

An Open Source Reporting System for Life Sciences

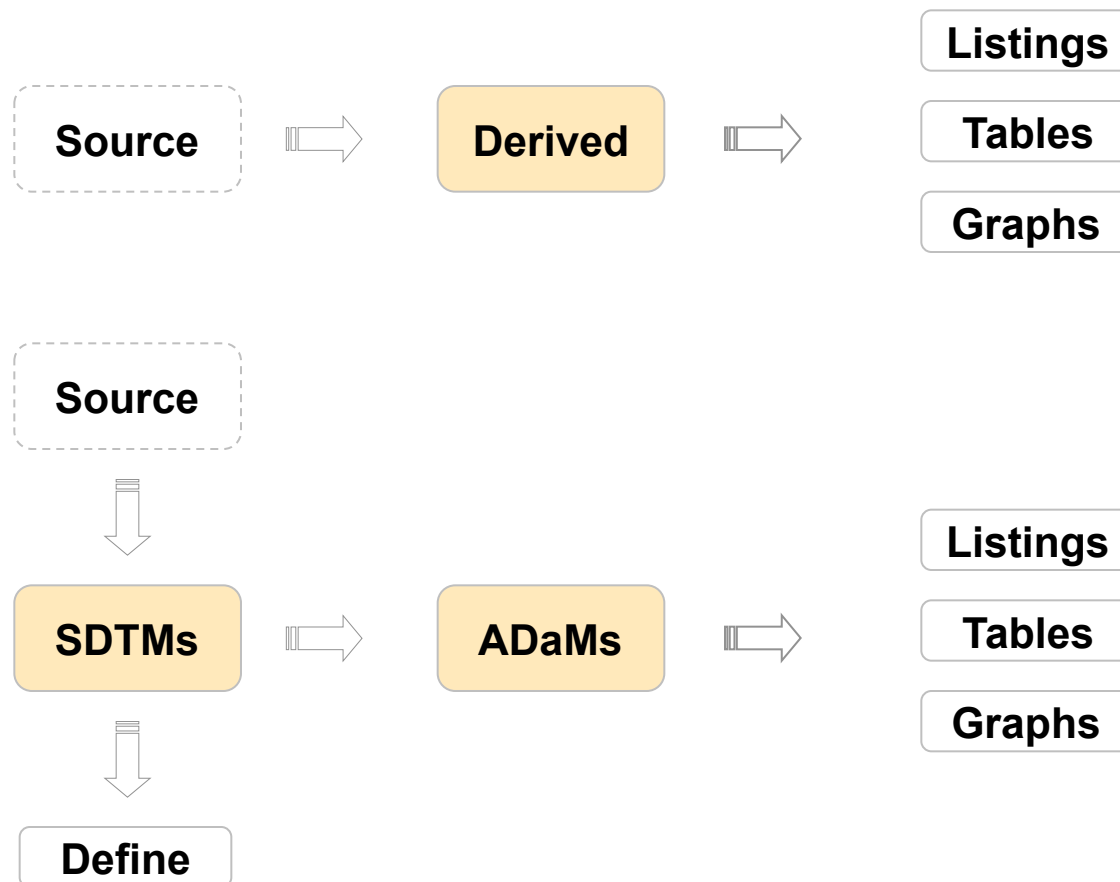
Magnus Mengelbier

Director

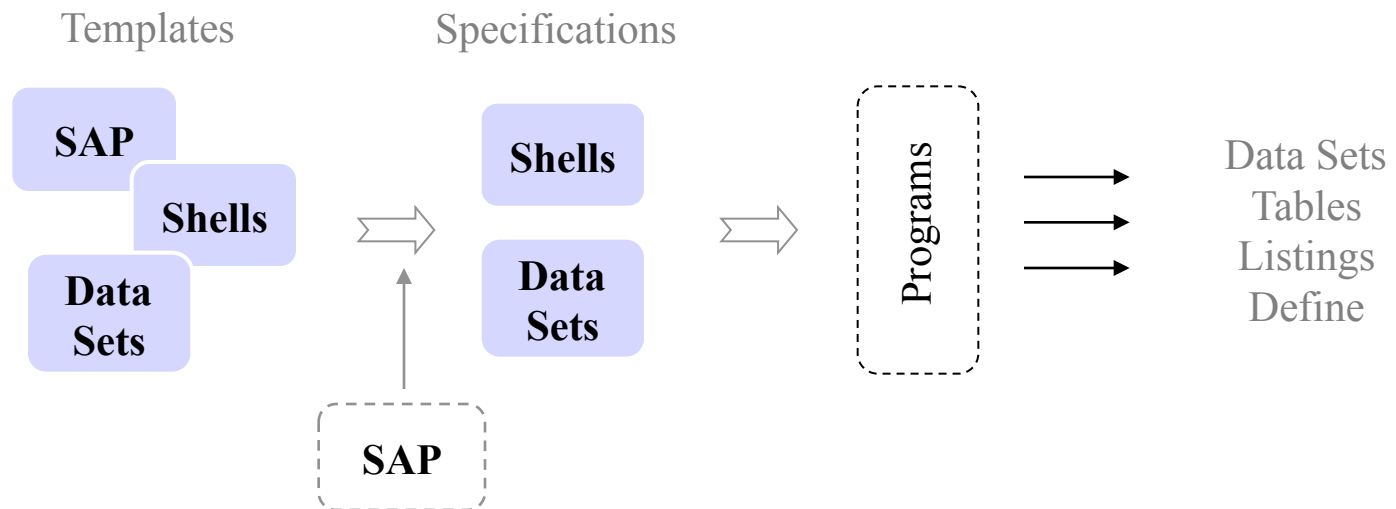
Topics

- Introduction
- Traditional process
- Library
- Analysis
- Reporting
- Connections
- Summary

