



TT11: Building a Scalable Utility Service to Make Multi-lingual Applications Available to the Masses!

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Helping people live better lives

Introduction

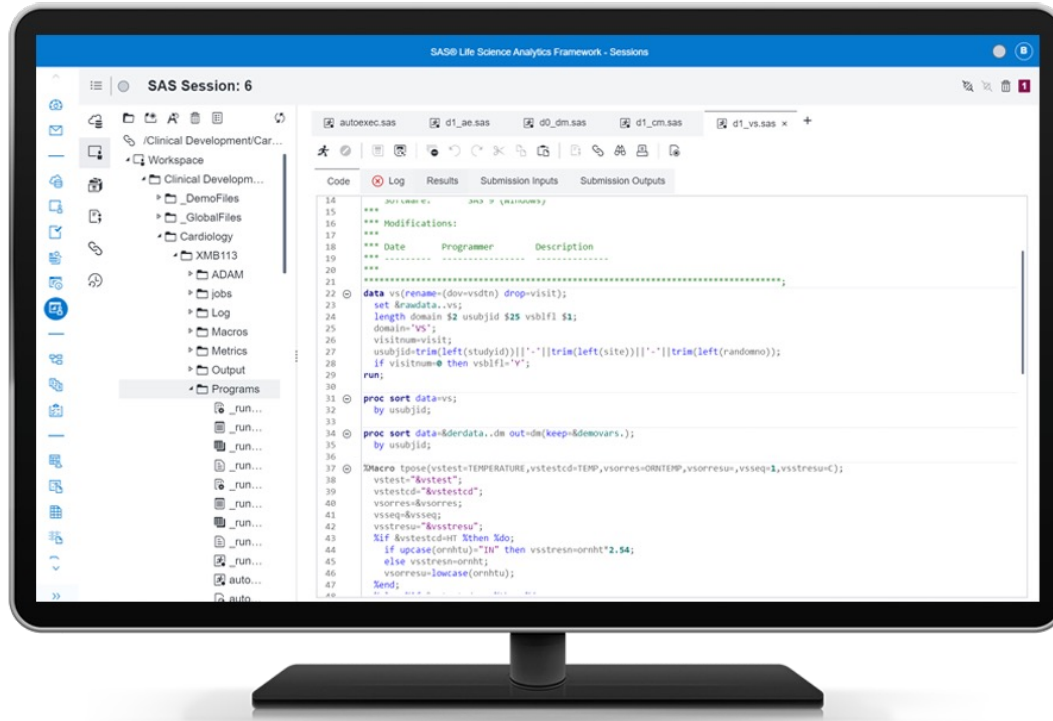
Evolving tech landscape

- Push towards a diverse tech stack
- Going away from one-size-fits all
- Towards co-existing technologies
- How do we make new tools available to colleagues?
 - Not like sharing a SAS macro...
 - Share with a non X programmer



Introduction

Our tech landscape



Introduction

Our tech landscape

SAS® Life Science Analytics Framework

- Statistical Computing Environment (SCE)
- Data repository
- SAS + (R)

MS Azure cloud platform

- Virtual machines
- Host applications
- All open source tools (R, Python, ...)

→ How do we best expose solutions developed on the Azure platform?

→ Stay innovative, but leave no one behind

Use case

Validation of End-Of-Text packages

- The EOT packages are one of the core trial deliveries for statistical programmers
 - Presented in tables, listings, and figures
 - Large Word documents, 1000+ pages
 - Data is continuously updated
 - Validation necessary to secure correct and consistent information
 - Manual and time-consuming process with many stakeholders
- Python based solution
- Git-compare-like report of changes

Use case

Looking towards the future

- Potential for many similar applications
- Efficient development
 - Easier to implement the next idea
 - Re-use of architecture
- Efficient sharing
 - Easy to use new application
 - User friendly interface
 - Reduce need for training



Use case

General Utility Service

1. Bridge between LSAF and Azure
2. No coding required by the user
3. Economics of scale for future development
4. Scope: Ad hoc tasks



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Biometrics Utility Service Terminal

The service enables the developer to build smaller containerized applications to process these tasks in their favorite language (R, Python, or any other), and make them readily available to their colleagues, without them being required to have any knowledge of the inner workings or language of the application.

