Knowledge Base

Exaquantum

How to Recover a Deleted Tag

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Document Summary	
Article Type	User Guide
Products Affected	Exaquantum/PIMS
Versions Affected	All but verified for R3.40 or earlier
Function Affected	History data retrieval
Available Resolution	Procedure
Audience	Users and Administrators
Summary	When a tag is deleted in Exaquantum, the associated history data is also lost. This article documents a procedure that can allow it to be retrieved in some circumstances.
Review Date	Document to be reviewed before March 2024

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Chapter 1 Introduction

Exaquantum tags are assigned an item ID when created. This ID is used to reference data requests including history data.

When a tag is deleted and recreated, a new item ID is assigned. Since the history data is still associated with the old ID, it cannot be retrieved.

This procedure allows old history data to be associated with a newly created tag.

The procedure is outside of standard product functionality and it outside standard support. The procedure is not guaranteed to work in all situations.

1.1 Audience

This guide is intended for system integrators and administrators.

1.2 Terminology

For the purposes of this document, the following terms are used.

Term	Meaning
Deleted Tag	The Exaquantum tag which was deleted and for which history data has been lost.
Recovery Tag	A newly created Exaquantum tag, based on the deleted tag, which will be assigned the history data from the deleted tag.
Interim Tag	A newly created Exaquantum tag, compatible with the recovery tag, that will collect history data while the procedure is carried out. Note: The Recovery tag may be used as the interim tag and a new recovery tag created.

Chapter 2 Procedure Overview

This section covers the common causes of the problem and the particular cases that can be resolved, including some limitations.

2.1 Issue Cause

The issue is caused when a tag is deleted from the Exaquantum system and re-added, even when it is given the same name.

Deletions can be accidental or can be done when a user is looking to update the tag settings. Any setting that involves a change to the underlying template could cause this issue since the tag being changed will actually be deleted and re-added.

Exaquantum tags are not referenced by name but are referenced by ID. This means that a tag name can be changed and still reference history data but it also means that when a tag is deleted, the ID is still associated with that tag and is not transferred automatically.

2.2 Cases where the procedure can work

For this procedure to work, the following must be true:

- The tag is recreated with exactly the same name and in exactly the same place within the hierarchy
- The tag is created with a tag template that is compatible to the deleted tag
- The tag has not been deleted more than once
- The restoration procedure has not been tried already
- Data has not been archived since the tag was deleted

2.3 Precautions/Limitations

Before commencing this procedure, the following should be noted.

2.3.1 Full Exaquantum back-up to be taken

It is essential that a full Exaquantum backup is taken before starting this procedure. There are two reasons for this.

Firstly, it is possible for this procedure to cause loss of data to existing tags and it is therefore imperative to have a fallback option.

Secondly, if the process doesn't work exactly as desired, it may be possible to refine it and retry but this is not possible if recovery of specific tags has already been attempted.

The full backup must include QConfig, QHistorianAdmin and QHistorianData databases. Databases for other applications are not needed.

2.3.2 Data Gap

This procedure involves the creation of a new tag which will have old history attached. When this process completes, any history that the newly created tag had acquired will be lost. It may be possible to overcome this by creating an interim tag. This is covered in the document.

2.3.3 Wildcard Limitation

The procedure works by using a wildcard string to identify all tags that need to be restored. It is important to be careful when specifying this string as other tags could be affected.

As an example, if the Tags PID001.PV and PID002.PV are to be recovered but there is also a tag called PID003.PV which does not need to be replaced, a wildcard string of PID00 is not suitable. This would also apply if a tag called PID001A.PV was to be restored but PID001A-2.PV is not required.

The limitation is only an issue if tags have been deleted that should not be restored. Mitigation can be achieved by checking the items that have been deleted. See later in the document for details.

2.3.4 Compatible Tag Template

For the Recovery Tag to use the data from the Deleted Tag, it must have a compatible tag template. Items such as update rate and deadband do not need to match but the data type does.