Tradition



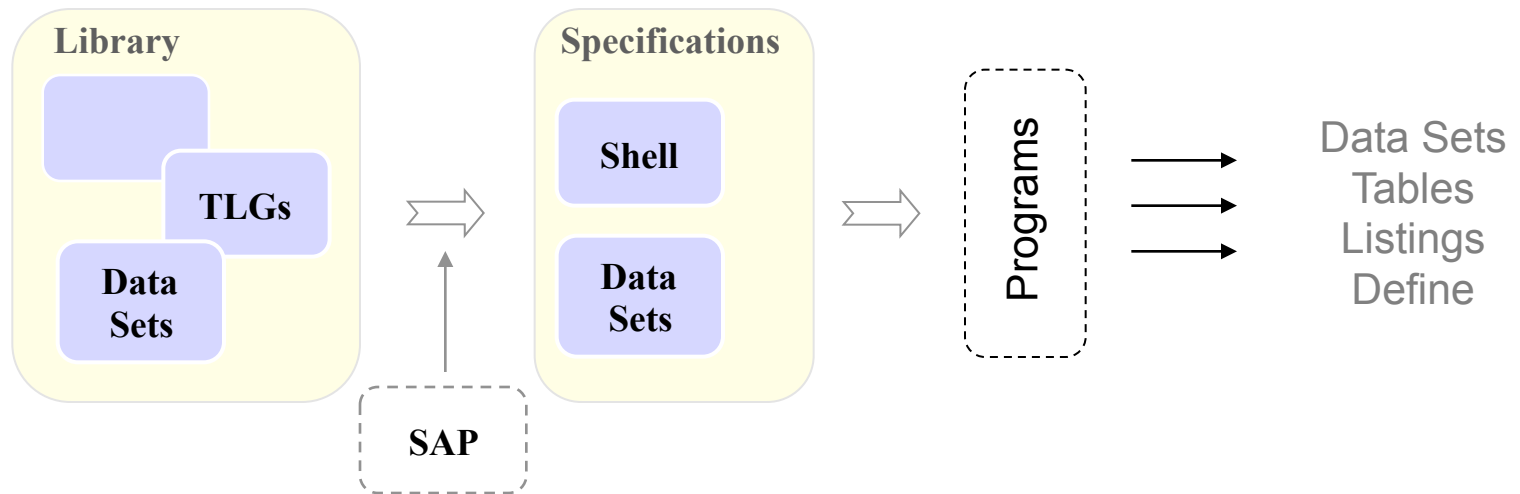
Templates and Specifications



Templates et al

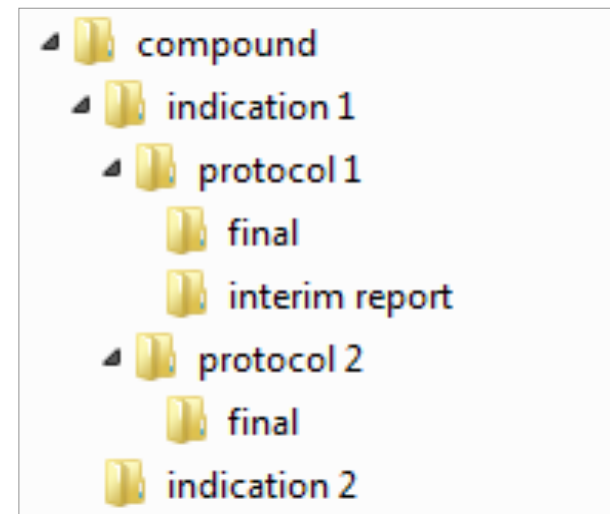
XXX-nnn Example Compound Table 15. Demographics and Baseline Characteristics All Subjects Safety Efficacy					
Demographics and Baseline Characteristics	Treatment A N = nn	Treatment B N = nn	Treatment C N = nn	Treatment D N = nn	Total N = nn
Gender					
Male	xx (xxx%)	xx (xxx%)	xx (xxx%)	xx (xxx%)	xx (xxx%)
Female	xx (xxx%)	xx (xxx%)	xx (xxx%)	xx (xxx%)	xx (xxx%)
Age (years)					
N	xx	xx	xx	xx	xx
Mean (SD)	xx.x (xx.xx)	xx.x (xx.xx)	xx.x (xx.xx)	xx.x (xx.xx)	xx.x (xx.xx)
Median	xx.x	xx.x	xx.x	xx.x	xx.x
Min - Max	xx - xx	xx - xx	xx - xx	xx - xx	xx - xx
Race					
White	xx (xxx%)	xx (xxx%)	xx (xxx%)	xx (xxx%)	xx (xxx%)
Black	xx (xxx%)	xx (xxx%)	xx (xxx%)	xx (xxx%)	xx (xxx%)
Hispanic	xx (xxx%)	xx (xxx%)	xx (xxx%)	xx (xxx%)	xx (xxx%)
Asian	xx (xxx%)	xx (xxx%)	xx (xxx%)	xx (xxx%)	xx (xxx%)
Other	xx (xxx%)	xx (xxx%)	xx (xxx%)	xx (xxx%)	xx (xxx%)
Height (cm)					
N	xx	xx	xx	xx	xx
Mean (SD)	xxx.x (xxx.xx)	xxx.x (xxx.xx)	xxx.x (xxx.xx)	xxx.x (xxx.xx)	xxx.x (xxx.xx)
Median	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x
Min - Max	xxx - xxx	xxx - xxx	xxx - xxx	xxx - xxx	xxx - xxx
Weight (kg)					
N	xx	xx	xx	xx	xx
Mean (SD)	xxx.x (xxx.xx)	xxx.x (xxx.xx)	xxx.x (xxx.xx)	xxx.x (xxx.xx)	xxx.x (xxx.xx)
Median	xxx.x	xxx.x	xxx.x	xxx.x	xxx.x
Min - Max	xxx.x - xxx.x	xxx.x - xxx.x	xxx.x - xxx.x	xxx.x - xxx.x	xxx.x - xxx.x
Specification -- Output not generated					

Library



Organizing Content

- Directory Trees
- No restriction on the number of levels
- No restriction on naming conventions
- Contexts
- Aware of parent directory



- Contexts have to be consistent within a directory tree
- Directory tree can be your departmental drive or network share

Default Defintions

- Data Sets
- Tables
- Listings
- Graphs

VIEWTABLE: sashelp.class					
	Name	Sex	Age	Height	Weight
1	Alfred	M	14	69	112.5
2	Alice	F	13	56.5	84
3	Barbara	F	13	65.3	98
4	Carol	F	14	62.8	102.5
5	Henry	M	14	63.5	102.5
6	James	M	12	57.3	83
7	Jane	F	12	59.8	84.5

