

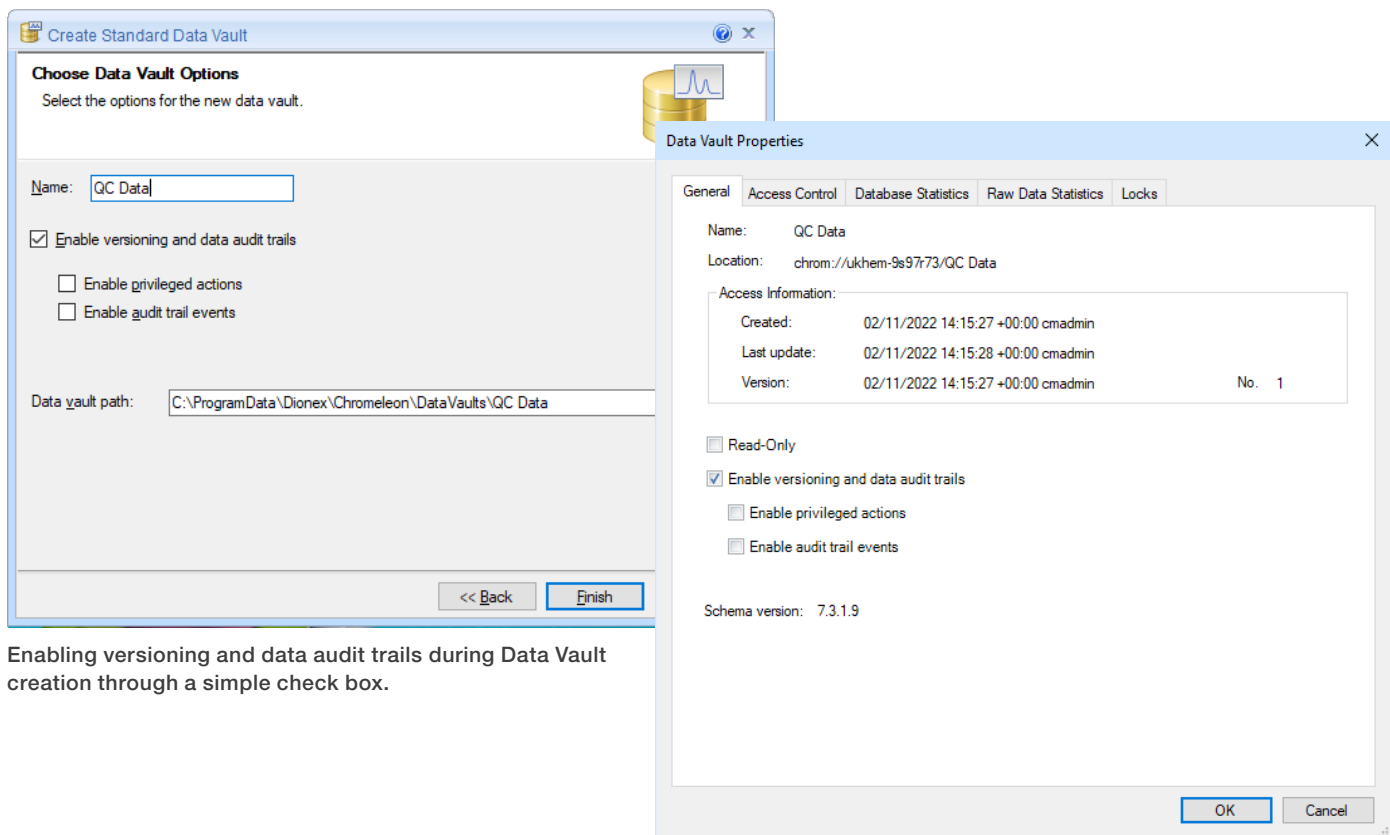
Using versioning to understand the history of data

Versioning of data objects such as Processing Methods, Sequences and Report Templates allows a lab to view the history of the data generated in order to see what changes were made during its lifecycle, and what impact, if any, those changes had on results. This ability is a critical component of data integrity in regulated labs.

Chromeleon CDS contains extensive audit trails that record all the details used to generate a result, and with its powerful versioning system, these details can easily be viewed for the entire history of the data.

