

A Journey to Adopting Open Source More Openly Across Organisations

Magnus Mengelbier
Managing Director

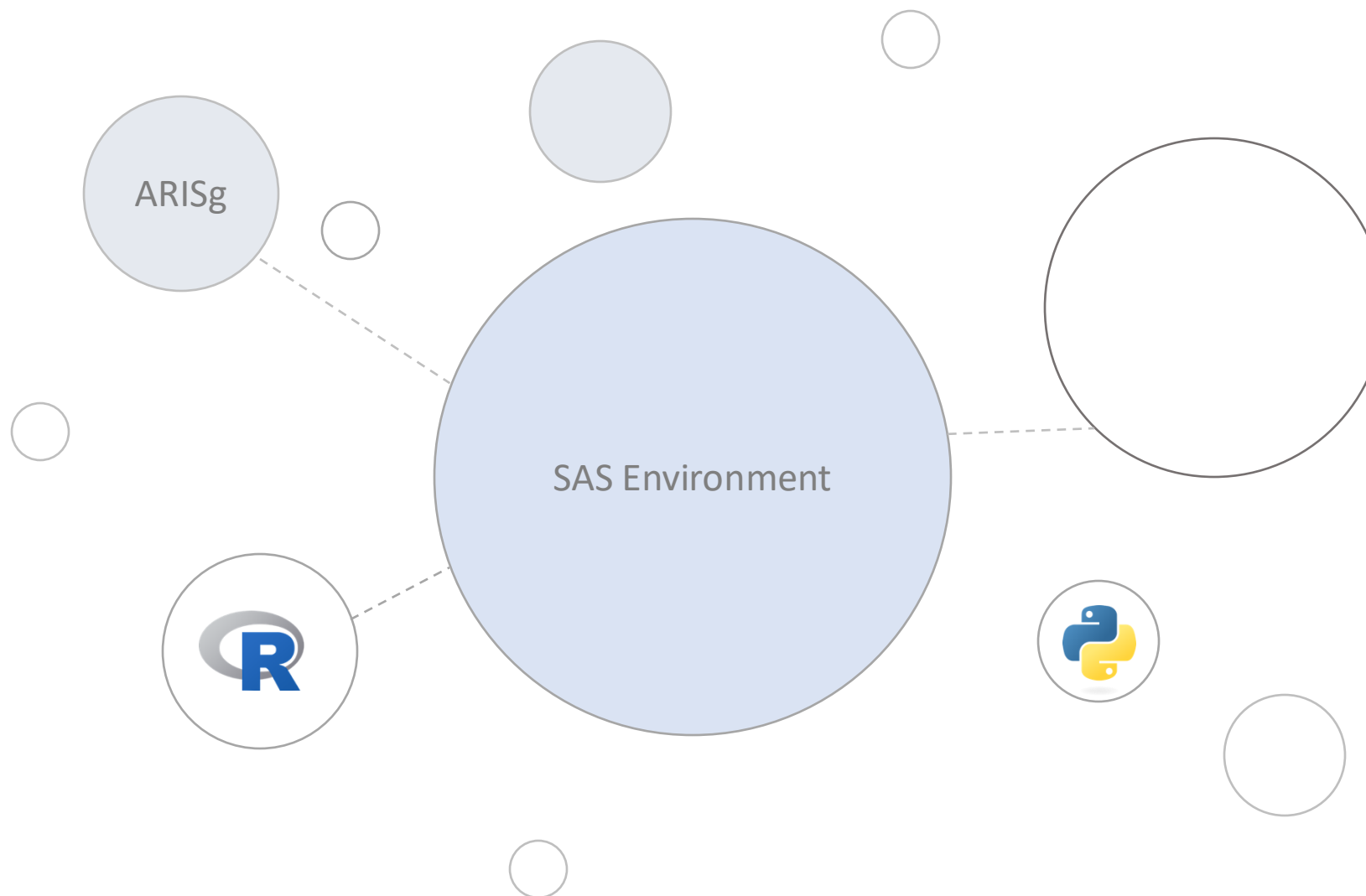
Topics

- Introduction
- Silos and satellites
- Buy versus build
- Compliance and validation
- Compromise
- Open
- Conclusion

The beginning



A few years later ...





