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Measures to ensure sufficient free hard disk space on Process Historian

Process Historian 2014 and Process Historian 2013 Upd4

https://support.industry.siemens.com/cs/ww/en/view/66579062

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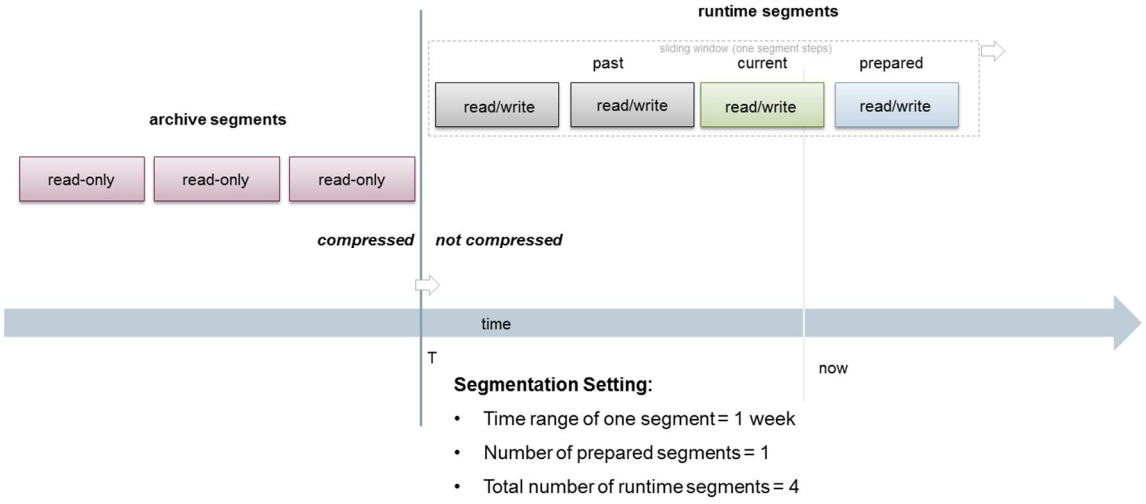
1 Overview

The archived process data is structured into segments in the Process Historian (PH) database, each of which represents a specific time span. A segment can be assigned to one of the two segment types below.

Table 1-1

Segment type	Features
Runtime segments	Non-compressed segments, unrestricted read and write access
Archive segments	Completed segments which can be compressed, archived and exported from the database

Figure 1-1



The Runtime segments cover a limited time span around the current time. Around the currently valid segment (marked green on the Segmentation Dashboard of the PH Management Console) there are runtime segments which lie in the past and contain data (marked gray) and runtime segments which lie in the future and which are still empty (marked blue).

Going towards the past the time span of the runtime segments is oriented on how far back in time the connected OS server systems could still archive data in the PH database. Future or prepared segments are a safety buffer so that archiving can continue immediately when there is a change of segment and to ensure time for any necessary changes when data carriers fill up.

2 Management of PH Database Memory Requirement via the Segment Settings

With the choice of segment size or segment unit (week, month...) and the total number of runtime segments you define the time span in which the data is available in the PH database in non-compressed form. The segment unit and number of non-compressed segments can be changed later. Changes to the segment settings are valid for segments to be newly created. Segments which are already created are not modified later. For example, a reduction in the number of prepared segments or the total number of runtime segments does not immediately lead to a change in the segmentation after saving the settings. If the number of prepared segments is reduced from 3 to 1, this setting becomes effective only when two of these prepared segments are also written/used regularly (for example, 2 weeks for week segments).

