Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent
damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert
symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are
graded according to the degree of danger.

<table>
<thead>
<tr>
<th>DANGER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicates that death or severe personal injury will result if proper precautions are not taken.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicates that death or severe personal injury may result if proper precautions are not taken.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicates that minor personal injury can result if proper precautions are not taken.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicates that property damage can result if proper precautions are not taken.</td>
</tr>
</tbody>
</table>

If more than one degree of danger is present, the warning notice representing the highest degree of danger will
be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to
property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by personnel qualified for the specific
task in accordance with the relevant documentation, in particular its warning notices and safety instructions.
Qualified personnel are those who, based on their training and experience, are capable of identifying risks and
avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
</table>
| Siemens products may only be used for the applications described in the catalog and in the relevant technical
documentation. If products and components from other manufacturers are used, these must be recommended
or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and
maintenance are required to ensure that the products operate safely and without any problems. The permissible
ambient conditions must be complied with. The information in the relevant documentation must be observed. |

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may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software
described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the
information in this publication is reviewed regularly and any necessary corrections are included in subsequent
editions.
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SIMATIC Process Historian is a central archiving system for storing process data, such as process values and messages. The Process Historian uses the Microsoft SQL Server 2008 R2 SP1 64 Bit and archives historical data originating from a PCS 7 Operator Station (OS)/ WinCC OS and SIMATIC BATCH. The data can belong to different PCS 7 or WinCC projects. Access to the historical data is transparent for the OS Clients.

Process Historian employs four services for processing, storing and backing up data:

- SIMATIC Process Historian Server
  This service implements all functions the server needs to process and store data.

- Process Historian Maintenance Service
  This service implements all functions that are necessary to maintain the Process Historian database. The Maintenance Service handles tasks such as starting mirroring, mirror monitoring, restore functions, maintenance of the transaction log and suchlike.

- Process Historian Redundancy Service
  This service implements functions that are necessary for data exchange between two redundant server systems.

- Process Historian Discovery Service
  This service supports the search for connected Process Historian systems. The Discovery Service is essential for the functionality of the Process Historian.

You can give the Process Historian the following commands by using the shortcut menu of the icon in the system tray:

- Starting
- Shutting down
- Starting restore

The following table provides an overview of the operating states and the color coding of the associated icons in the system tray:
### Basics

#### 1.1 Overview

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Process Historian operating state</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="symbol" alt="Active" /></td>
<td><strong>Active</strong></td>
<td>In the &quot;Active&quot; operating state, the Process Historian archives data. You can query data from the OS Server or Information Server.</td>
</tr>
<tr>
<td><img src="symbol" alt="Restoring" /></td>
<td><strong>Restoring</strong></td>
<td>In the &quot;Restoring&quot; operating state, the Process Historian requests data from an OS Server for a recognized period of inactivity. The preceding and the subsequent operating state is &quot;Active&quot;.</td>
</tr>
<tr>
<td><img src="symbol" alt="Starting restore" /></td>
<td><strong>Starting restore</strong></td>
<td>This operating state starts &quot;Restoring&quot;.</td>
</tr>
<tr>
<td><img src="symbol" alt="Stopping restore" /></td>
<td><strong>Stopping restore</strong></td>
<td>This operating state terminates &quot;ActiveRecovery&quot; and is an intermediate state between &quot;ActiveRecovery&quot; and &quot;Active&quot;.</td>
</tr>
<tr>
<td><img src="symbol" alt="Deactivated" /></td>
<td><strong>Deactivated</strong></td>
<td>The Process Historian changes to the &quot;Deactivated&quot; operating state in the case of maintenance tasks where access to the database is limited. The maintenance tasks can include the creation or the backing up/restoring of segments. The system is offline in this operating state. Access via a network is not possible.</td>
</tr>
<tr>
<td><img src="symbol" alt="Deactivate" /></td>
<td><strong>Deactivate</strong></td>
<td>&quot;Deactivate&quot; is the intermediate state between &quot;Active&quot; and &quot;Deactivated&quot;.</td>
</tr>
<tr>
<td><img src="symbol" alt="Error" /></td>
<td><strong>Error</strong></td>
<td>The &quot;Error&quot; operating state occurs when an error has been recognized or when no connection to the SIMATIC Process Historian service exists.</td>
</tr>
<tr>
<td><img src="symbol" alt="Inactive" /></td>
<td><strong>Inactive</strong></td>
<td>No data is archived in the &quot;Inactive&quot; operating state. In this operating state, you can carry out updates, maintenance work to the Process Historian PC or a restart of the PC.</td>
</tr>
<tr>
<td><img src="symbol" alt="Shutting down" /></td>
<td><strong>Shutting down</strong></td>
<td>Intermediate state between &quot;Active&quot; and &quot;Inactive&quot;</td>
</tr>
<tr>
<td><img src="symbol" alt="Starting" /></td>
<td><strong>Starting</strong></td>
<td>Intermediate state between &quot;Inactive&quot; and &quot;Active&quot;</td>
</tr>
<tr>
<td><img src="symbol" alt="Not defined" /></td>
<td><strong>Not defined</strong></td>
<td>Initial state for &quot;Inactive&quot;</td>
</tr>
</tbody>
</table>
1.2 Data structures

Value sequences

The Process Historian operates with time-variant value sequences that include runtime data and configuration data (GUID). Each time-variant value sequence is identified by a sequence identifier that references the configuration data and runtime data for a time-variant value sequence.