Buy versus Build

Buy

- Example: SAS
- Commercial license
- Initial install = All capabilities
- Question ... What if ?
- Next generation 3-5 years

Build

- Example: R
- Open-source
- Initial install = Totally empty
- Same question ... What if?
 - R package = capability
 - CRAN 20 000+
 - Bioconductor 20 000+
 - Which packages ... curated by your organization
- Continuous update
- Next generation 1-2 years
 - R version update: Minor release on an annual cycle
 - Recommended R version update ... bi-annual

Everything has a cost

- No license fee *
- Risk
- Knowledge and skill development
- New support processes
- New communication channels
- Changes Business risk

$$\text{Trust} = 1 - \text{Risk}$$



Validation is a matter of perspective

Analysis Application (think SAS)

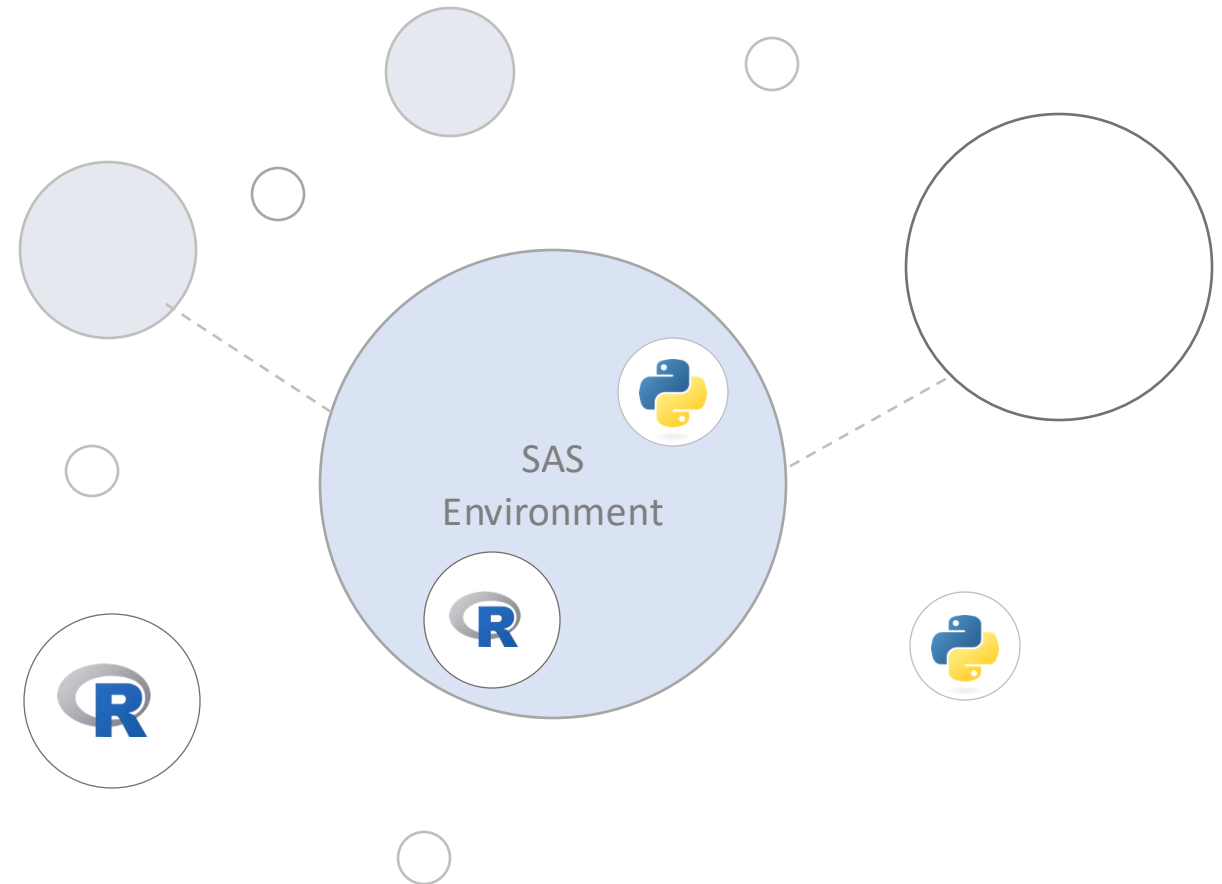
- Initial deployment is the core set of capabilities
- Packages ...
 - Modules
 - Adds and modifies capabilities (ex. R generic methods and re-define anything)
- GAMP v5 Category 4 (Configurable software)
- Validate configurations
- Complex allocation of risk

