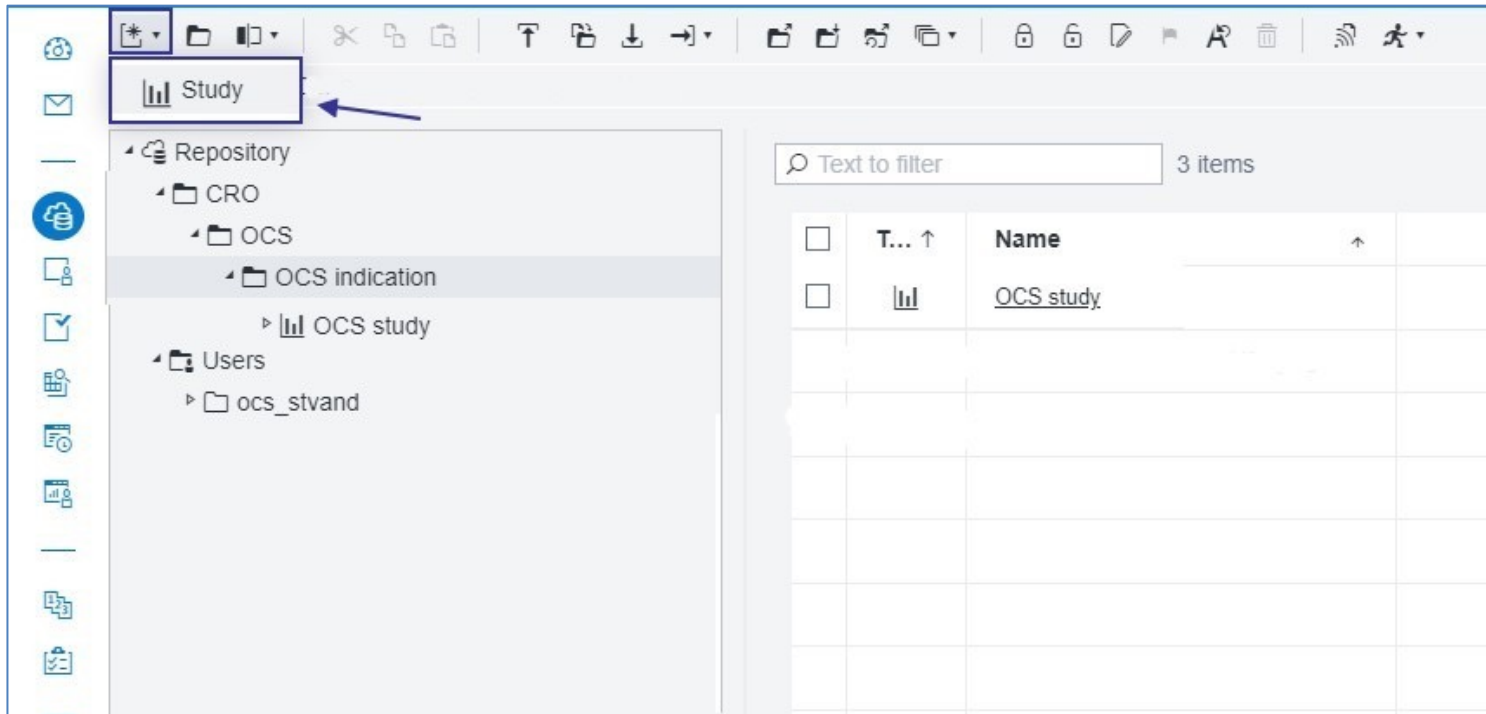
Groups

Members

Roles

Permissions

Owner



- Macros API
 - %lsaf_createfolder(lsaf_path=)
 - %lsaf_createcontext(lsaf_path=, lsaf_typeid=)



Examples of Job - Folder Setup

Containers

Groups

Members

Roles

Permissions

Owner

	A	B	C
1	LSAF_group_context	LSAF_group_name	lsaf_group_description
2	/XbusinessunitX	system_admin	System admin
3	/XbusinessunitX	XstudyX_dm_readonly	Datamanagers read only
4	/XbusinessunitX	XstudyX_stat_readonly	Statisticus read only
5	/XbusinessunitX	XstudyX_prg_readonly	Programmers read only
6	/XbusinessunitX	XstudyX_dm	Datamanagers
7	/XbusinessunitX	XstudyX_stat	Statisticus
8	/XbusinessunitX	XstudyX_prg	Programmers



