Agaram TECHNOLOGIES

WHITE PAPER

How Logilab ELN helps organizations to maintain ALCOA Data Integrity

Importance of Data Integrity

Data integrity, an area of increasing priority in today's laboratory world and "The focus area" when it comes to regulatory compliance such as 21 CFR Part 11 and Eudralex Annex 11.

The US Food and Drug Administration (FDA) guidance on data integrity, issued in December 2018 (1), set new standards for all research companies. Under the new guidelines, "firms should implement meaningful and effective strategies to manage their data integrity risks".

A major concern of biopharmaceutical R&D executives is implementing these strategies in order to maintain data integrity throughout the entire drug discovery and development lifecycle – crucial for shortening drug time to market, avoiding unexpected expenses and preventing delays due to violations of data regulations.

Considering the number of warning letters from US FDA and other such regulatory bodies issued to pharmaceutical and medical devices manufacturers across the globe, Data integrity is the "Buzz word" in today's audit.

About ALCOA Data Integrity

FDA defines data integrity as "the **completeness, consistency, and accuracy** of data. Complete, consistent, and accurate data should be **attributable, legible, contemporaneously recorded, original or a true copy,** and **accurate**.

FDA has been adopting the **ALCOA** attributes to verify data integrity

- **A**ttributable - Defining Source data and who performed an action on it.

- **L**egible - Permanent recording of information and Access to easy reading any time
- **C**ontemporaneous- Recording the date & time when work is performed
- **O**riginal - Justifying if the information / data is a true copy
- **A**ccurate - Is the data accurate, with no errors or editing

To achieve Data Integrity in context to ALCOA as defined above, let us first understand the stages in a data life cycle.

Additional terms based on European Medicines Agency's concept the following acronyms also emerged (CCEA)

- ✓ **C**omplete - All data including repeat or re-analysis performed on the sample
- ✓ **C**onsistent - Consistent application of date & time stamps in the expected sequence
- ✓ **E**nduring - Recorded in controlled worksheets, laboratory notebooks or electronic media
- ✓ **A**vailable - Available /accessible for review/ audit for the life time of the record

Challenges in following Data Integrity principles

The Pharmaceutical R&D deals with a massive amount of information during R&D operations on a regular basis. To ensure a high degree of data integrity and data security, R&D labs have to adhere to strict regulations on data management that support the organizations to meet all regulatory compliances. The R&D labs working with traditional Paper Notebook face many challenges of data integrity and data security. Some of these challenges are:

- ✓ Data accessibility
- ✓ Data credibility
- ✓ Data consistency and accuracy
- ✓ Data transparency
- ✓ Manual errors and inefficiency associated with paper notebooks
- ✓ Unauthorized access attempts
- ✓ Data confidentiality and authenticity

ROLE OF LOGILAB ELN IN ALCOA DATA INTEGRITY

ABOUT LOGILAB ELN

Logilab ELN is Agaram Technologies' generic Electronic Lab Notebook to enable the lab users to document protocols & procedures, enter lab results, scientific and research observations, notes and other data & perform calculations in paperless electronic format.

Logilab ELN is a proven and dependable system that provides a fully configurable sheet template with test- based workflow design to meet the needs of QA/QC and R&D operations for industries including pharmaceutical, life sciences, biopharmaceutical, chemical, petrochemical, environmental, food, feed, milling, and dairy.

Logilab ELN is designed to capture data in a spreadsheet like template called as Labsheet or lab notebook. Labsheet templates can be designed by scientists by dragging and dropping generic fields into the Labsheet and creating a form like input template depending on the type of test, experiment or research task. This makes the ELN usable for any digital data capture application for lab personnel, research scientists, process and process research personnel.

Labsheets can be designed with data fields like text, numeric, dop-down list, date, time, formula, image, hyperlinks etc.,

Logilab ELN has been designed and developed with a unique feature of protocol management by which set of laboratory procedures and instructions can be configured and corresponding results can also be captured in the same. It has very wide variety of rich features namely data input, research information, tables, images and charts preparation, drawing chemical diagrams, tagging of fields, etc.