2.3.5 Exaquantum Restart

It is necessary to restart the Exaquantum services once this procedure has been executed for the changes to be applied. Therefore, time for a restart will need to be scheduled. This may need to be agreed with users beforehand.

2.3.6 Scope of Support

This procedure is considered a last resort recovery mechanism and is not part of standard functionality. Therefore, although best efforts will be made to support any cases where tags are deleted, it may not be possible to recover data in all cases.

2.4 Procedure Steps

The procedure comprises the following steps which are detailed in sections that follow:

- Preparation
- Recovery tag creation
- Interim tag creation (if required)
- History data update
- Exaquantum Restart and verification

Chapter 3 Preparation

This section lists the steps that should be undertaken before the procedure is carried out.

3.1 Full Database Backup

It is essential that a full backup is taken of the three core Exaquantum databases before this procedure is attempted. The three core databases are:

- QConfig
- QHistorianAdmin
- QHistorianData

These backups are required in case the procedure caused unexpected results or in case it needs to be reattempted.

3.2 Tag Mapping Plan

Before starting, a map of deleted tags should be created so that it is clear which tags are to be recovered.

This will also allow a check to be made to ensure all tags are updated once the procedure is complete.

To complete this task, a list should be created that includes all tags that need to be recovered and the function blocks that they are part of if any.

3.3 Wildcard Check

As mentioned in the previous section, the procedure uses a wildcard to determine the tags to be recreated. In brief, a search is made for deleted tags to find candidates for restoration. A temporary table is made to facilitate the procedure.

Since specifying an incorrect wildcard can have an undesired effect, it is important to test beforehand. The steps below should be followed:

a) Determine the wildcard to be used.

b) Open SQL Server Management Studio and create a new query window.

c) Enter the following line of SQL Script replacing wildcard with the string to be used.

d) select * from QHistorianData..QDeletedItem where path like ‘%wildcard%’

e) The script will display a list of items that will be affected. Verify this list against the tag mapping in the previous step noting that the query will also list items such as aggregations.

f) If the list doesn’t match, review further to confirm why. Do not proceed unless the list of tags in the tag mapping list matches exactly the tags shown in the query.

Chapter 4 Recovery Tag Creation

To allow the history of tags to be recovered, a new tag must be created to be associated with the old history data.

4.1 Considerations

Care must be taken when creating the Recovery Tags, in particular the following must be noted.

4.1.1 Item Path

Recovery Tags must have an identical path to the tags that were deleted.

4.1.2 Tag Name

Recovery Tags must have the same tag names as the tags that were deleted including the Function Block Name

4.1.3 Tag Template

Recovery tags must have a compatible tag template to the tags that were deleted. Generally, they will need to have the same data type. It is not necessary for the Tag Templates to have the same name, nor is it essential to have the same update rate or deadband setting.

4.1.4 Associated Tags

Aggregations will be restored to Recovery Tags, even if a new template does not have them. To ensure no complications in the future, it is strongly recommended that the Tag Template for the Recovery Tags has the same aggregations as the template associated with the deleted tags.

4.1.5 Tag Structure Changes

Changes to the structure of Tags and Functions blocks can be achieved in some circumstances but best practice is to complete the recovery process first.

4.2 Tag Recreation

Tags can be recreated using any form of Tag Equalization. Generally, the tags are already recreated when this procedure is required.

Verify that the tags created match the list of the tag mappings.

It is also prudent to confirm that history for these tags only goes back to the time of creation. This forms an additional check that these are the correct tags and there is currently no history data before the point of deletion.

If required, details of how to create tags in Exaquantum can be found in the Exaquantum PIMS Users Guide, Chapters 7 to 11.

Chapter 5 Interim Tag Creation

5.1 Overview

This step can help combine history for some tags. Often, it will be important to get the history restored as soon as possible and a small amount of missing data is acceptable. The interim tags will not be needed in this case.

