Managing files in compliance with 21 CFR Part 11 Today's Options

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Presented by Frank Senk, Sr. Associate Director, GCE Solutions

21 CFR Part 11

Sec. 11.10 Controls for closed systems

Persons who use closed systems

- to create, modify, maintain, or transmit electronic records
- shall employ procedures and controls
- designed to ensure the authenticity, integrity, and,
- when appropriate, the confidentiality of electronic records,
- **and to ensure that the signer cannot readily repudiate the signed record as not genuine.**

Integrated Development Environment (IDE)

- **Software suite that consolidates the basic tools developers need to write and test software.**
- Typically, an IDE contains
  - a code editor
  - a compiler or interpreter and a debugger that the developer accesses through a single graphical user interface (GUI).

Source Control Management (SCM)

- A component of software configuration management
- Version control, also known as revision control or source control
- **Management of changes to documents, computer programs, large web sites, and other collections of information.**

Version Control

- Records changes made over time to
  - A file
  - Set of files
- **To recall specific versions later**

System Options

Customized

- Unix via DEV/PROD directories
- PC via file share devices
- Use of virtual machine technology

Commercial off-the-shelf

Proprietary SCMs

Borland's StarTeam

IBM's ClearCase

Open-Source SCMs

CVS (older)

IBM's Rational Team Concert

Statistical Computing Environment

1. Security: controlled access and permissions for objects and actions
2. **Version control: for traceability and process control**
3. Dependency management of objects: a fundamental organizational principle for programming projects
4. Metadata management: enables interoperability and interchange
5. Easy-to-use development environment: analysis tools that are versatile, accessible, and validated
6. Configurable: ability to define and enforce business process rules

Rational Team Concert

- Software development team collaboration tool
- Developed by the Rational Software brand of IBM
- First released it in 2008
- Available in both client versions and a Web version
- **Maintains version control using database technology**

Write Specifications

Metadata including:

- Dataset names and attributes
- Variable names and attributes
- Derivation logic
- **Mock templates, preferably annotated, for requested output**
- Titles and footnotes
- Etc.

Define Scope of Work - Work Items

AE	.sas	SDTM Adverse Events SAS program
AE	.log	SDTM Adverse Events SAS program log
AE	.sas7bdat	SDTM Adverse Events SAS dataset
AE_QC	.sas	SDTM Adverse Events QC SAS program
AE_QC	.log	SDTM Adverse Events QC SAS program log
AE_QC	.lst	SDTM Adverse Events QC SAS program listing

Initialize Work Items in RTC Database

- Add database record named a work item (e.g. ae.sas)
- Assign roles
  - Developer (Programming)
  - Validator (Quality Assurance)
  - Statistician (Statistical Review)
  - Approver (Sign-off)

Develop Programs in SCE User Area

- Write program code
- Upon completion of coding
  - **Create change set (i.e. complete set of files)**
  - Assign change set to a work item (i.e. manual assignment)
  - Change role to “Validator”
  - **Check in files (i.e. version control and notification to Validator)**

Validate Programs in SCE User Area

- Write and test program code using specification
- Add comments in RTC database
- Change status to “Developer”
- **Continue dynamic loop until all comments are resolved**
- When complete, change status to “Statistical Reviewer”

Statistical Reviewer

- Writes independent code to test statistical output
- Add comments in RTC database if errors are found
- Change status to “Validator” if errors are found
- **Continue dynamic loop until all comments are resolved**
- When complete, send to “Approver”

Approver

- Final review
- **Final sign-off for the developer to “deliver”**
- Delivery provides a copy of the files to the entire team

Production

- Performed after all work items have been delivered
- Lead programmer takes a “snapshot” of all files

- **Note: multiple “snapshots” can be accommodated if change requests occur**

Additional Functionality

- Check-in creates database version for recovery
- Delivery creates a team version for distribution
- Compare function included in software
- Audit trail is generated and maintained by the software
- **Ability to attach files and document informational exchanges between team members**

Version Control Delivers

- Improved quality of programs and deliverables
- Decreased time required for clinical trial programming
- Traceability and transparency
- **Compliance with regulatory regulations**

Food for Thought

- ✓ Is your system user friendly?
- ✓ Is your process well documented?
- ✓ Is quality assured?
- ✓ Do you have adequate traceability?

- ✓ **Are you really compliant with FDA regulations?**

References

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