Python and R as a Language

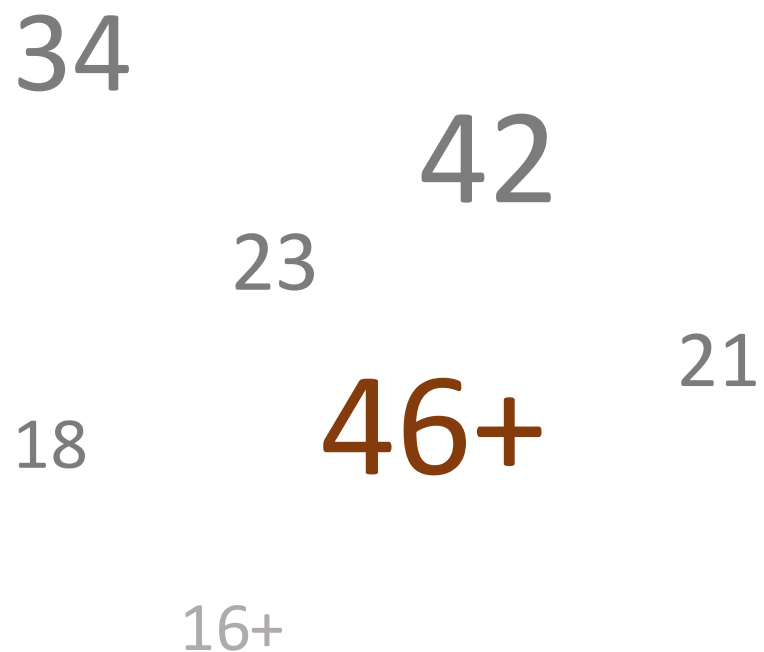
- It's a language
- Packages ...
 - Natural language extensions
 - Frameworks and methods
- GAMP v5 Category 1
- Validate methods
- Managing risk is the business process

One environment for all

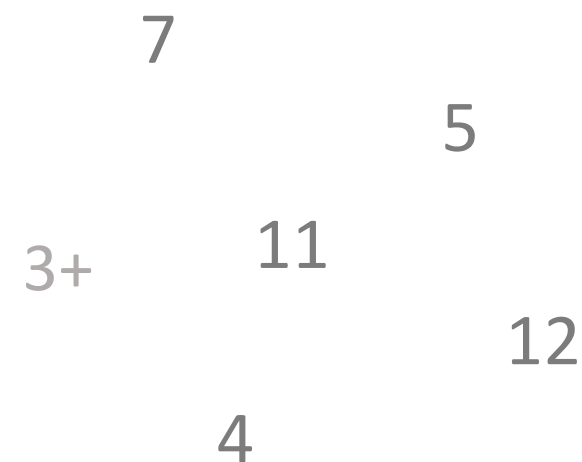
- A new language in an existing environment
- Parent environment dictates the rules
 - Directory structure
 - Grant/Revoke permissions
 - Available language versions
 - Available packages
 - Update cycles
 - Permitted/Restricted use
 - User interfaces
- Central environment
 - Any update impacts all users