There is significant effort needed to include this step, but it can be considered if the collection of all data is imperative.

The use of interim tags works well where Recovery Tags have been in existence for a short time since the QTFS function is designed to only import small amounts of data at a time.

The procedure uses a combination of Excel and QTFS which is a built-in data import function of Exaquantum.

5.2 When to use this procedure

If Tags were deleted and recovered quickly, but there has been a delay in the recovery procedure, it is possible for the Recovery Tags to hold some history data which might be desired to complete the fullest possible picture.

This part of the procedure caters for this scenario but is only suitable for a small amount of Tag Data.

The process has an administrative overhead and is not suited to cases where many tags need to be recovered.

A suitable case would be for less than 5 tags with an update rate of 60 seconds for less than 1 day.

For larger systems, it may be possible to import a subset of data or aggregation data. Consult with a relevant support channel for more detail and advice.

5.3 Limitations

There are some limitations with this part of the procedure. These are detailed in the following sections.

5.3.1 QTFS Capacity

The main limitation of this procedure is the amount of data that can be imported by QTFS at one time. The QTFS program was only designed to import around 100 values as a time.

If a Recovery Tag has been on the system for some time or if there are multiple tags, this procedure is not suitable.

5.3.2 Aggregations and Calculations

Aggregations and Calculations would not be automatically updated if raw data was imported using QTFS. Recalculation is available in some cases for Exaquantum but not normally on a tag by tag basis.

5.4 Procedure

The procedure to include Interim Tags consists of the following steps. It is assumed that Recovery Tags are already created. See Recovery Tag Creation.

5.4.1 Renaming of Tags

The first step is to rename the tags that were created as Recovery Tags. This is so they are not overwritten when the Recovery Process takes place. It is recommended to rename the Tags or Function Blocks with a prefix of ‘interim’ to clearly distinguish them.

These tags will be removed when the procedure is completed.

5.4.2 Complete Recovery Procedure

The next step is to complete the Recovery Procedure which is detailed in the next Chapter. This will restore the old history data to the Recovery Tag which will also start storing new data. There will be a gap covering the data that is in the Interim Tag.

For the recovery procedure, refer to History Data Update.

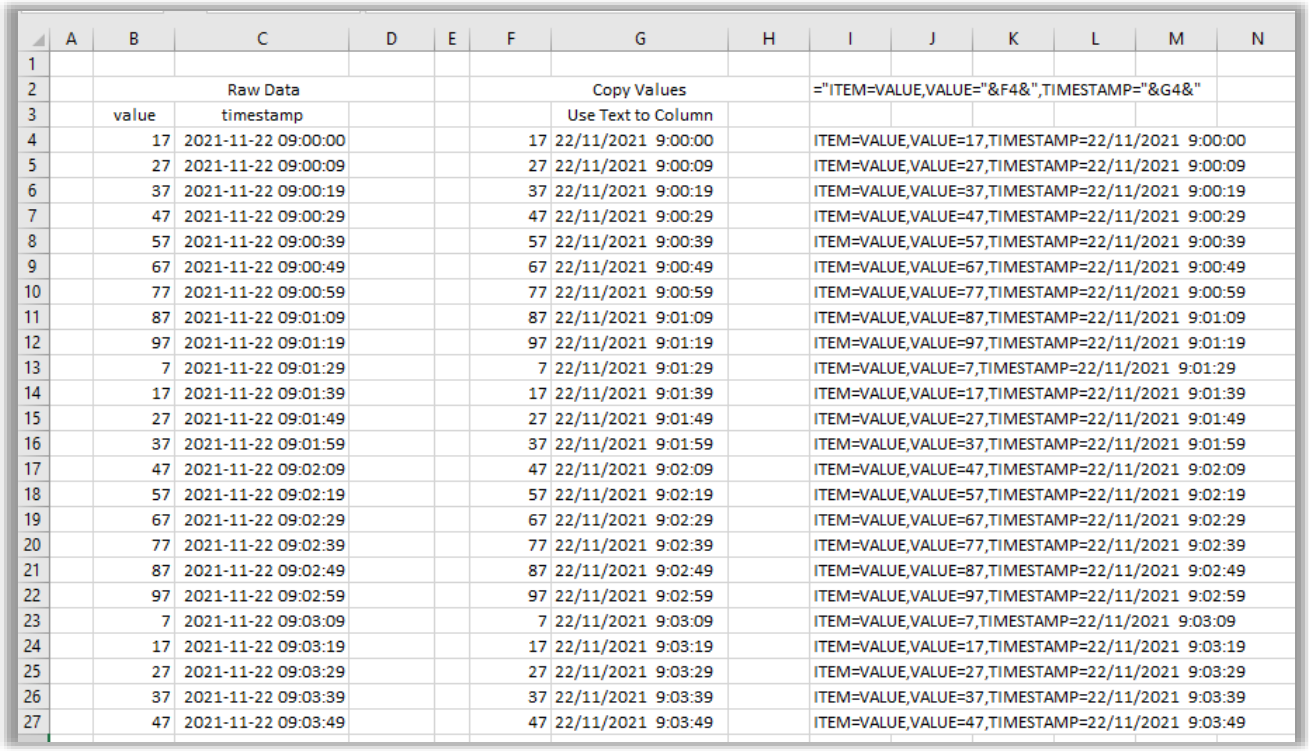
Once History Data Update is completed, the Export and Import process can begin.