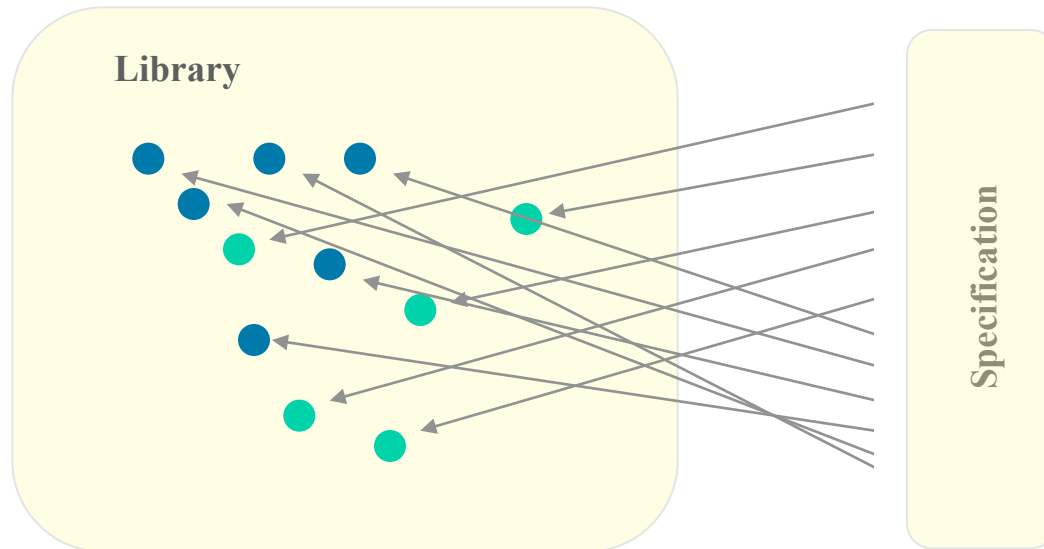
XXX-nnn Example Compound				112.5
Table 15. Demographics and Baseline Character				84
All Subjects Safety Efficacy				99.5
Demographics and Baseline Characteristics	Treatment A N = nn	Treatment B N = nn	Treatment C N = nn	50.5
Gender				88
Male	xx (xxx%)	xx (xxx%)	xx (xxx%)	
Female	xx (xxx%)	xx (xxx%)	xx (xxx%)	
Age (years)				
N	xx	xx	xx	
Mean (SD)	xx.x (xx.xxx)	xx.x (xx.xxx)	xx.x (xx.xxx)	
Median	xx.x	xx.x	xx.x	
Min - Max	xx - xx	xx - xx	xx - xx	
Race				

Definitions and Inheritance

- Types of definition controlled for each level
- Definitions can be inherited from parent to child levels

Report	x	x		x	x
Study		x	x		x
Indication					
Project					
Global	x	x		x	
	STUDYID	AGE	FEDFAST	Data Set AE	Data Set XY

Specifications



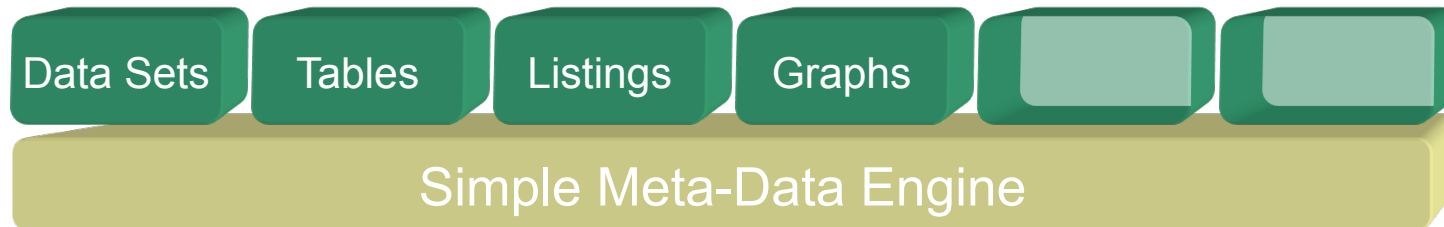
- A Specification is just a set of links to content in the Library
- All Definitions have to be in the Library

A Comparison of Defintions

VIEWTABLE: sashelp.class					
	Name	Sex	Age	Height	Weight
1	Alfred	M	14	69	112.5
2	A				
3	B				
4	C				
5	H				
6	J				
7	J				
8	J				
9	J				
10	J				
11	J				
12	J				

XXX-nnn Example Compound				
Table 15. Demographics and Baseline Character				
All Subjects Safety Efficacy				
Demographics and Baseline Characteristics		Treatment A N = nn	Treatment B N = nn	Treatment C N = nn
Gender				
Male		xx (xxx%)	xx (xxx%)	xx (xxx%)
Female		xx (xxx%)	xx (xxx%)	xx (xxx%)
Age (years)				
N		xx	xx	xx
Mean (SD)		xx.x (xx.xxx)	xx.x (xx.xxx)	xx.x (xx.xxx)
Median		xx.x	xx.x	xx.x
Min - Max		xx - xx	xx - xx	xx - xx
Race				

Repository



- Model – View – Controller (MVC) design pattern
 - Model – Meta-data
 - View – Graphical and programming interface
 - Controller – "Administrator" of the meta-data
- Very primitive and flexible meta-data engine

Repository - Definitions

- Definitions
 - Type, e.g Data Set, Table, etc.
 - Identified by Type and Name
- References and associations to other meta-data items
 - Look-up
 - Ordered list
- Versions
 - Increment
 - Construct for a unique reference to variations of the same item
 - More than one version is selectable
 - Future plans include major/minor versions

Repository – Data Set

Attribute	Value
Name	CLASS
Label	Class
Sort order	
Key sequence	

VIEWTABLE: sashelp.class					
	Name	Sex	Age	Height	Weight
1	Alfred	M	14	69	112.5
2	Alice	F	13	56.5	84
3	Barbara	F	13	65.3	98
4	Carol	F	14	62.8	102.5
5	Henry	M	14	63.5	102.5
6	James	M	12	57.3	83
7	Jane	F	12	59.8	84.5
8	Janet	F	15	62.5	112.5
9	Jeffrey	M	13	62.5	84
10	John	M	12	59	99.5
11	Joyce	F	11	51.3	50.5

Sequence	Reference
1	NAME
2	SEX
3	AGE
4	HEIGHT
5	WEIGHT

Collections

Repository – Table (1)

XXX-nnn Example Compound Table 15. Demographics and Baseline Character All Subjects Safety Efficacy			
Demographics and Baseline Characteristics	Treatment A N = nn	Treatment B N = nn	Treatment C N = nn
Gender			
Male	xx (xxx%)	xx (xxx%)	xx (xxx%)
Female	xx (xxx%)	xx (xxx%)	xx (xxx%)
Age (years)			
N	xx	xx	xx
Mean (SD)	xx.x (xx.xx)	xx.x (xx.xx)	xx.x (xx.xx)
Median	xx.x	xx.x	xx.x
Min - Max	xx - xx	xx - xx	xx - xx
Race			