Two perspectives



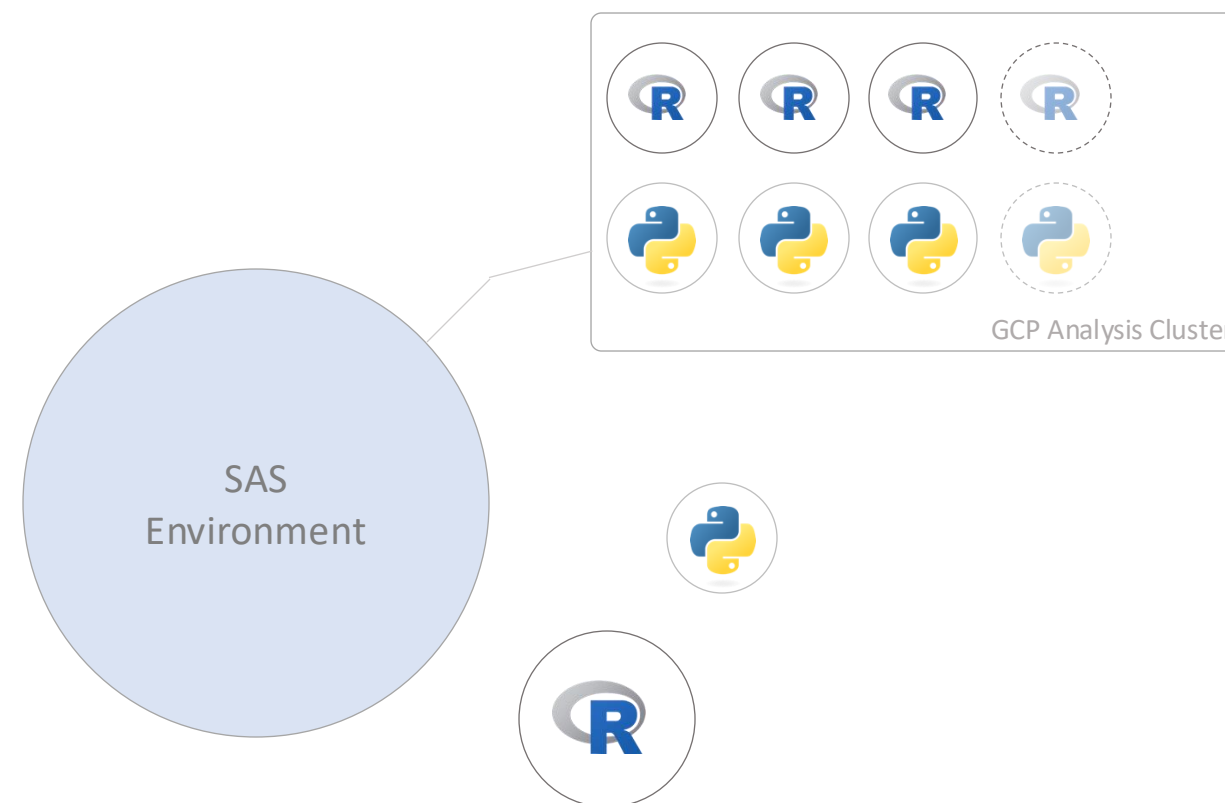
Technical Compromise



Business Compromise

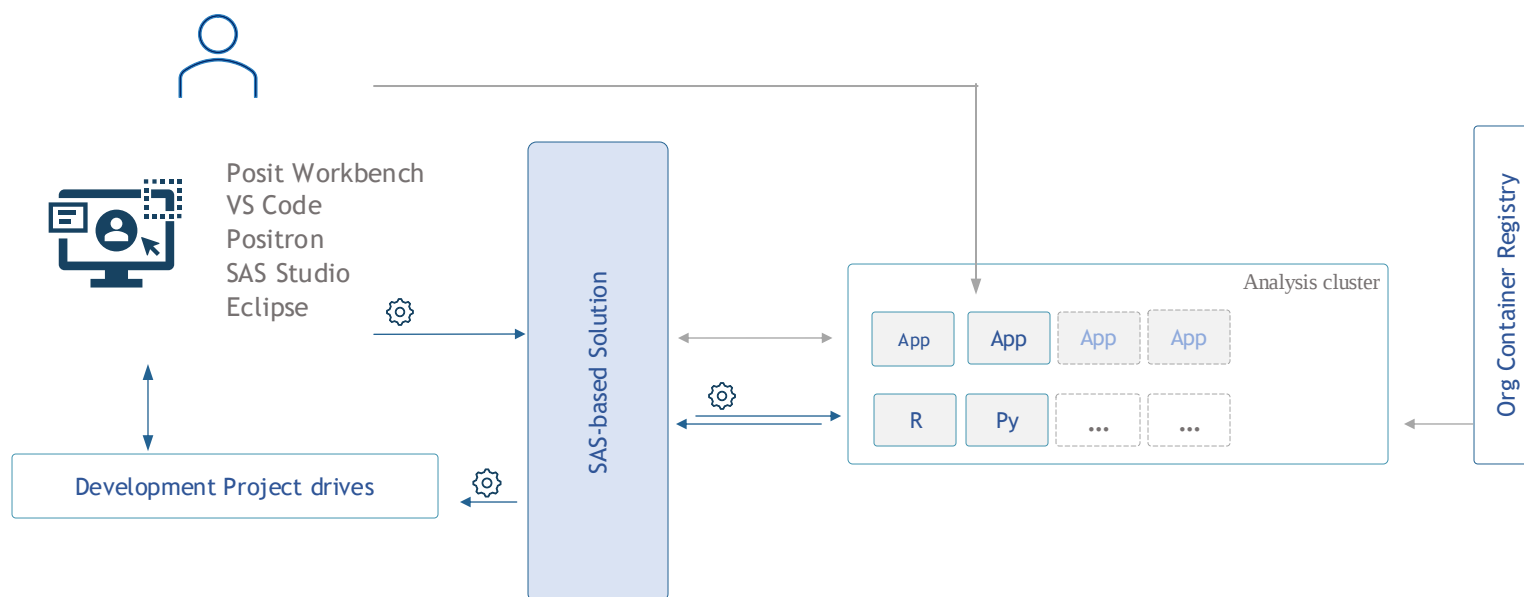
Replicating the environment

- Leaning on containers
- One virtual environment per project
- Project silos
- (In-)Consistent standard
- Project configurations