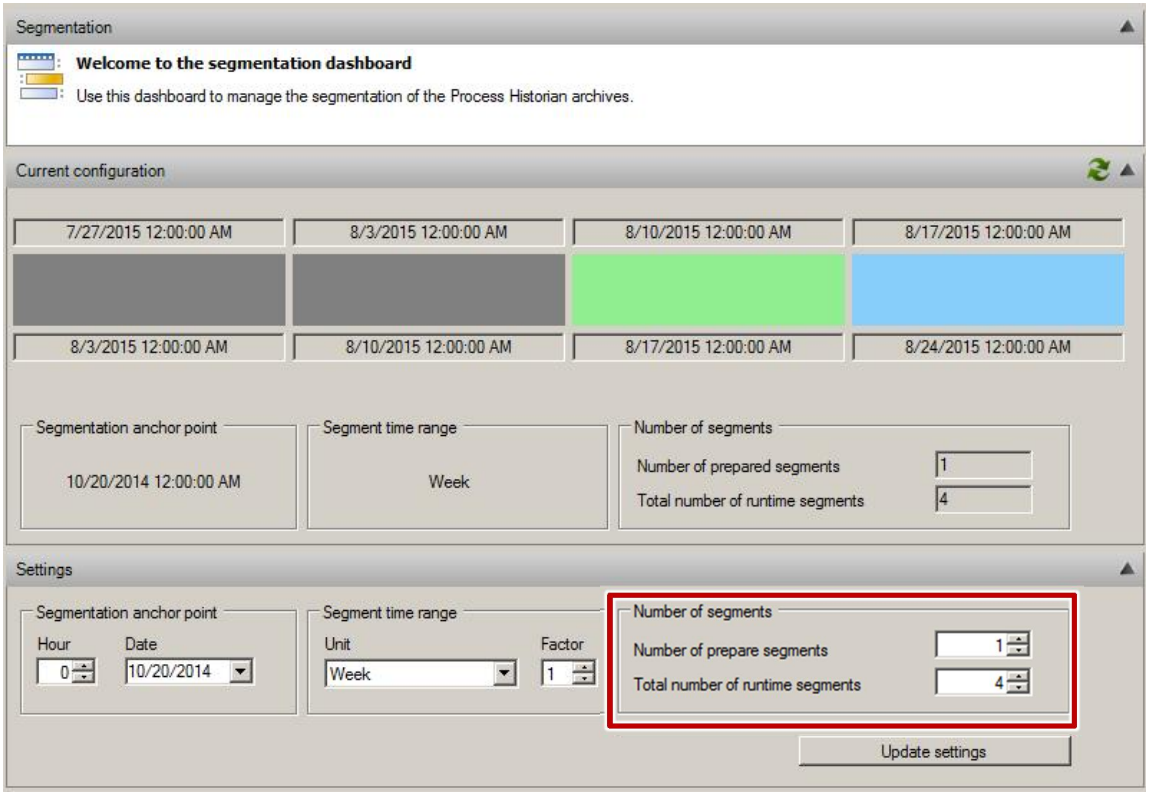
Note If you increase the number of prepared segments, the segmentation is modified immediately after changing the setting.

2.1 Minimizing Memory Requirement

In order to minimize the memory requirement for the PH database it is recommended to set the number of prepared segments as far as possible to the minimum value of 1 segment, because as soon as a prepared segment is created the required hard disk space is reserved immediately. The extrapolation of the initial size is made on the basis of the last completely written segments.

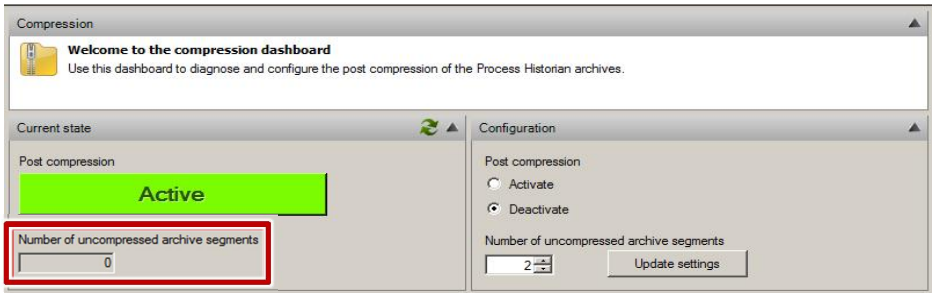
In addition to the number of prepared segments you can also set the total number of runtime segments to the minimum value of 4 segments. In this way the segments can be compressed at the earliest time possible.

Figure 2-1



For compression of the archive segments to begin immediately after a segment is identified as archive segment the number of non-compressed prepared archive segments must be set to the value 0.

Figure 2-2



Note The internal compression of the PH server covers only the tables with archive tags. There is no compression for table with process messages.