Repository – Table (2)

Age (years)		
N	xx	xx
Mean (SD)	xx.x (xx.xx)	xx.x (xx.xx)
Median	xx.x	xx.x
Min - Max	xx - xx	xx - xx

Attribute	Value
Name	AGE
Label	Age (years)
Link	DM.AGE

Attribute	Value
Name	N
Label	N
Format	[2]
Decimals	[0]

Attribute	Value
Name	MEAN_SD
Label	Mean (SD)
Template	MEAN (SD)

Repository – Table (3)

Age (years)		
N	xx	xx
Mean (SD)	xx.x (xx.xx)	xx.x (xx.xx)
Median	xx.x	xx.x
Min - Max	xx - xx	xx - xx

- ✓ N
- ✓ MEAN_SD
- ✓ MEDIAN
- ✓ MIN-MAX



- ✓ N
- ✓ MEAN_SD
- ✓ MEDIAN
- ✓ MIN-MAX
- ✓ MEAN
- ✓ SD
- ✓ MIN
- ✓ MAX

Analytics

- ✓ Meta-data driven
- ✓ Standard statistics

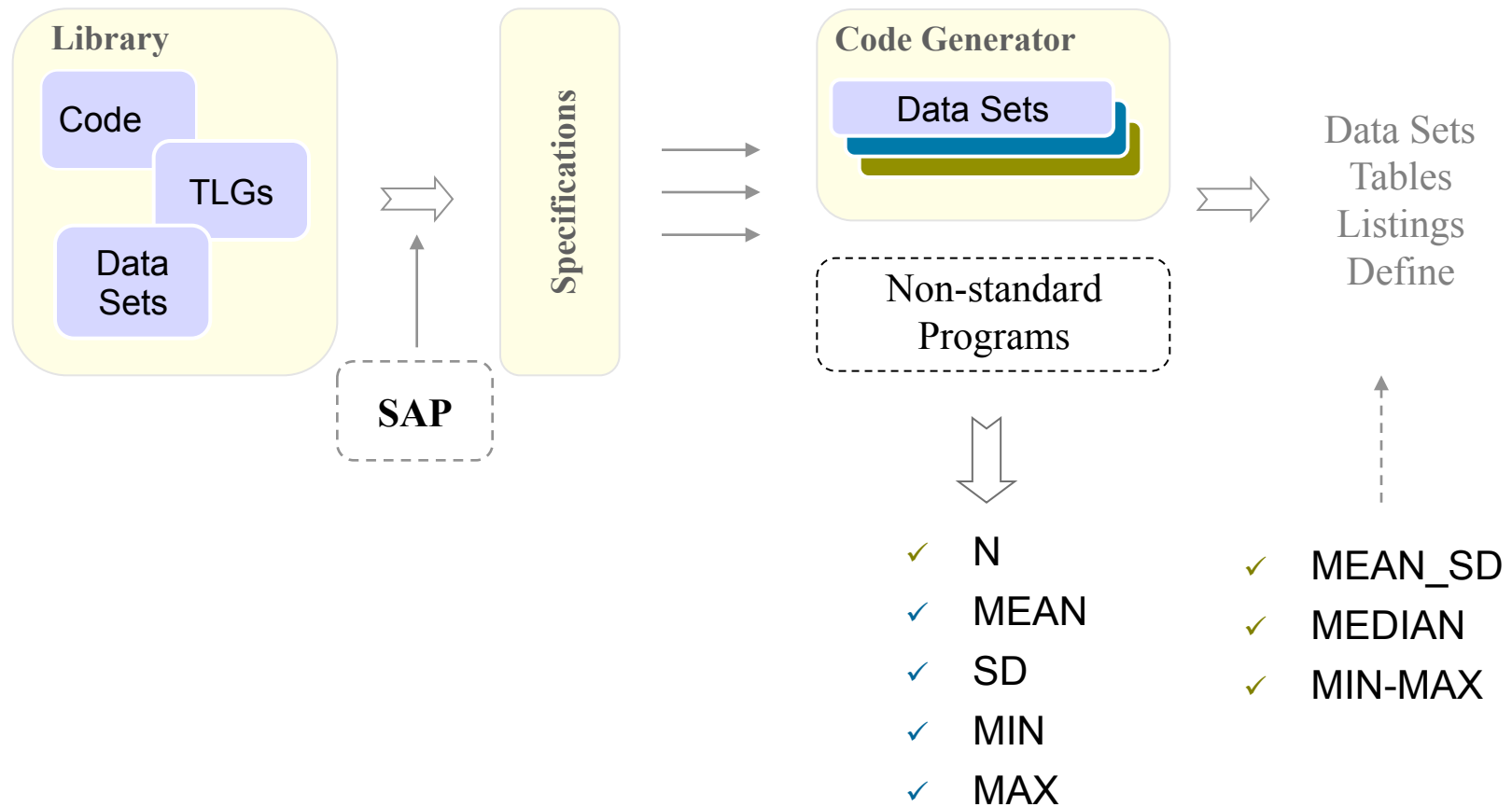


- Statistics “meta-data” interface
- Requires an analytics engine (SAS/R/S-Plus)