Examples of Job - Folder Setup

Containers

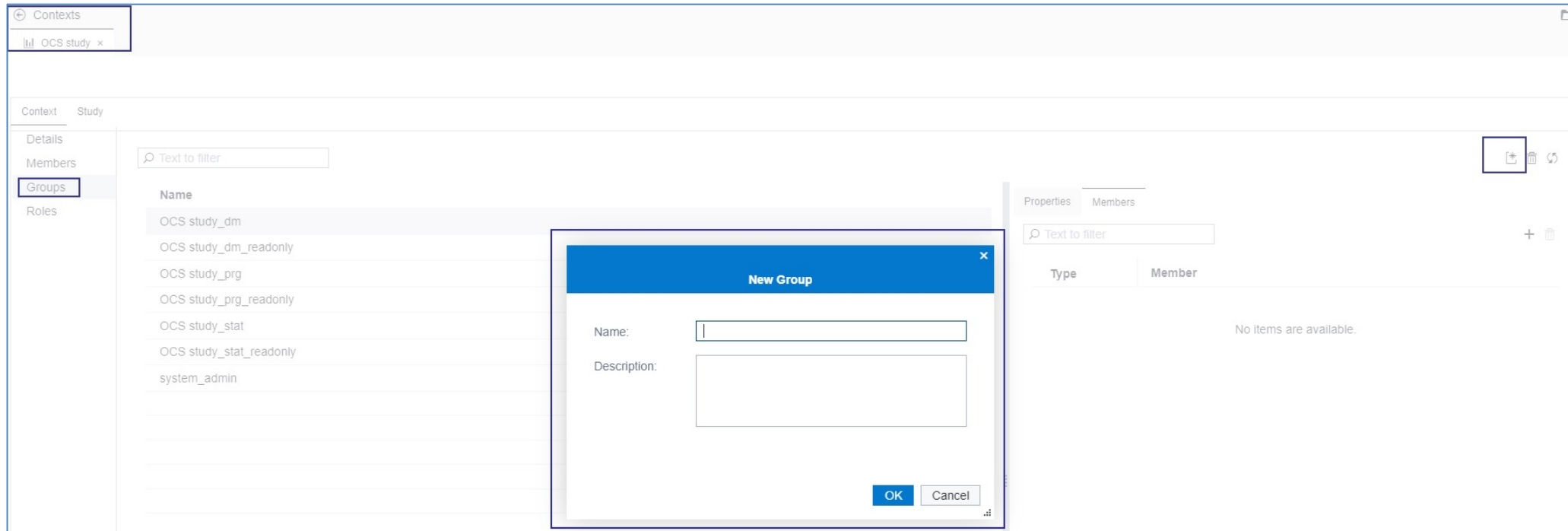
Groups

Members

Roles

Permissions

Owner



- Macros API:
 - %lsaf_creategroup(lsaf_path=, lsaf_group=, lsaf_description=)
 - %lsaf_groupexists(lsaf_path=, lsaf_group=)



Examples of Job - Folder Setup

Containers

Groups

Members

Roles

Permissions

Owner

Type	Member
☐	Administrators (Business Unit)
☐	OCS (Drug)
☐	Stephan van Driel (ocs_stvand)

- Macros API:
 - %lsaf_ismember(lsaf_path=, lsaf_member=, lsaf_type=, lsaf_group_context=)
 - %lsaf_addmember(lsaf_path=, lsaf_member=, lsaf_type=, lsaf_group_context=)
 - %lsaf_removemember(lsaf_path=, lsaf_member=, lsaf_type=, lsaf_group_context=)



Examples of Job - Folder Setup

Containers Groups Members Roles Permissions Owner

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	LSAF_role_name	LSAF_role_context	LSAF_role_description	Create Process Flows	Manage Process Flows	Administer Process Flows	Enable Versioning	Manage Locking	Manage Membership	Manage Roles	Manage State	Manage Study	Manage Versioning	Permanently Delete Items	Propagate Permissions	Restore Items Deleted by Others	Sign Files
1	system_admin	/XbusinessunitX		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2	stat_prg_dm	/XbusinessunitX		Y	Y	N	Y	Y	N	N	N	N	N	N	N	Y	Y