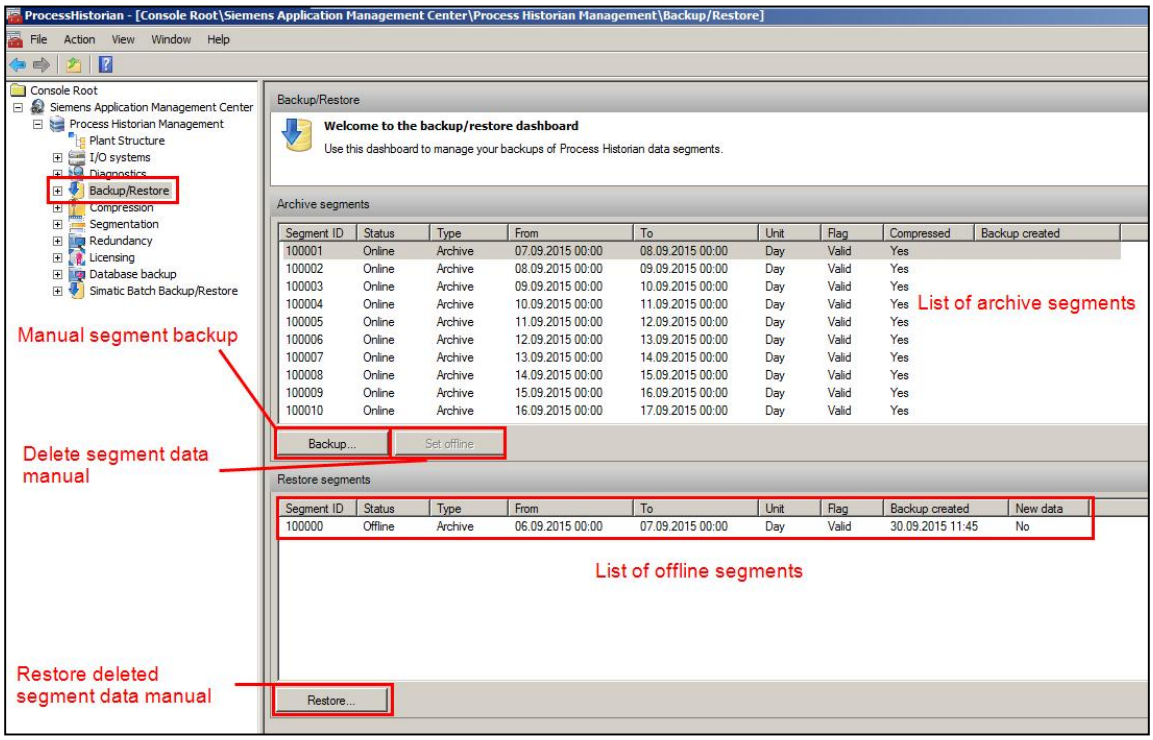
2.2 Exporting Segments from the PH Database

Archive segments which have been internally compressed by the PH server can be exported manually or automatically by the backup scheduler to a backup file. This backed-up data is present initially in parallel both in the backup file and still in the PH database. Only execution of the "Set offline" function or the relevant option in the backup scheduler deletes the data of this segment from the PH database and thus releases hard disk space on the database drive.

The manual functions "Backup", "Set Offline" and "Restore" can be executed via the "Backup/Restore" menu of the PH Management Console.

Note Daily segmentation (unit = day) is designed for test applications and not for productive operation. A weekly segmentation is recommended (unit = week).

Figure 2-3



Note Making a segment backup or "Set offline" (delete) from the database is only possible in "Active" mode with Process Historian version 2013.

In order to ensure permanent archiving without regular manual intervention it is necessary to have automatic exporting of old segments from the PH database. How to set automatic backup by the backup scheduler depends on different parameters:

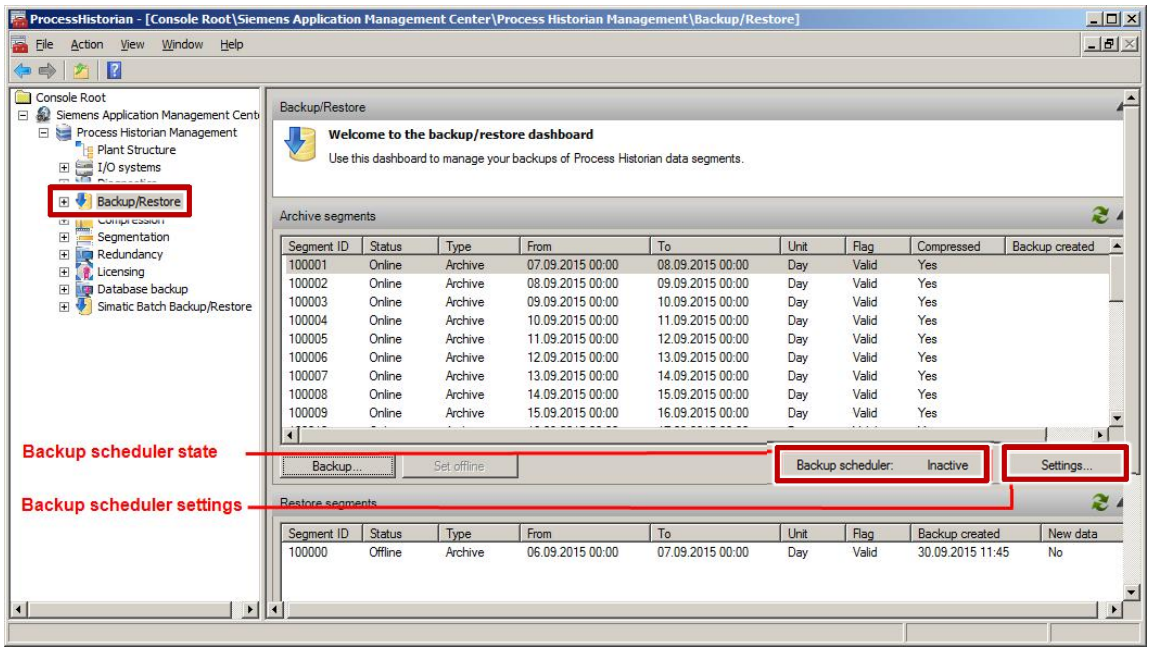
1. The time that the PH database permanently provides in runtime or archive segments must be oriented on the absolute hard disk space available.