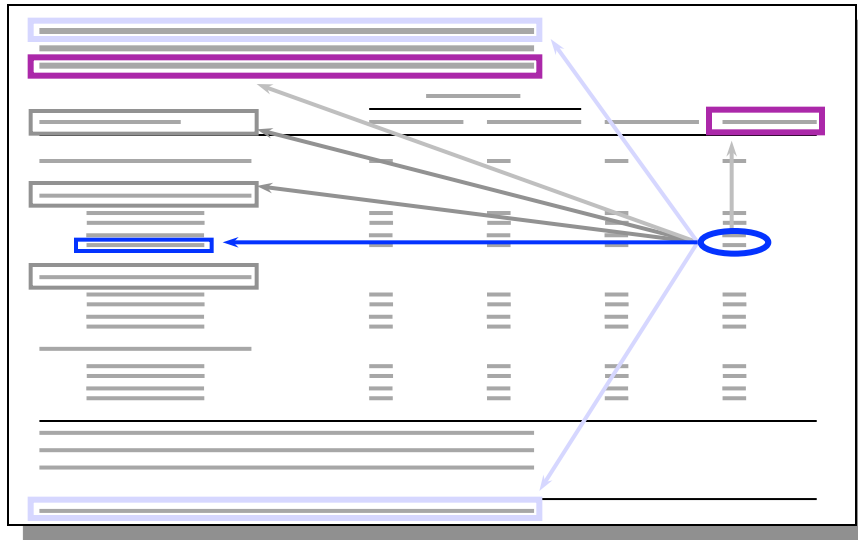


- Code library
- Code generators

Analytics



Reporting By Elements



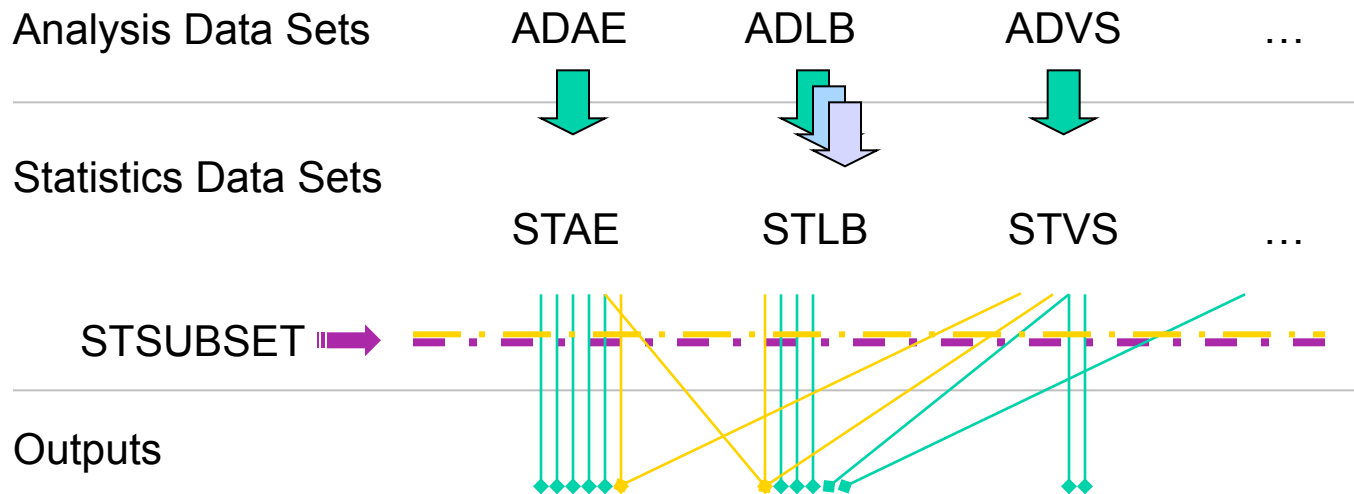
Library

Analytics

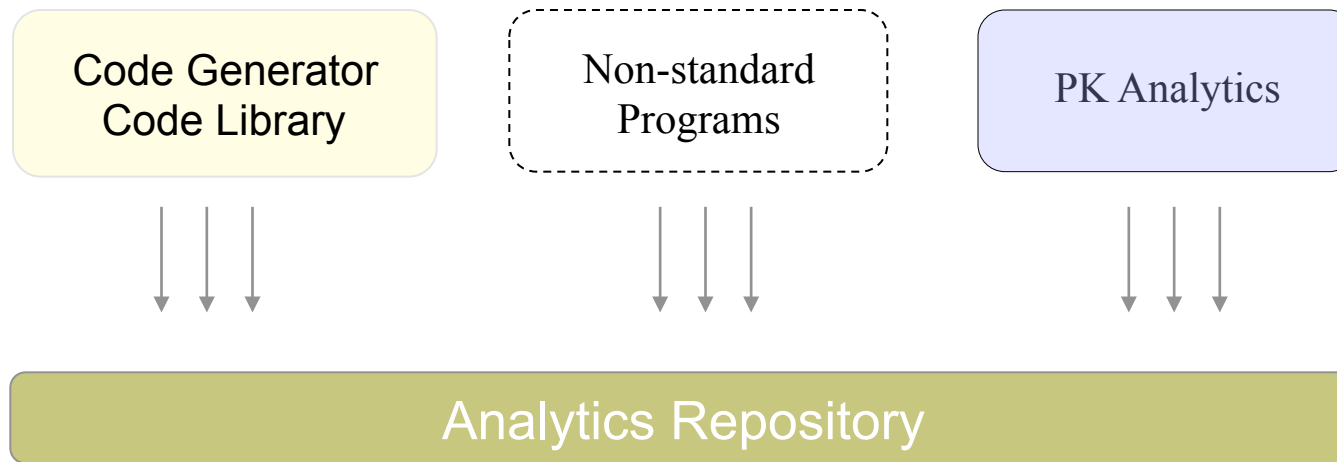
Reporting

- Data
 - Input Data Set
 - Select Parameter(s)
 - Subset
- Summaries & Statistics
 - Compute
 - Append
 - Format
- Render Table
 - Report structure
 - Format
 - Sort & Order
 - Render