Logilab ELN is designed to capture data from any analytical instrument that has RS232 and TCP/IP and also PC-based instruments that can either export results in ASCII, Excel, CSV formats or has the capability to can print a result report.

The system is a fully scalable, flexible, enterprise system designed to streamline test or experiment along with instrument data capture (via SDMS) in a controlled environment, calculate and integrate with external system. It helps laboratories to adopt paperless

processes.

It ensures easy adaptability, time-savings due to faster configuration and operations and Reduced complexity to use resulting in better customer experience.

LOGILAB ELN'S ROLE IN ALCOA DATA INTEGRITY

ATTRIBUTABLE: DEFINING SOURCE DATA AND WHO PERFORMED AN ACTION ON IT

Logilab ELN is a user centric computerised Lab Notebook system and hence will help easily identifying the data source i.e., which user generated and collected the data from which instrument.

LEGIBLE: PERMANENT RECORDING OF INFORMATION AND ACCESS TO EASY READING ANY TIME

Logilab ELN records data in a central database which is a permanent and secure one. Also, the database will reside in a controlled server environment. Data will always be available for accessing and reading for authorised persons. Even archived data can be restored and read through these electronic systems in a seamless manner.

Electronic data captured from simple instruments like balance, titrator, pH meter etc. (when integrated with Logilab ELN) can be easily read even after a very long period of time. This is due to the fact that the communication is direct between the instrument and the software and it is in ASCII.

Also, data is stored in human readable ASCII format. The life of such data can be eternal (assuming still computers use ASCII).

Whereas the output data generated by complex instruments with complex software as described by MHRA's data integrity guidance (HPLC, LC-MS) is subject to more variables i.e., meta-data along with primary data is required to make sense on the data. This complexity will lead to trouble in terms of longevity of the data in terms of readability.

Systems like Logilab ELN can capture the data and meta- data in an as-is-basis or original format and also a human readable format (pdf). So, it becomes important to maintain a copy of the original software that generated the data during the life time of the data. These systems can maintain such data for a very long period of time.

Logilab ELN has search capabilities for rapid access to research information and to access

the data from the big database for review or audit throughout the lifecycle. This can make the required data easily available, saving a lot of time and effort of users. This helps to prevent data errors

CONTEMPORANEOUS: RECORDING THE DATE & TIME WHEN WORK IS PERFORMED

Logilab ELN can allow usage or recording of data in a contemporaneous manner i.e. recording of details can happen as and when an activity is being conducted. At the same time, they can record the date and time at which the data was captured which is real-time for simple instruments. Whereas for the complex computer-controlled instruments the date/time of a file generated by the instrument becomes the cotemporaneous time. Logilab ELN when integrated with SDMS has a real-time file capture mechanism which can capture almost just after the file was generated.

ORIGINAL: JUSTIFYING IF THE INFORMATION / DATA IS A TRUE COPY

When Logilab ELN is integrated with SDMS, Data captured is always true and directly from instrument (if it is via a port like RS232 or TCP/IP). Also, for the complex instrument it is the original file generated by the instrument software that is captured. After a file is generated and if it is modified by some means (mostly through the instrument software) these software systems will capture the new modified file and version it automatically.
CFR Gateway.

Agaram Technologies has developed a unique solution called as “CFR Gateway” to cater to this specific requirement. i.e., “Original” data/meta-data should never be obscured. CFR gateway when used along with Logilab SDMS and Logilab ELN will never allow the instrument software user to delete, rename, save-as, copy, paste files which are monitored by it. This means “Original” data cannot be compromised at any point and time.

ACCURATE: IS THE DATA ACCURATE, WITH NO ERRORS OR EDITING

Data once generated is always pushed to the server. Whereas the local copy/version of the data in the instrument pc can be still used by the instrument user for better convenience. Even if you open an existing data using the original software and edit the data/meta-data, the system will understand that the data has changed and will push the new version to the server. The system has cross check mechanisms such as check-sum calculations to validate the accuracy of the original data versus the data pushed to the server. If there are any such errors the system has failsafe mechanism to retransmit the

data to the server.