- Re-build



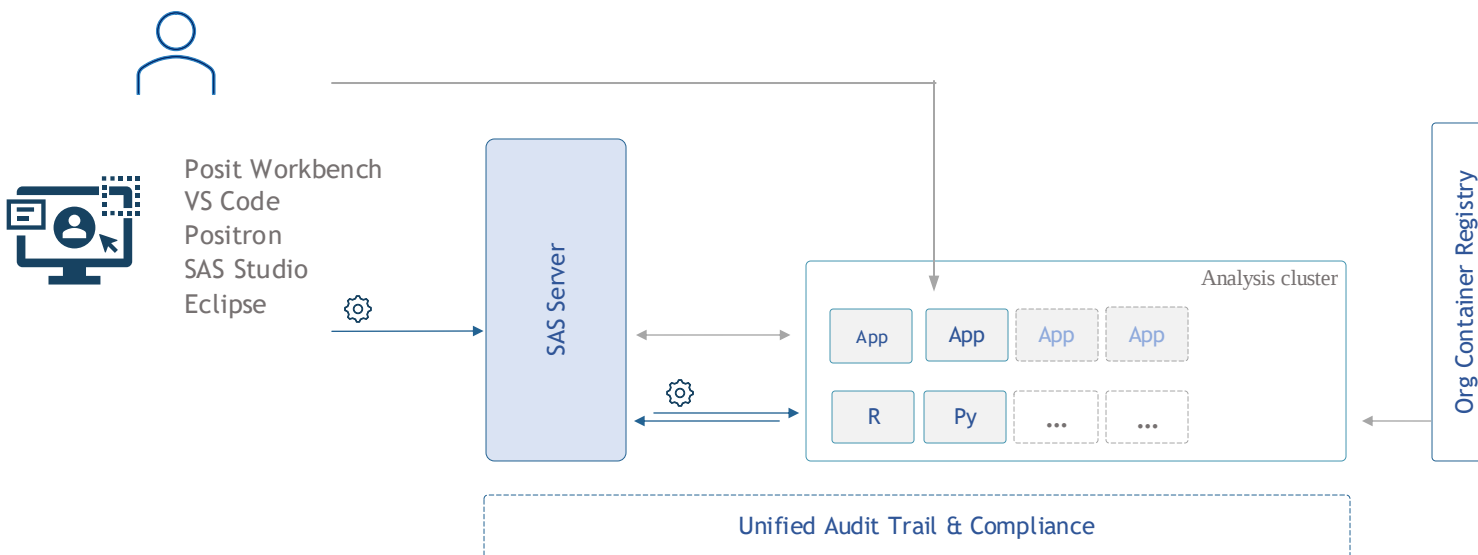
Integrated solutions

- SAS-based Solutions
 - SAS Life Science Analytics Framework
 - Entimo entimICE
- Enable R and Python
- Any version
- Any package *
- Any development tool
- Any language any time
- Multi-lingual analysis