Enable version control

Versioning, along with Data Audit Trails, is controlled at the Data Vault level. This level of control makes it possible to have Data Vaults with versioning enabled when it is needed (for example, QC data), and Data Vaults with versioning disabled when it is not required (for example, development work.) Versioning can be enabled during the initial creation of the Data Vault, or afterwards if circumstances change. The ability to enable or disable versioning is controlled through a privilege, which helps to ensure only qualified users can make changes.



Enabling versioning and data audit trails during Data Vault creation through a simple check box.

Enabling and disabling versioning through the Data Vault Properties box. The ability to enable and disable versioning is controlled through privileges.

Version numbering

Whenever a data item (Processing Method, Instrument Method, Report Template, etc.) is saved, an additional record (excluding raw data) is created. The record is stored along with an audit trail entry that captures information related to the creation (time, date, user, etc.). Chromeleon CDS then maintains the relationship between the records by automatically assigning an incremental number that cannot be amended in any way, and we refer to these as versions.

The version number of each data item is displayed in the Sequence along with the date. The entire version history of the item can be displayed by showing the Data Audit Trail. In addition to the version number, the Data Audit Trail displays the Date/Time the version was created, Operator, Operation and any Comments added by the Operator when it was created.

The screenshot shows the Chromeleon Console interface. The main window displays a sequence of 17 data items for 'ETO, GC00909'. The items are listed in a table with columns: #, FID1B, Name, Type, Level, Position, and Volume [µL]. Below this table is a smaller table with columns: Name, Type, Date Modified, Version, and Comment. The 'Version' column in this smaller table is highlighted with a red box, showing values 4, 5, 14, and 1. The 'Data Audit Trail' window is also visible at the bottom of the console.

The version number of each data object is displayed in the Sequence.

The screenshot shows the Data Audit Trail window for 'ETO, GC00909/ETO Quant PM'. The window displays a table with columns: #, Name, Type, Version, Date / Time, Operator, Operation, and Comment. The table shows a detailed history of 14 versions, including the date, time, operator, and operation performed.

The entire version history of the data object displayed in the Data Audit Trail.

Data Audit Trail window

The Data Audit Trail window contains some very powerful functions that allow you to get a complete history of the data. The Show Changes feature displays the changes that occurred between the currently selected version and the version immediately prior to that, or, if two separate

versions are selected, will show the changes between them. The display can easily be switched between showing only the changes in the records and showing all the properties, even those that have not changed. In either display, easily identifiable icons quickly show which properties have been changed, added or deleted.

Version	Date/Time	Operator	Operation	Comment
5	6/1/2018 3:49:02 PM -04:00	Red	Changed	added calibration type
14	5/14/2019 11:06:42 AM -04:00	cmadmin	Changed	

Property	Value version 5	Value version 14
Channel	All Channels	FID1B
Cal. Type	Lin	Lin. WithOffset

Version	Date/Time	Operator	Operation	Comment
5	6/1/2018 3:49:02 PM -04:00	Red	Changed	added calibration type
14	5/14/2019 11:06:42 AM -04:00	cmadmin	Changed	

Property	Value version 5	Value version 14
Name	ETO	ETO
Channel	All Channels	FID1B
Comment	auto generated	auto generated
Factor	1.000000	1.000000
Eval. Type	Area	Area
Cal. Type	Lin	Lin. WithOffset
Stand. Meth.	External	External
Level 1	0.250000	0.250000
Level 5	25.000000	25.000000
Level 6	50.000000	50.000000
Level 3	5.000000	5.000000
Level 4	12.500000	12.500000
Level 2	2.500000	2.500000
Level Tolerance 1		

Viewing changes between version 5 and version 14. Easily identifiable icons show when a property has been changed, added or deleted. The display can be changed to show only the properties that have been changed (top figure) or all properties (bottom figure.)

Restoring versions

At any point, a previous version may be restored to be the current version with ease. When the restore action is executed, it is treated as an additional new record and is fully tracked as such in the audit trail, including the assignment of a new version number. A message is also added to the Data Audit Trail showing that it was restored and what version it was restored from. All versions (current and previous) are saved and are accessible as part of the audit trail.