	A	B	C	D	E
	LSAF_role_name	LSAF_role_context	LSAF_group_name	LSAF_member_type	LSAF_group_context
1	system_admin	/XbusinessunitX	system_admin	GROUP	/XbusinessunitX
2	stat_prg_dm	/XbusinessunitX	XstudyX_dm_readonly	GROUP	/XbusinessunitX
3	stat_prg_dm	/XbusinessunitX	XstudyX_stat_readonly	GROUP	/XbusinessunitX
4	stat_prg_dm	/XbusinessunitX	XstudyX_prg_readonly	GROUP	/XbusinessunitX
5	stat_prg_dm	/XbusinessunitX	XstudyX_dm	GROUP	/XbusinessunitX
6	stat_prg_dm	/XbusinessunitX	XstudyX_stat	GROUP	/XbusinessunitX
7	stat_prg_dm	/XbusinessunitX	XstudyX_prg	GROUP	/XbusinessunitX



Examples of Job - Folder Setup

Containers

Groups

Members

Roles

Permissions

Owner

The screenshot displays the 'Roles' management interface. A modal window titled 'New Role' is centered, with fields for 'Name' and 'Description'. The main interface has a sidebar with 'Contexts' and 'OCS study' tabs. The 'Roles' tab is selected in the sidebar. The main content area shows a table with columns 'Type' and 'Name', and a message 'No items are available'. On the right, there are tabs for 'Properties', 'Members', and 'Privileges', with the 'Members' tab currently active, showing a table with columns 'Type' and 'Member' and a message 'No items are available'.

- Macros API:
 - %lsaf_createrole(lsaf_path=, lsaf_role=, lsaf_description=)
 - %lsaf_addroleprivilege(lsaf_path=, lsaf_role=, lsaf_privilege=)
 - %lsaf_addrolemember(lsaf_path=, lsaf_role=, lsaf_role_context=, lsaf_member=, lsaf_type=, lsaf_group_context=)



Examples of Job - Folder Setup

Containers Groups Members Roles Permissions Owner

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
		level_1	level_2	level_3	level_4	level_5	level_6	level_7	level_8	level_9	level_10	system_admin	XstudyX_dm_readonly	XstudyX_stat_readonly	XstudyX_prg_readonly	XstudyX_dm	XstudyX_stat	XstudyX_prg
1	Type																	
2	businessunit	XbusinessunitX										ARPCD/ARPCD	-R---/-	-R---/-	-R---/-	-R---/-	-R---/-	-R---/-
3	drug		XdrugX									ARPCD/ARPCD	-R---/-	-R---/-	-R---/-	-R---/-	-R---/-	-R---/-
4	indication			XindicationX								ARPCD/ARPCD	-R---/-	-R---/-	-R---/-	-R---/-	-R---/-	-R---/-
5	study				XstudyX							ARPCD/ARPCD	-R---/-	-R---/-	-R---/-	-R---/-	-R---/-	-R---/-
6	folder					data						ARPCD/ARPCD	-R---/-R---	-R---/-R---	-R---/-R---	-R---/-R---	-R---/-R---	-R---/-R---
7	folder					metadata						ARPCD/ARPCD	-R---/-R---	-R---/-R---	-R---/-R---	-R---/-R---	-R---/-R---	-R---/-R---
8	folder					production						ARPCD/ARPCD	-R---/-	-R---/-	-R---/-	-R---/-	-R---/-	-R---/-
9	folder						data_managers					ARPCD/ARPCD	-R---/-R---	-R---/-R---	-R---/-R---	-RPC-/RPCD		
10	folder						statisticians					ARPCD/ARPCD	-R---/-R---	-R---/-R---	-R---/-R---		-RPC-/RPCD	
11	folder						programmers					ARPCD/ARPCD	-R---/-R---	-R---/-R---	-R---/-R---			-RPC-/RPCD
12	folder					staging						ARPCD/ARPCD	-R---/-	-R---/-	-R---/-	-R---/-	-R---/-	-R---/-
13	folder						data_managers					ARPCD/ARPCD	-R---/-R---	-R---/-R---	-R---/-R---	-RPC-/RPCD		
14	folder						statisticians					ARPCD/ARPCD	-R---/-R---	-R---/-R---	-R---/-R---		-RPC-/RPCD	
15	folder						programmers					ARPCD/ARPCD	-R---/-R---	-R---/-R---	-R---/-R---			-RPC-/RPCD
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30																		
31																		
32																		

input_parameters

folder_structure

create_groups

create_role

add_role_members

+



Examples of Job - Folder Setup

Containers

Groups

Members

Roles

Permissions

Owner

- Macros API:
 - %lsaf_getacls(lsaf_path=, sas_dsname=, lsaf_recursive=)
 - %lsaf_updateacls(sas_dsname=)