2. There must be a reserve the size of several segment units taken into account, because the system temporarily needs additional free space for internal processes like segmentation, compression, creation of backups, etc.

3. There must also be free memory for restoring old backups (temporary incorporation in the PH database of segments from old backups).

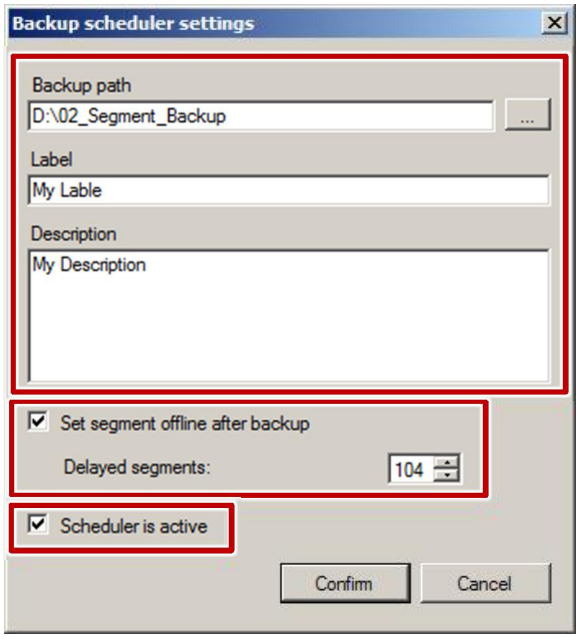
The automatic functions "Backup" and "Set Offline" are configured in the "Backup/Restore" menu of the PH Management Console.

Figure 2-4



Click the "Settings…" button to open the "Backup scheduler settings" menu. Here you configure the parameters required for automatic "Backup" and "Set Offline". The "Set Offline" function is executed only when a backup has been made successfully.

Figure 2-5



Note If you define a counter of 104 for a weekly segmentation of the "Delayed segments", then 104 segments = 104 weeks = 2 years in the database. All older segments are saved in the backup path and deleted from the Historian database.

2.3 Merging Data during Backup/Restore of Segments

When a segment backup is made, in rare cases it might be necessary to merge data from internal segments in the PH database. In addition to the segments configured by the user the PH database also contains internal segments for historical data and segments for future data. These internal segments might contain data archived at a time when the normally valid segment for that data was not available (segment was already offline, for example).

With Process Historian 2014 and higher the need for data merging for a segment can be determined already before segment backup or restore. For online segments this is identified with the "Segment ID" column and with the "New data" column for offline segments.

Note The merging of data can significantly slow down the creation of a backup, especially if a very large volume of data is stored in the internal segments.

Hard Disks Nearly Full of PH Database Files

If segments are not regularly exported manually or with backup scheduler support, the PH database grows continuously so that the hard disks on which the database files are stored fill up.

For this case the PH software provides a multi-level system of messages and actions. At the first level control system messages are triggered on the connected WinCC or PCS 7 OS systems. When specified limits are exceeded, the archiving in the PH database is stopped and a corresponding control system message is issued.

Note The control system messages and the archiving behavior of the PH server are different in Process Historian versions 2013 and 2014. In version 2014 and higher the messages are improved in the form of control system, the warning and alarm limits changed and the reaction of the PH system further improved in this operating case. For example, the PH server version 2014 is set into an additional operating mode - "Blocked" - as soon as the hard disk fills to a critical level. In this operating mode manual restart of archiving is suppressed for as long as there is not enough free memory.

3 Other Options for Releasing Hard Disk Space

If the above options for providing additional hard disk space for the PH database are not sufficient or the measures would only be effective later, other methods can be considered.