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Login

Biometrics Utility Service Terminal

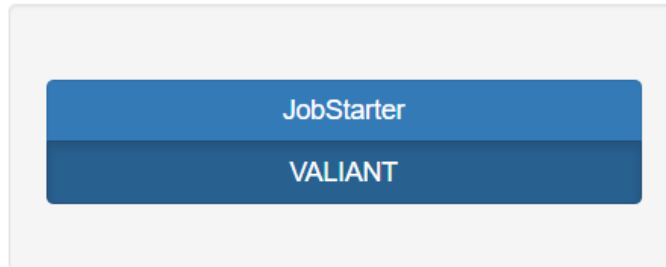
Login with your LSAF credentials

Username

Password

Login

Biometrics Utility Service Terminal



VALIANT

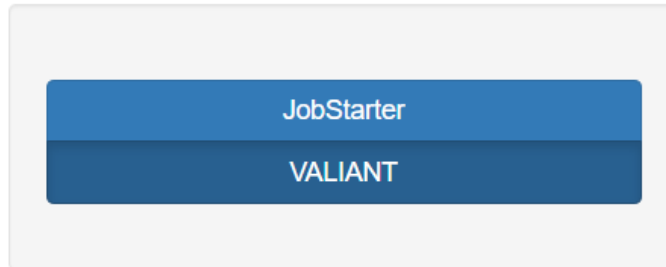
Validation of Analysis Tables - a tool to compare and validate summary tables and/or listings

Input

Base file (full path in LSAF)

File for comparison (full path in LSAF)

Biometrics Utility Service Terminal



VALIANT

Validation of Analysis Tables - a tool to compare and validate summary tables and/or listings

Input

Base file (full path in LSAF)

File for comparison (full path in LSAF)

Result

Job status: **completed**

Summary:

- original_line_nr: 28
- compare_line_nr: 28
- changes: 6
- additions: 1
- removals: 1

Full report in LSAF: [Link](#)

f	1	Body measurements by age stratum and visit - FAS						f	1	Body measurements by age stratum and visit - Full Analysis Set					
n	2							n	2						
	3								3						
n	4	Age stratum: All						n	4	Age stratum: Both					
	5								5						
	6								6						
	7	Placebo	Trt 1	Trt 2	Trt 3	Total		7	Placebo	Trt 1	Trt 2	Trt 3	Total		
	8	(N=107)	(N=111)	(N=103)	(N=97)	(N=418)		8	(N=107)	(N=111)	(N=103)	(N=97)	(N=418)		
	9								9						
	10								10						
n	11	Screening						n	11	Screening visit					
	12								12						
	13	Height (m)							13	Height (m)					
n	14	n	108	111	103	97	418	n	14	n	107	111	103	97	418
	15	Mean (SD)	1.65 (0.07)	1.65 (0.07)	1.66 (0.07)	1.67 (0.07)	1.65 (0.07)		15	Mean (SD)	1.65 (0.07)	1.65 (0.07)	1.66 (0.07)	1.67 (0.07)	1.65 (0.07)
n	16	Median	1.65	1.65	1.66	1.67	1.66	n	16	Min; max	1.5; 1.9	1.5; 1.8	1.5; 1.8	1.5; 1.8	1.5; 1.9
	17								17						
	18	Weight (kg)							18	Weight (kg)					
	19	n	107	111	103	97	418		19	n	107	111	103	97	418
	20	Mean (SD)	63.7 (8.9)	65.7 (10.4)	64.3 (9.6)	65.8 (12.0)	65.3 (10.7)		20	Mean (SD)	63.7 (8.9)	65.7 (10.4)	64.3 (9.6)	65.8 (12.0)	65.3 (10.7)
t	21	Median	62.6	63.8	63.0	62.6	63.0	t	21	Min; max	44; 90	47; 93	46; 99	43; 100	43; 110
	22								22						
	23								23						
	24	N = Number of subjects							24	N = Number of subjects					
	25	n = Number of subjects with observation							25	n = Number of subjects with observation					
	26								26						
	27	FEXXXXXX/YYYYYY/Report/DDMONYYYY-INIT/T_ADBL.sas							27	FEXXXXXX/YYYYYY/Report/DDMONYYYY-INIT/T_ADBL.sas					
	28								28						