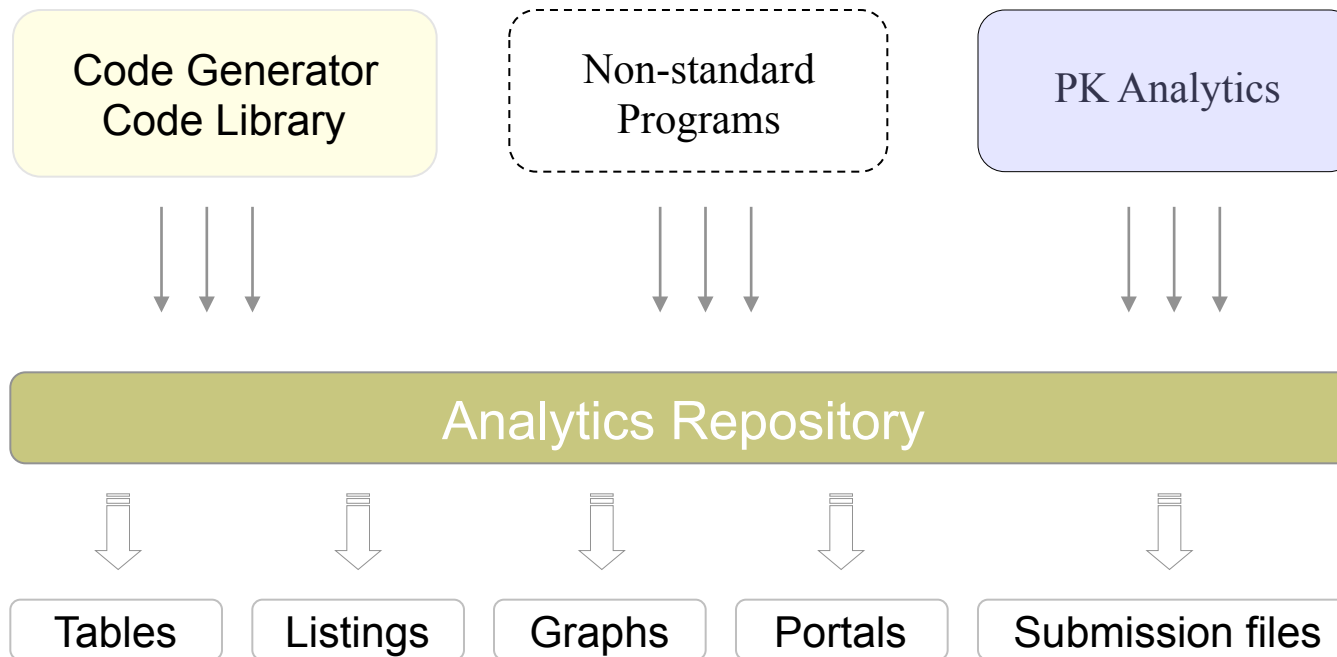
Reporting by Elements



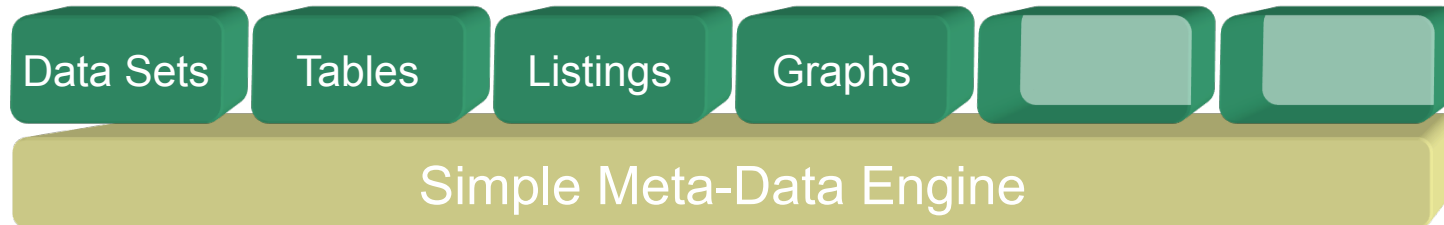
Analytics Repository



Reporting Results

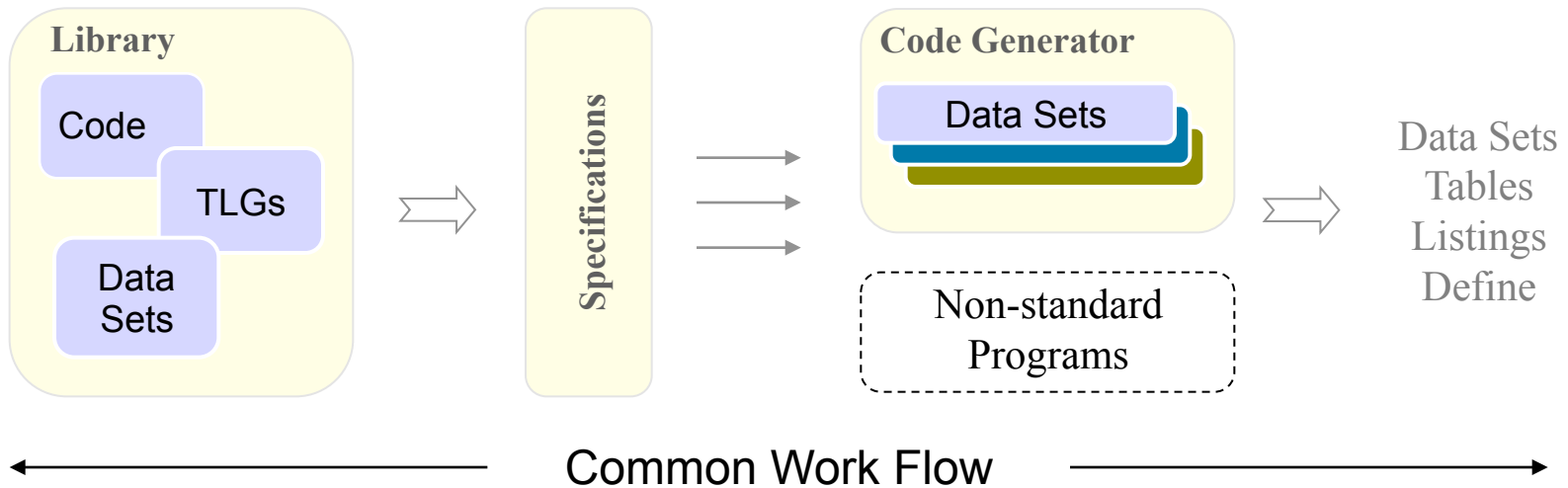


Other Outputs



- Model – View – Controller (MVC) design pattern
 - Model – Meta-data
 - View – Graphical and programming interface
 - Controller – "Administrator" of the meta-data
- Very primitive and flexible meta-data engine
- Adding an output starts with a Model, View and Controller(s)