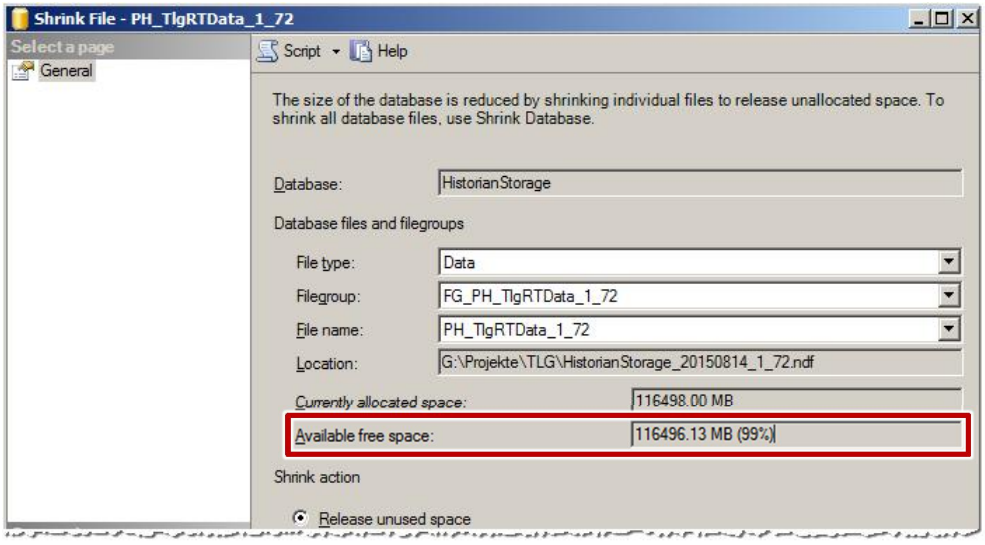
WARNING	Since these measures directly affect the PH database, they should be considered only in a situation of **acute lack of memory**, but **not** as a standard procedure for releasing hard disk space.

3.1 Shrinking the Size of Database Files in the Microsoft SQL Server Management Studio

This measure can release hard disk space quickly in particular for databases with many and/or large prepared segments (future segments). For selective shrinking of database files belonging to the future segments, the files must first be identified in the Windows Explorer or SQL Server Management Studio.

The "Shrink" function dialog displays the available free space.

Figure 3-1

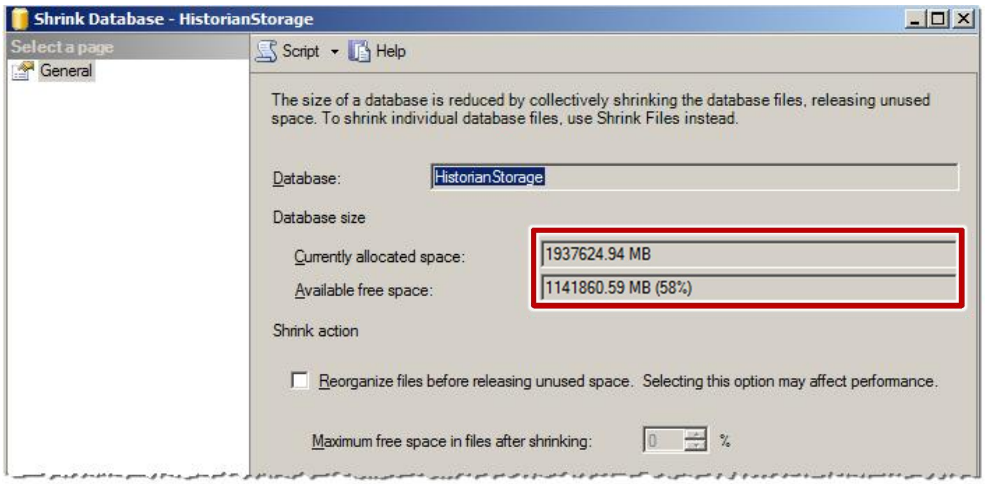


3.2 Shrinking the Complete PH Database in the Microsoft SQL Server Management Studio

This measure is less complicated than the shrinking of individual future segments, but it can take a lot longer and under circumstances it shrinks database files which later have to be enlarged again by the SQL server with corresponding loss of performance.

The maximum additional free space is displayed in the dialog window before triggering the "Shrink" function.

Figure 3-2



4 Related literature

Table 4-1

	Topic	Title / Link
\1\	Siemens Industry Online Support	http://support.industry.siemens.com
\2\	Download page of this entry	https://support.industry.siemens.com/cs/ww/en/view/66579062
\3\		

5 History

Table 5-1

Version	Date	Modifications
V1.0	11/2015	First version