Legends

Colors	Links
Added	(f)first change
Changed	(n)ext change
Deleted	(t)op

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Architecture - Components

Data repository:

- SAS® Life Science Analytics Framework (LSAF)
→ Access content using REST API

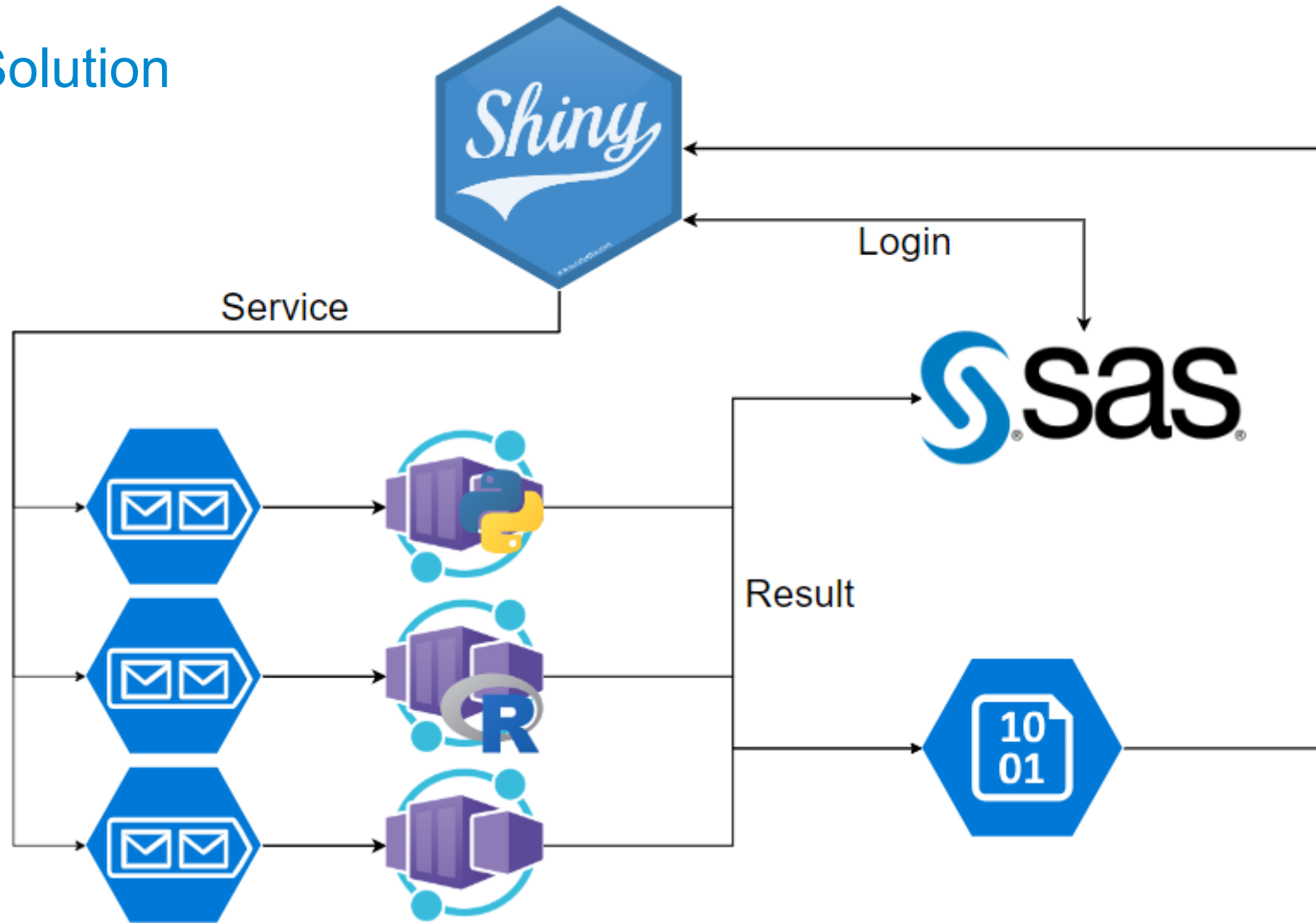
Cloud computing:

- MS Azure
- Storage account
 - Containers for semi-persistent storage
 - Queues for job information
- Container apps
 - Host Docker applications
 - Scaling with demand



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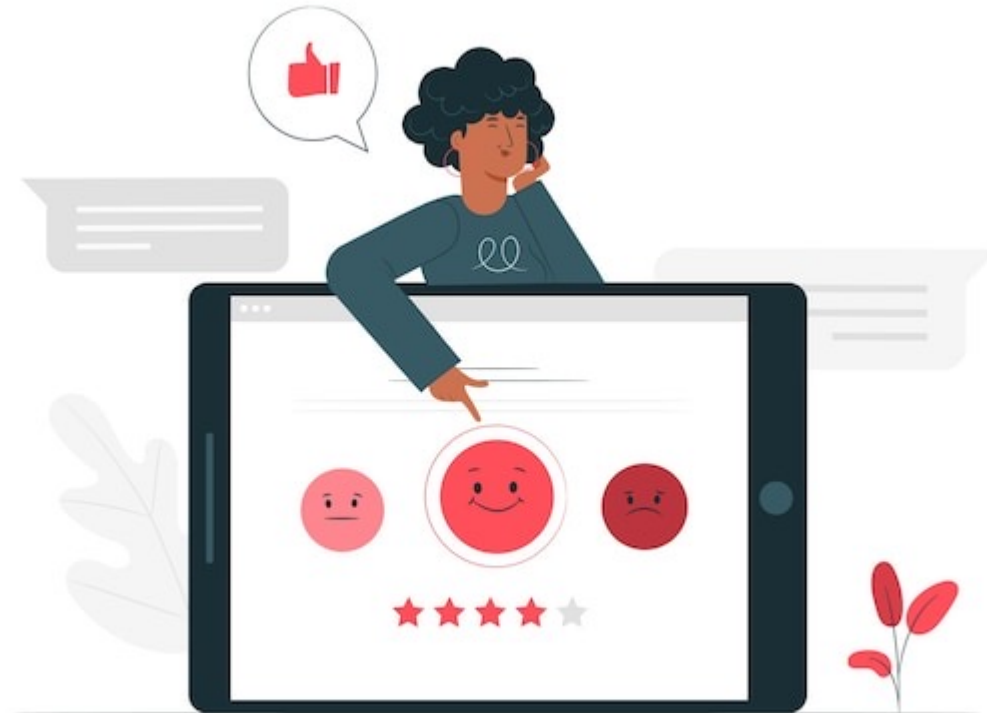
Architecture - Solution



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Next steps

- Broad user testing ongoing
- Implement feedback
 - Useability
 - Need for training/documentation
- Add new services
 - Administrative/ setup jobs
 - Creation of the EOT package



Reflections

- Azure has a steep learning curve
 - First mover in new GXP environment
 - New for both us and IT!
 - Large IT overhead in initial development
- Coding the first app is quick
- Secure infrastructure takes time
- Container apps are brilliant!
- Good infrastructure pays off!
 - Can go from script to app in a few hours!



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