Development and Implementation of a Statistical Programming Environment in a Small Biotechnology Company

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Topics

- Challenges of managing SAS programming
- Business requirements
- Technical solution
- Implementation and feedback
Challenges of managing SAS programming in a small organisation

Technology
- Large companies: Server technology
- Small companies: Individual PC over LAN
  - Cost of IT infrastructure
  - Limited resource
  - Expertise

Nature of programming work
- In-house vs outsourcing
- Clinical study reporting vs Ad-hoc analyses vs Data review
DATA

SAS Program

Output

Dependencies - 1
Reverse Impact Analysis

- Program 1
  - Dataset C
  - Output P

- Program 2
  - Dataset A

- Program 3
  - Dataset B
  - Output Q

- Program 4
  - Output R
Other challenges

- Overwriting of files when programs are re-run
- Program log
- Documentation
  - Programs: Input and output files
  - Audit trail
- Group of programs to run
- Standards
Business requirements

- Multiple tools vs single application
- Off-the-shelf vs bespoke solution

Constraints
- Data storage
- Cost
- Resource needed for implementation and maintenance
- Changes to existing setup and processes
- Fit for purpose
Business Requirements translated into Technical Requirements:

- Workflow
- Snapshots
- Audit trail
- Productivity
• Displays the SAS programs in a project
• Visually indicates errors and warnings
• Presents program dependencies (inputs and outputs)
• Visually indicate modified dependencies
Batch lists

- Virtual folders group SAS programs into lists
- Order the execution of programs within each list
- One SAS program may appear in many batch lists
Snapshots

- Elementary source control
- Secure all objects in a study to a compressed folder
- Read-only, users never know edit password
- Safely recover studies
Technical Solution

Audit trail:

- Status of each SAS program
- Dependencies to each program
- Dates created, modified, submitted
- Export to Microsoft Excel
Productivity

- Define SAS title statements
- Derive ODS statements
- Edit SAS program in a display manager session
- Navigation through log file error and warnings
- Populate company standard folder structures and autoexec
- Consolidate PDF outputs into a single PDF
Implementation and feedback

- Intuitive and quick to learn
- Easy method to detect errors, warnings and custom text
- Easy to see what has been changed
- Ordering of program submission & Batch list
- Dependency analysis
- Snapshot function

- Multi-user access – only 1\textsuperscript{st} user has write access to XML file
- Performance – additional time
Thank you for listening

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