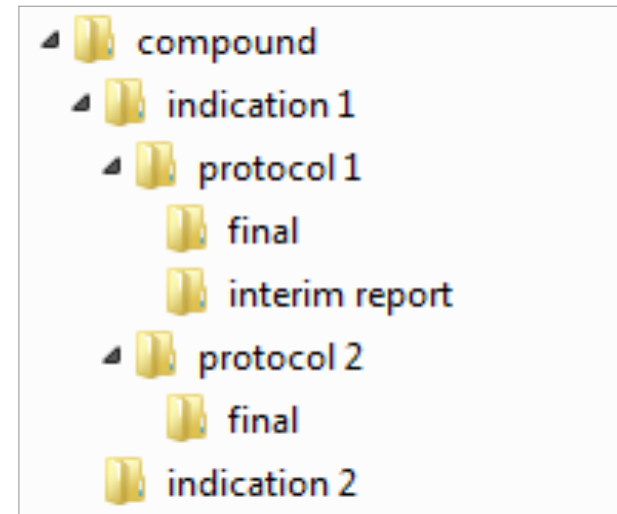
Tracking and Status



- Track status
- Track and enforce dependencies

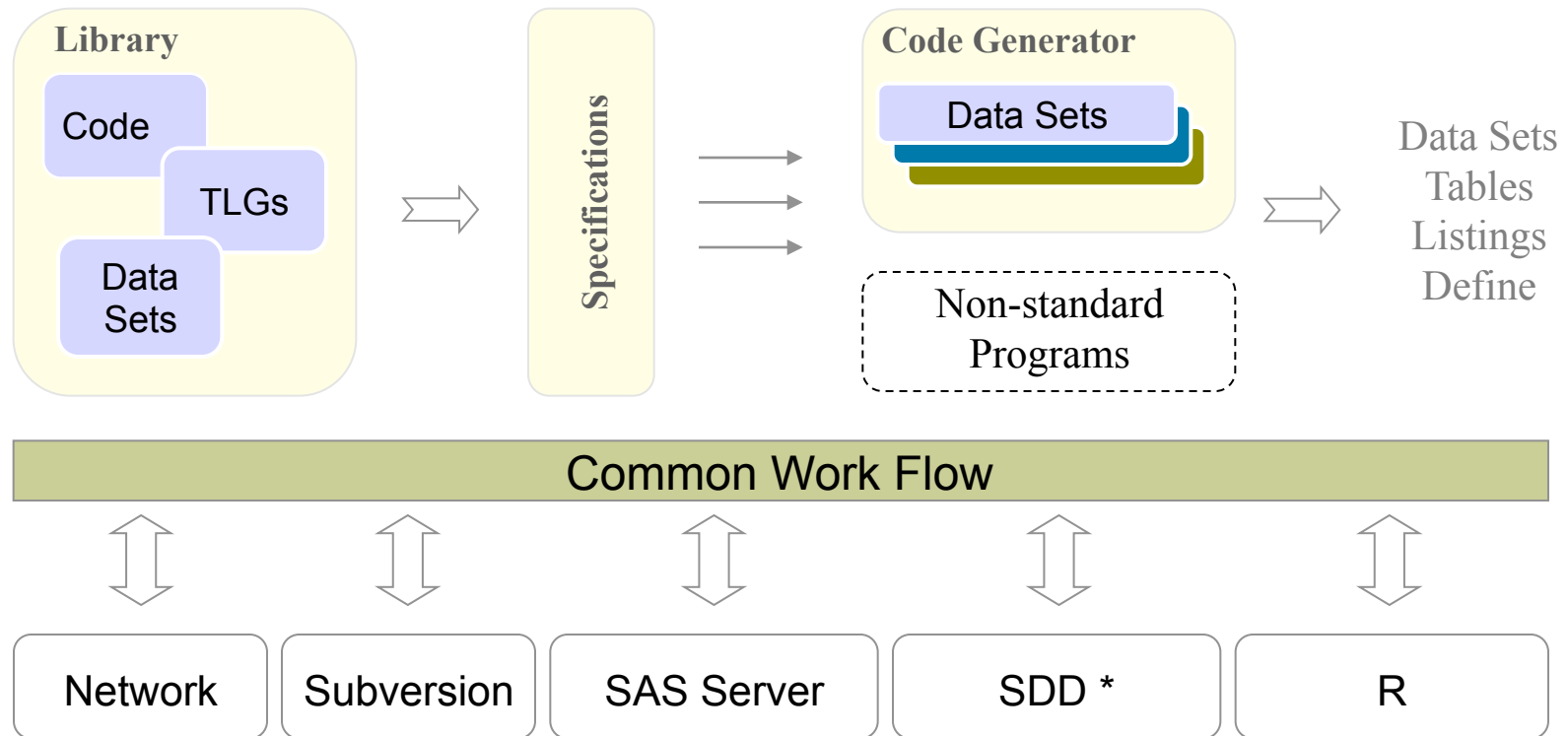
Organization Revisited

- Directory Trees
- No restriction on the number of levels
- No restriction on naming conventions
- Contexts
- Aware of parent directory



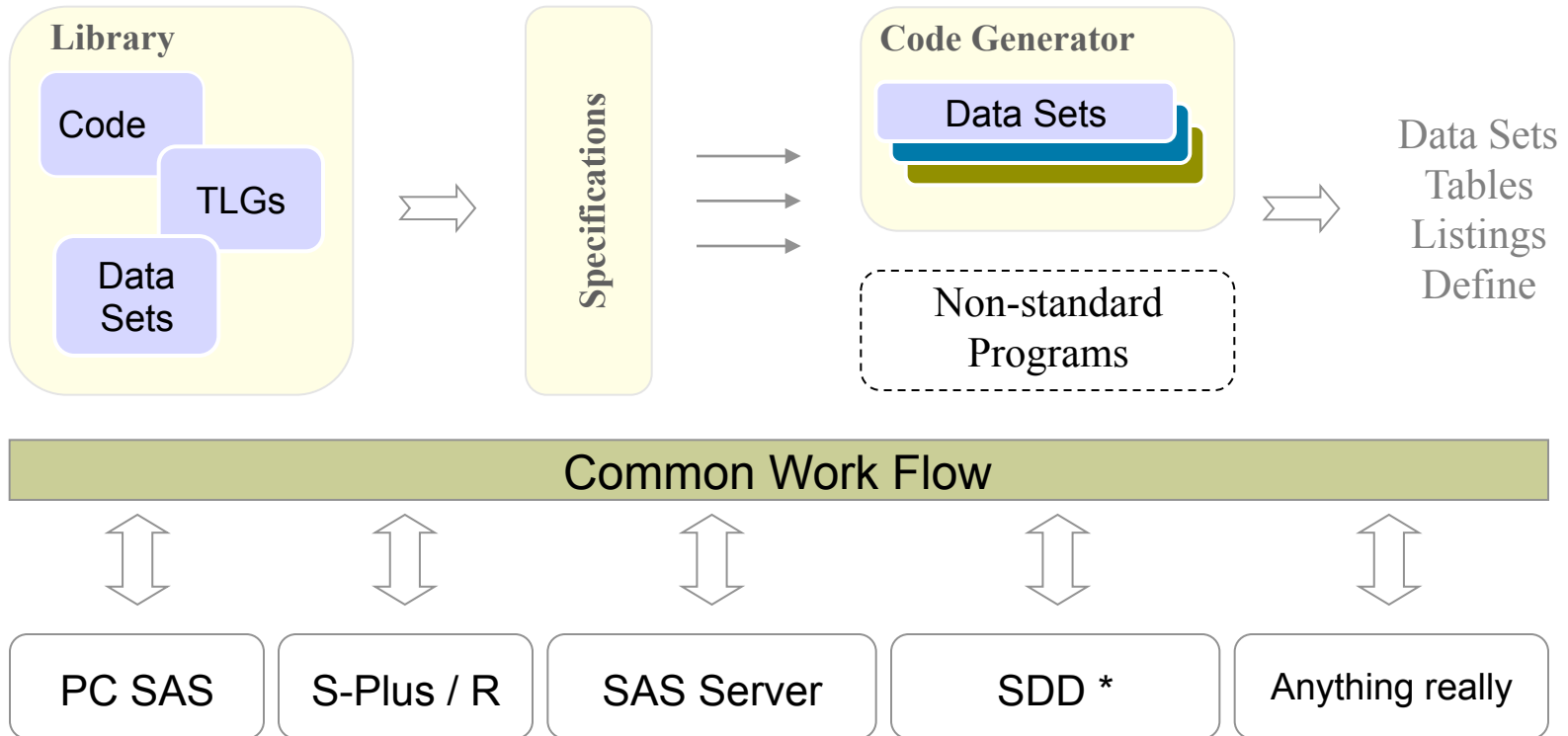
- Contexts have to be consistent within a directory tree
- Directory tree can be your departmental drive or network share