COMPLETE: ALL DATA INCLUDING REPEAT OR RE-ANALYSIS PERFORMED ON THE SAMPLE

In Logilab ELN, Data versioning is available i.e., for example if you captured the weight of a sample once and are interested in replacing this weight with another one due to some reason the system will allow you to capture the new weight but will version this new weight and audit trail it with a reason. So, any repeat or re-analysis data is always versioned at data level within the Eln Software.

CONSISTENT: CONSISTENT APPLICATION OF DATE & TIME STAMPS IN THE EXPECTED SEQUENCE

All data capture events and their sequence of capture is data and time stamped. e.g., it is possible to go through a pre-determined sequence of events which will be aligned with the actual method of analysis. Each step or event of recording of data either from instrument or manually recorded in the electronic template is date and time stamped.

There is data consistency in Logilab ELN as it occurs in a sequence, it is easily traceable. It creates its own new version after each change or modification in original data. The system generates a new version on each saves allow to review editing history in an experiment. Where the changes made in each version are highlighted. The version comparison provides complete traceability data and its updates through the data life cycle

ENDURING: RECORDED IN CONTROLLED WORKSHEETS, LABORATORY NOTEBOOKS OR ELECTRONIC MEDIA

Records are stored in electronic media when using Logilab ELN. It provides and electronic equivalent of paper worksheets or notebook to capture data in a controlled manner.

AVAILABLE: AVAILABLE /ACCESSIBLE FOR REVIEW/ AUDIT FOR THE LIFE TIME OF THE RECORD

Data can always be retrieved even after archival and will be accessible for review or audit for the life time of the record. Logilab ELN keeps a track record of all events in the audit trail. Making changes or editing in the original data is recorded and documented with date-time and signature stamped to make sure the data is complete, contemporaneous, and truthful

LOGILAB ELN'S ROLE IN DATA SECURITY

Authentication of users

Logilab ELN requires a unique username and password to log in. This maintains its authenticity. It takes care of access control.

Role-based privileges

Eln Software provides for defining user roles and access permissions. It allows an added layer of control to limit access only to relevant records. It also ensures notebook level access control. Unnecessary access to sensitive information must be limited to the organization. Additionally, it ensures the Intellectual property protection. All these are well implemented to assure protection of the new research and inventions related to intellectual property.

Password Policy & authorized workstations

Logilab ELN has a strict password policy to stop unauthorized access, by default – users are required to change the password after a particular period (Which can be configured based on consumer's requirement). Logilab ELN does the urgent reporting of unauthorized access attempts. In addition, it helps to prevent the disclosure of information to unauthorized individuals or systems to maintain the confidentiality of research and inventions

Authorized network

Logilab ELN typically stores the data on a server. These servers are put on Intranet (internal cloud) or on an external cloud (Microsoft Azure). The electronic documents are easy to access, from anywhere. Logilab ELN provides an added layer of security to define the authorized network and authorized works station from which Logilab ELN could be accessed. This is in addition to the user's authentication. The most compelling feature of the cloud ELN server is that it can be accessed from multiple geographic locations, with complete data security.

CONCLUSION

Having an understanding of the ALCOA data integrity principles namely Attributable, Legible, Contemporaneous, Original, Accurate in addition to Complete, Consistent, Enduring and Available, is the first step to protecting a company from potential Good X Practice (GXP) irregularities that may result in regulatory breach. In order to prevent such problems, it is important to be able to demonstrate compliance.

Cloud-based ELNs such as Logilab ELN Cloud SaaS and other laboratory management systems namely SDMS and LIMS facilitate the homogeneity of data and high-quality standards. Automatically capturing and storing data creates more robust procedures for future research and supports reuse of data and reproducibility of experiments.

The following are the benefits that organization can reap by implementing Logilab ELN.

- ✓ Better user experience and confidence
- ✓ Time savings in terms of implementation and roll-out
- ✓ Operational time savings and cost due to automated and paperless processes
- ✓ Low cost of ownership and reduced overhead costs due to standard technology architecture.
- ✓ Low compliance cost due to adherence to regulatory and industry standards of data integrity
- ✓ Minimum errors due to automated processes and consistent result generation.

For more information about Agaram Technologies' Logilab ELN, please refer to the website page: https://www.agaramtech.com/product/logilab-eln-software/

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