The screenshot displays the 'Permissions' tab of the SAS Job - Folder Setup interface. The 'Current' sub-tab is selected. The 'Owner' field is set to 'Stephan van Driel (ocs_stvand)'. Below this, the 'Permissions' section is expanded, showing a list of 'Users or Groups' and their corresponding 'Permissions'.

Users or Groups	Permissions
Owner	Admin
Members	Read
Administrators (Business Unit)	Properties Write
OCS (Drug)	Content Write
OCS study_dm (Study)	Delete
OCS study_dm_readonly (Study)	
OCS study_prg (Study)	
OCS study_prg_readonly (Study)	
OCS study_stat (Study)	
OCS study_stat_readonly (Study)	
system_admin (Study)	

Examples of Job - Folder Setup

Containers

Groups

Members

Roles

Permissions

Owner

- Macros API:
 - %lsaf_updateowner(lsaf_path=,lsaf_aclType=,lsaf_userid=)

Properties Permissions

Current Default

Owner: <creator>

Permissions ?

Users or Groups

- Owner
- Members
- Administrators (Business Unit)
- OCS (Drug)
- OCS study_dm (Study)
- OCS study_dm_readonly (Study)
- ...
- OCS study_prg (Study)
- OCS study_prg_readonly (Study)
- OCS study_stat (Study)
- OCS study_stat_readonly (Study)
- system_admin (Study)

Permissions

Admin	✓
Read	✓
Properties Write	✓
Content Write	✓
Delete	✓





Examples of Job - Folder Setup

- Folder setup SAS program(s)
 - Parameters (global SAS macros)
- Folder setup job
 - Details
 - SAS program(s)
 - Parameters
 - *Parent containers*
 - *Name of new folder(s)*
 - Inputs
 - *Metadata*
 - Outputs
 - *Master inventory file*

```
Folder setup study.sas* x +
Code Log Results Submission Inputs Submission Outputs
1  /*****
2  Program   : Folder setup study.sas
3  Author    : Stephan van Driel (OCS Consulting)
4  Location  : /CRD/OCS/OCS indication/OCS study/tools/system tools
5  Date (ISO) : 2021-08-31
6  Description : Folder setup driver of study folder.
7  *****/
8  %global name_study folder_indication; /*Global macros / Job parameters*/
9
10 %macro folder_setup_study; /*Setup study folder*/
11 /*Check if folder exists in Repository*/
12 %lsaf_exists(lsaf_path=%str(&folder_indication./&name_study.)); /*Macro API*/
13
14 /*Create study context folder if the folder does not exist*/
15 %if &_lsafExists_ = 0 %then %do;
16 /*Create study context*/
17 %lsaf_createcontext(lsaf_path=%str(&folder_indication./&name_study.),
18                    lsaf_typeid=study); /*Macro API*/
19
20 /*Get access controlled list of study context folder (permissions)*/
21 %lsaf_getacls(lsaf_path=%str(&folder_indication./&name_study.),
22              sas_dsname=work.get_acls_study,
23              lsaf_recursive=1); /*Macro API*/
24
25 /*Change access controlled list of study context folder (permissions)*/
26 data work.update_acls_study;
27 set work.get_acls_study end=eof;
28 output; /*Output current permissions*/
29 if eof then do; /*Add group to current permissions*/
30 aclType = "CURRENT";
31 aclPrincipalType = "GROUP";
32 aclPrincipalName = "prg_readonly";
33 grpSrcCtxt = "&folder_indication.";
34 adminPermission = 0;
35 readPermission = 1;
36 writePropPerm = 0;
37 writeContentPerm = 0;
38 deletePermission = 0;
39 output;
40 end;
41 run;
42
43 /*Update access controlled list of study context folder (permission)*/
44 %lsaf_updateacls(sas_dsname=work.update_acls_study); /*Macro API*/
45 %end; /*end do loop &_lsafExists_ = 0*/
46
47 %mend folder_setup_study;
48 %folder_setup_study /*Setup study folder*/
49
```