Connections



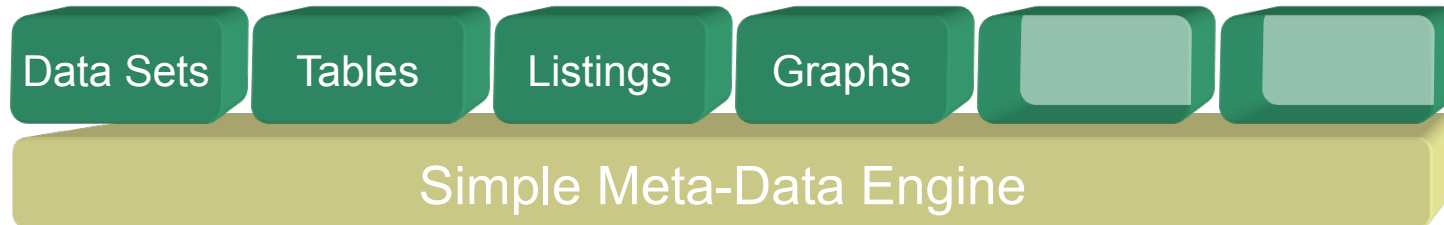
* SAS Drug Development

Web Services



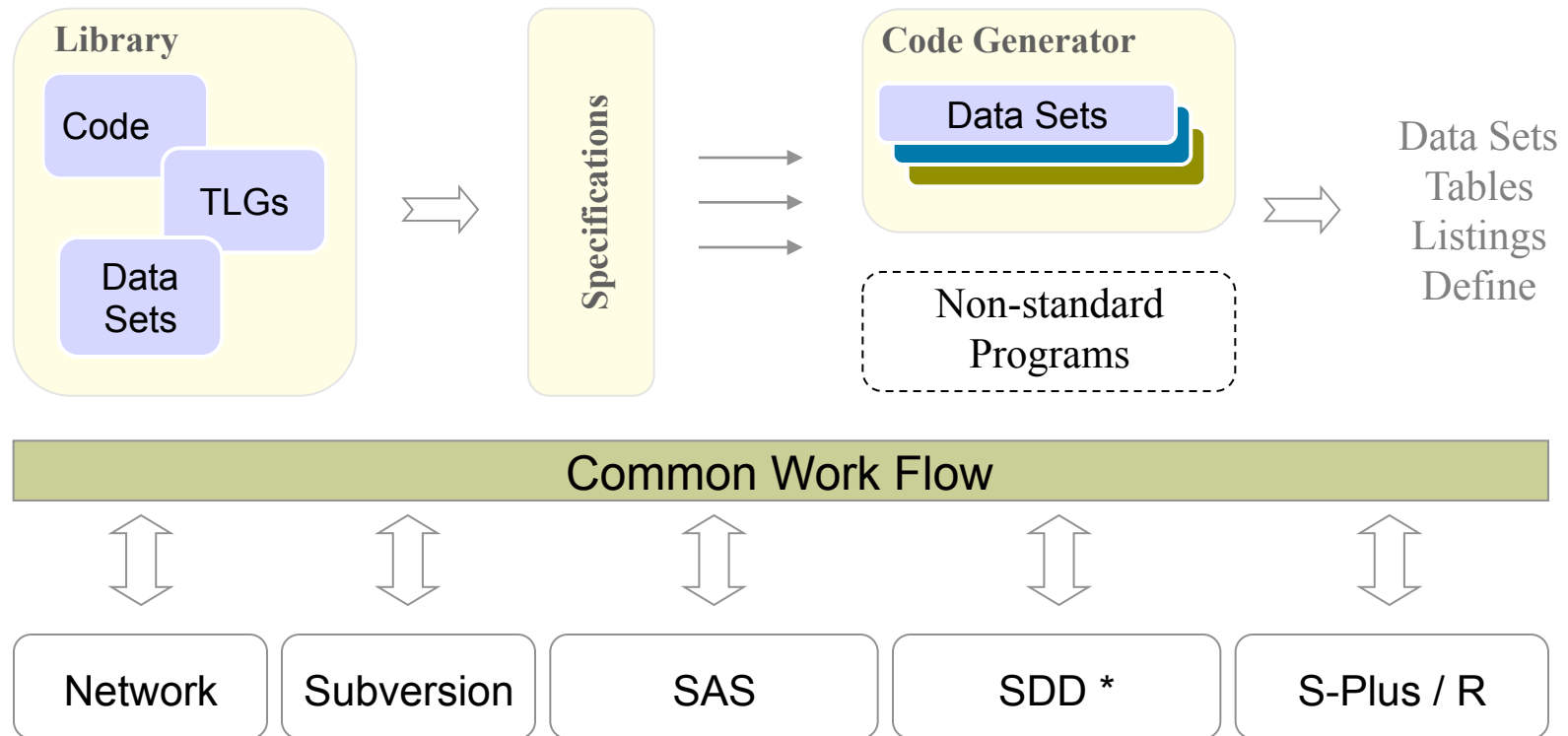
* SAS Drug Development

Conclusion



- Model – View – Controller (MVC) design pattern
 - Model – Meta-data
 - View – Graphical and programming interface
 - Controller – "Administrator" of the meta-data
- Very primitive and flexible meta-data engine
- Adding an output starts with a Model, View and Controller(s)

Conclusion



* SAS Drug Development

Questions & Comments

- Introduction
- Traditional process
- Library
- Analysis
- Reporting
- Connections
- Summary

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THE END