5.4.3 Export History Data

This is done by using the Excel Add-in within a specifically designed worksheet which will convert the data to a format that can be used by QTFS. An example worksheet can be provided by YMX support.

Data should be collected in small amounts to cater for QTFS operation. No more than 100 values should be added to an import file at one time, but Excel can gather more complete data which can then be split.

A sample Worksheet would look like this:



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1														
2			Raw Data				Copy Values		="ITEM=VALUE,VALUE="&F4&",TIMESTAMP="&G4&"					
3		value	timestamp				Use Text to Column							
4		17	2021-11-22 09:00:00			17	22/11/2021 9:00:00		ITEM=VALUE,VALUE=17,TIMESTAMP=22/11/2021 9:00:00					
5		27	2021-11-22 09:00:09			27	22/11/2021 9:00:09		ITEM=VALUE,VALUE=27,TIMESTAMP=22/11/2021 9:00:09					
6		37	2021-11-22 09:00:19			37	22/11/2021 9:00:19		ITEM=VALUE,VALUE=37,TIMESTAMP=22/11/2021 9:00:19					
7		47	2021-11-22 09:00:29			47	22/11/2021 9:00:29		ITEM=VALUE,VALUE=47,TIMESTAMP=22/11/2021 9:00:29					
8		57	2021-11-22 09:00:39			57	22/11/2021 9:00:39		ITEM=VALUE,VALUE=57,TIMESTAMP=22/11/2021 9:00:39					
9		67	2021-11-22 09:00:49			67	22/11/2021 9:00:49		ITEM=VALUE,VALUE=67,TIMESTAMP=22/11/2021 9:00:49					
10		77	2021-11-22 09:00:59			77	22/11/2021 9:00:59		ITEM=VALUE,VALUE=77,TIMESTAMP=22/11/2021 9:00:59					
11		87	2021-11-22 09:01:09			87	22/11/2021 9:01:09		ITEM=VALUE,VALUE=87,TIMESTAMP=22/11/2021 9:01:09					
12		97	2021-11-22 09:01:19			97	22/11/2021 9:01:19		ITEM=VALUE,VALUE=97,TIMESTAMP=22/11/2021 9:01:19					
13		7	2021-11-22 09:01:29			7	22/11/2021 9:01:29		ITEM=VALUE,VALUE=7,TIMESTAMP=22/11/2021 9:01:29					
14		17	2021-11-22 09:01:39			17	22/11/2021 9:01:39		ITEM=VALUE,VALUE=17,TIMESTAMP=22/11/2021 9:01:39					
15		27	2021-11-22 09:01:49			27	22/11/2021 9:01:49		ITEM=VALUE,VALUE=27,TIMESTAMP=22/11/2021 9:01:49					
16		37	2021-11-22 09:01:59			37	22/11/2021 9:01:59		ITEM=VALUE,VALUE=37,TIMESTAMP=22/11/2021 9:01:59					
17		47	2021-11-22 09:02:09			47	22/11/2021 9:02:09		ITEM=VALUE,VALUE=47,TIMESTAMP=22/11/2021 9:02:09					
18		57	2021-11-22 09:02:19			57	22/11/2021 9:02:19		ITEM=VALUE,VALUE=57,TIMESTAMP=22/11/2021 9:02:19					