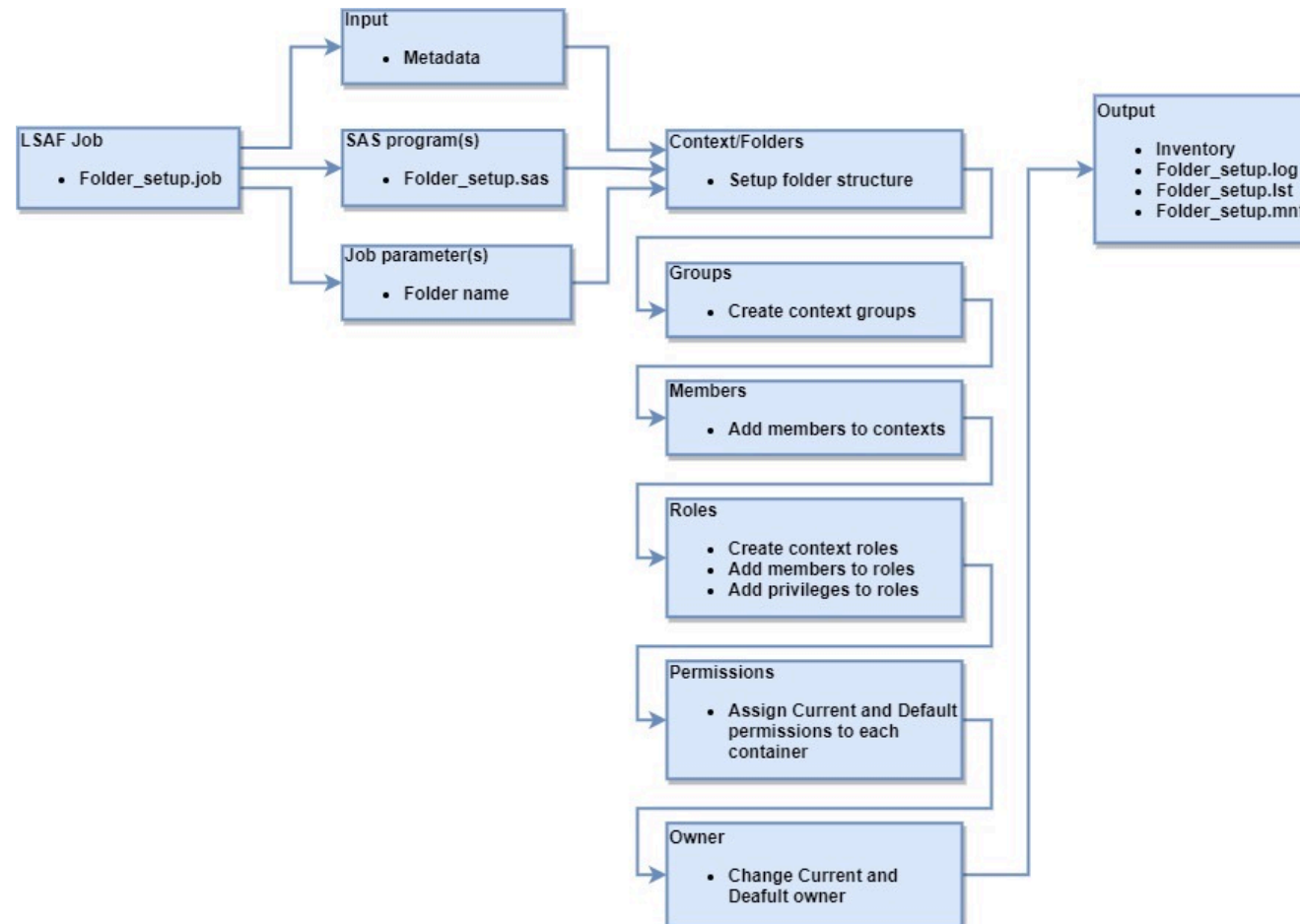


- [illegible]

Conclusion



- Create a structured, controlled and personalised LSAF environment with
 - Metadata
 - SAS programs
 - SAS Macro API
 - LSAF jobs



Thank You!



- Questions?
 - E-mail OCS Life Sciences: sasquestions@ocs-consulting.com
- PHUSE 2021 Connect LSAF presentations by OCS Life Sciences
 - SM08: Automation of Process Flow Instances
 - DH05: Utilising LSAF for data management at a Belgian biotech