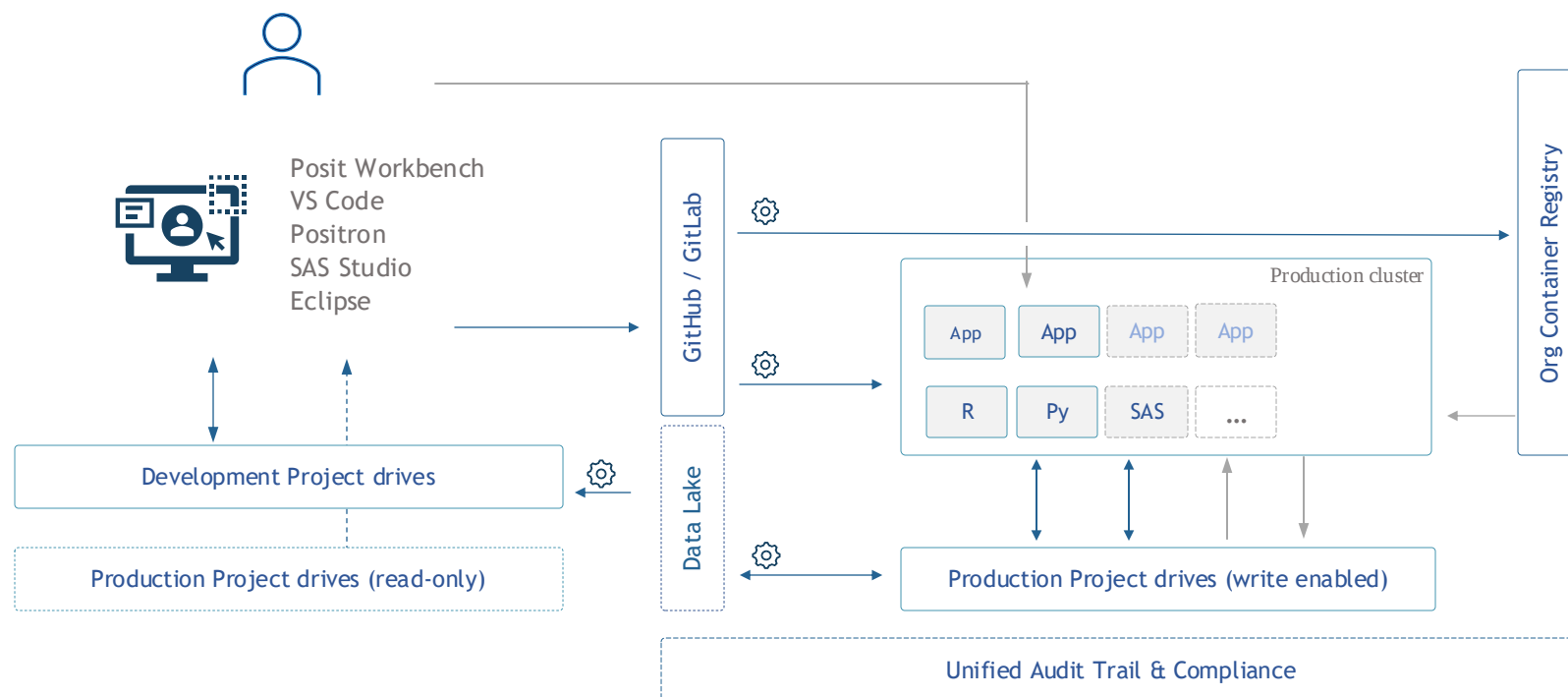
Integrating with SAS server

- Standard SAS server
- Enable R and Python
- Any version
- Any package *
- Any development tool
- Any language any time
- Multi-lingual analysis
- GCP & 21 CFR Part 11 compliant



Moving to an open architecture

- Open architecture
- Any development tool
- Language as a service
- Multi-lingual analysis
- GCP & 21 CFR Part 11 compliant



In summary

- Build before you buy
- Everything comes at a cost
- Compromise in the right place
- Open up the architecture
- Right tool at the right time
- Multi-lingual analysis and submissions

Magnus Mengelbier

magnus.mengelbier@limellogic.com

Limellogic AB

Jungmansgatan 12

SE-211 11 Malmö

Sweden

www.limellogic.com

orgs

github.com/limellogic

github.com/openapx

github.com/cxlib