19		67	2021-11-22 09:02:29			67	22/11/2021 9:02:29		ITEM=VALUE,VALUE=67,TIMESTAMP=22/11/2021 9:02:29					
20		77	2021-11-22 09:02:39			77	22/11/2021 9:02:39		ITEM=VALUE,VALUE=77,TIMESTAMP=22/11/2021 9:02:39					
21		87	2021-11-22 09:02:49			87	22/11/2021 9:02:49		ITEM=VALUE,VALUE=87,TIMESTAMP=22/11/2021 9:02:49					
22		97	2021-11-22 09:02:59			97	22/11/2021 9:02:59		ITEM=VALUE,VALUE=97,TIMESTAMP=22/11/2021 9:02:59					
23		7	2021-11-22 09:03:09			7	22/11/2021 9:03:09		ITEM=VALUE,VALUE=7,TIMESTAMP=22/11/2021 9:03:09					
24		17	2021-11-22 09:03:19			17	22/11/2021 9:03:19		ITEM=VALUE,VALUE=17,TIMESTAMP=22/11/2021 9:03:19					
25		27	2021-11-22 09:03:29			27	22/11/2021 9:03:29		ITEM=VALUE,VALUE=27,TIMESTAMP=22/11/2021 9:03:29					
26		37	2021-11-22 09:03:39			37	22/11/2021 9:03:39		ITEM=VALUE,VALUE=37,TIMESTAMP=22/11/2021 9:03:39					
27		47	2021-11-22 09:03:49			47	22/11/2021 9:03:49		ITEM=VALUE,VALUE=47,TIMESTAMP=22/11/2021 9:03:49					

Key:

Column	Comments
B	Data value from Excel add-in trend
C	Timestamp from Excel add-in trend
F	Value copy from column B
G	Value copy from column C. This must be formatted as data and then the Text to Column Data function used to convert to text
I	A concatenation of the items to create the QTFS string

5.4.4 Import History Data

Data is imported by use of QTFS. QTFS is covered in the Exaquantum Manual Set, refer to the Engineering Guide Volume 3, Chapter 18.

A typical import file could be named import.txt and look like this:

```
TAGNAME=Root.PID001.PV
ITEM=VALUE, VALUE=17,TIMESTAMP=19/11/2021 16:10:09
TAGNAME=Root.PID001.PV
ITEM=VALUE, VALUE=18,TIMESTAMP=19/11/2021 16:11:09
TAGNAME=Root.PID001.PV
ITEM=VALUE, VALUE=19,TIMESTAMP=19/11/2021 16:12:09
```

It would be called by a command line function such as this:

QTFS.exe /I, “import.txt”, “import.log”

Chapter 6 History Data Update

Once all the preparation has been completed, the history data update can be run. This is the part of the procedure that moves the history records from the Deleted Tags to the Recovery Tags.

The script mentioned in the procedure is available from the Exaquantum support website, see the further reading section for details.

6.1 Preparation

Ensure that the following are in place before starting.