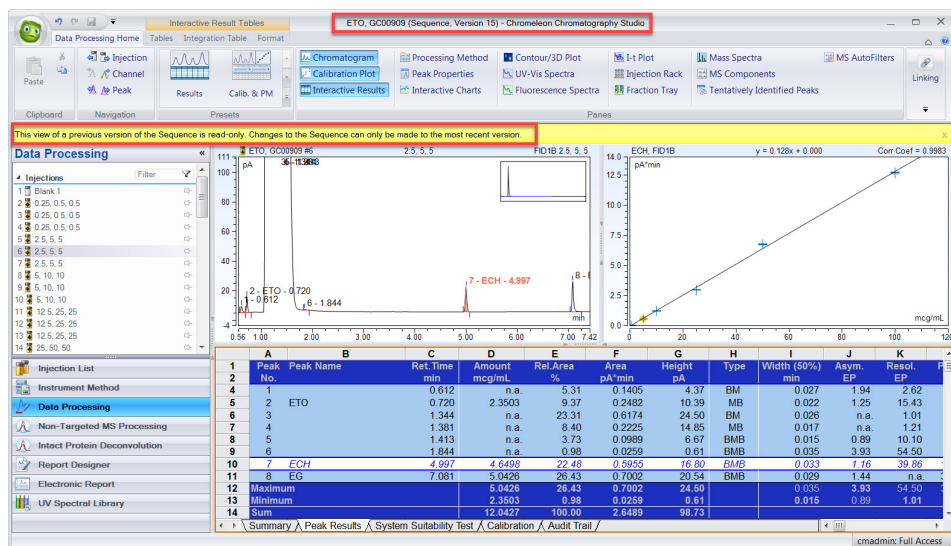
Read-only sequence viewer

Changes to some data objects, such as integration parameters in a Processing Method, or dilution factors in a Sequence, may impact sample results. Even after a new version of an object

has been created, for example after a change in the Processing Method, Chromeleon CDS is able to show the results of a Sequence based on the prior version. The results are displayed as a read-only version of the Sequence, including all sample results, and a visual warning is displayed to indicate this is not the current version. Multiple read-only Studio versions of the Sequence can be opened simultaneously, allowing side-by-side comparison of results. While viewing the read-only Studio versions of the data, no changes to the Processing Method, printing of the Sequence, or saving of the Sequence is allowed, however temporarily changing views, panes and zooming is possible.

#	Name	Type	Version	Date / Time	Operator	Operation	Comment	Additional Information
15	ETO Quant	Processing Method	15	5/15/2019 2:09:17 PM -04:00	cmadmin	Changed		Restored to version 13.
14	ETO Quant	Processing Method	14	5/14/2019 11:06:42 AM -04:00	cmadmin	Changed		
13	ETO Quant	Processing Method	13	4/2/2019 10:02:42 AM -04:00	pkenny	Changed		
12	ETO Quant	Processing Method	12	2/27/2019 7:12:13 PM -05:00	cmadmin	Changed		Restored to version 10.
11	ETO Quant	Processing Method	11	2/27/2019 6:04:03 PM -05:00	cmadmin	Changed		
10	ETO Quant	Processing Method	10	1/29/2019 1:50:41 PM -05:00	cmadmin	Changed		
9	ETO Quant	Processing Method	9	1/24/2019 3:15:25 PM -05:00	cmadmin	Changed		
8	ETO Quant	Processing Method	8	11/21/2018 11:38:07 AM -05:00	cmadmin	Changed		
7	ETO Quant	Processing Method	7	10/23/2018 3:51:57 PM -04:00	cmadmin	Changed		
6	ETO Quant	Processing Method	6	6/1/2018 3:49:38 PM -04:00	Red	Changed	corrected channel for calibration	
5	ETO Quant	Processing Method	5	6/1/2018 3:49:02 PM -04:00	Red	Changed	added calibration type	
4	ETO Quant	Processing Method	4	6/1/2018 2:59:03 PM -04:00	Red	Changed	added level concentrations to component table	
3	ETO Quant	Processing Method	3	6/1/2018 2:57:04 PM -04:00	Red	Changed	added blanks, standards and standard levels	
2	ETO Quant	Processing Method	2	6/1/2018 2:54:40 PM -04:00	Red	Changed	optimized integration and added components	
1	ETO Quant	Processing Method	1	5/23/2018 11:32:26 AM -04:00	Red	Created	adding for training	

Previous versions may be restored and are given a new version number. In the figure above, version 15 (the current version) was created by restoring from version 13.



Read-only Studio Sequence of a previous version. The title bar displays the version number of the Sequence and a warning message indicates this is not the most recent version.

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