6.1.1 Database backup

A full database backup of QConfig, QHistorianAdmin and QHistorianData must be available before starting this part of the procedure. Refer to Full Exaquantum back-up to be taken.

6.1.2 Recovery Tag creation

Recovery Tags must be created before starting this part of the procedure. Refer to Recovery Tag creation.

6.1.3 Tag Mapping List

A list of tags to be recovered must exist before starting this part of the procedure. Refer to Tag Mapping List.

6.2 Running the procedure

Follow these steps to complete the procedure:

a) Determine the wildcard to be used.

b) Open SQL Server Management Studio

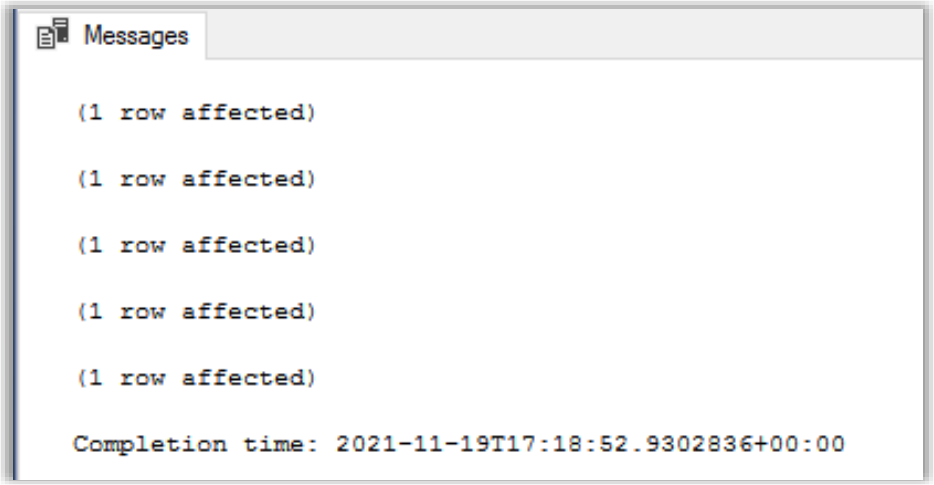
c) Load the SQL script called undeletescript.sql into a new query window

d) Update the wildcard in the script to match the desired string

e) Run the script by clicking on the Execute button in SQL Server Management Studio

f) The script will take time to run and display multiple messages stating that 1 row is affected

g) Wait until the script shows a completion message and verify that no errors are seen



h) Once complete, Exaquantum services need to be restarted to apply the changes

Chapter 7 Exaquantum Restart and Verification

Once History Data script has completed successfully, restart Exaquantum by using the Exaquantum Services Manager which can be found on the start menu.

Once Exaquantum is restarted, check that history data is available for the tags from before the time of deletion.

Note that history data after the time of deletion will not be shown. It may be possible to use an Interim Tag to recover more data, but this needs to have been set up before the History Data Update took place.

See the Interim Tag Creation section for details on this procedure.

Chapter 8 Failure and Roll-back

If the procedure did not work, it will be necessary to restore the database backups taken previously. The outline procedure is:

- Stop Exaquantum using the Exaquantum Services Manager
- Restore the database backups
- Start Exaquantum using the Exaquantum Services Manager

It will then be possible to retry the procedure, refining it if necessary.

Chapter 9 Further Reading

If required, details of how to create tags in Exaquantum can be found in the Exaquantum PIMS Users Guide, Chapters 7 to 11.

More support is available from:

- Website www.ymx.yokogawa.com\support
- Knowledge base www.ymx.yokogawa.com/knowledge-base
- Email support.ymx@yokogawa.com (note new address from March 2023)

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Highlights

The Highlights section gives details of the changes made since the previous issue of this document.

Summary of Changes

This is Issue 1.0 of the document related to Product Library version 1.0.

Detail of Changes

The changes are as follows:

Chapter/Section/Page	Change