The time-variant value sequences are divided into data groups in the Process Historian for better parallel processing.

Each data group is assigned a storage location on a shared cluster of physical sources. Such as a group of several hard disks, for example:

- Data group 1 on drive partition 1
- Data group 2 on drive partition 2
- etc.

Note

You can distribute the data groups among the available hard disks in order to influence the performance and the scaling of the system used. Distribution is carried out using the Wizard when creating the database.

Partition

The amount of runtime data of a single time-variant value sequence, such as an archive tag, for example, is unlimited and grows constantly.

The entire amount of data that is assigned to an individual time-variant value sequence must therefore be divided into several "partitions" using the time axis.

Data groups are divided into partitions using the time axis.

The following conditions apply to partitions:

- Each partition has a high and low limit for the time period.
- But the high time limit must always be higher than the low one.
- The partitions of a data group should not overlap.

Segment of a runtime database

A "segment" combines the data partitions of several data groups.
A database segment consists of the sum of partitions of all data groups that share the same high and low time limits. These groups correspond to the limits of the segment.

The difference between the high and low time limit is referred to as the "time period" of the database segment.

Each segment has a unique segment number.

- The start segment, the first segment created in a system, has the number 100,000.
- The segment whose low limit is equal to the high limit of segment n is referred to as segment n+1.
- The segment whose high limit is equal to the low limit of segment n is referred to as segment n-1.
### 1.3 Segmentation

#### Introduction

The Process Historian can process and manage very large amounts of data. The saved data is split up into segments so that performance is not impaired.

Segments are defined by a time period with a high and low time limit. A segment contains the amount of data that was recorded during the defined time period.

By default, segments are created with a segment size of one week when the Process Historian database is created. You can change this setting. You can find information on changing segment configurations under 'Segmentation dashboard (Page 28)'.

You cannot retroactively reconfigure segments that already contain data.

#### Segmentation configuration

You can change the properties of segmentation on the "Segmentation" dashboard as Process Historian administrator.

You can make the following settings:

- Anchor point of segmentation
- Time period of a segment
- Number of prepared segments
- Total number of runtime segments

The following table provides an overview of the basic segmentation parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor point of</td>
<td>Date, time</td>
<td>Start time of the segment</td>
</tr>
<tr>
<td>segmentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time period of</td>
<td>Day, week, month, quarter, year</td>
<td>Segment size</td>
</tr>
<tr>
<td>the segment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiplier</td>
<td>Integer</td>
<td>Multiplier for the set time period for segmentation, the specified segment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>size is multiplied by the selected number, the size of the segment increases</td>
</tr>
<tr>
<td>Number of segments</td>
<td>Prepared segments</td>
<td>Total number of prepared segments</td>
</tr>
<tr>
<td></td>
<td>Total number of runtime segments</td>
<td>Number of segments not yet archived and still in runtime</td>
</tr>
</tbody>
</table>

The Process Historian continuously creates segments with the defined time period. To ensure that the entire period of possible times is covered, there is a high and a low "Catch-all" segment. These special segments collect all incoming data that lies outside the current runtime segment. These segments are called "Catch-all-upper" (CAU) and "Catch-all-lower" (CAL). The CAL and CAU segments exist permanently. They cannot be deleted, removed or set to offline.
Anchor point

When you change the anchor point, it should refer to a time at or after the last time stamp. The anchor point of the segmentation does not have to be changed if the number of prepared segments or the total number of runtime segments is to be changed. Any existing segments are not deleted when the settings are changed (e.g. reducing the prepared segments).

This means the new settings are not reached when you reduce the prepared signals until the surplus and prepared segments have been exhausted.

If the number of prepared signals is increased, a segmentation with the new settings is initiated immediately.

Note

If the last segment of the existing segmentation configuration ends before the anchor point of the new segmentation, an intermediate segment must be created. This intermediate segment starts with the end time of the last segment of the existing segmentation configuration and ends with the start time of the new segmentation configuration. A suitable anchor point is suggested to avoid the need for an intermediate segment. If you reject this suggestion, an intermediate segment is created automatically.

Segments: Types

In the Process Historian, a distinction is made between segments of the "Runtime" and "Archive" types.

Runtime segments are displayed on the "Segmentation" dashboard. They have the following properties:

- The data in runtime segments can be changed by the Process Historian system at any time.
- Runtime segments cannot be compressed.
- Runtime segments cannot be backed up.

<table>
<thead>
<tr>
<th>Action</th>
<th>Runtime segment</th>
<th>Archive segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Compression</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Back up</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Delete</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Archive segments are displayed on the "Backup/Restore" dashboard. These are compressed or uncompressed, depending on the setting.

The status of a segment is classified as "Online" or "Offline".

- Segments of the "Runtime" type always have the status "Online".
- Segments of the "Archive" type can have the status "Online" or the status "Offline".
You can only read the contents of segments that are online. In order to read the contents of segments that are offline, you have to restore these segments.

**Note**

Information about restoring a segment is available under [Restoring a segment (Page 25)].

### Segments: Status

The properties of segments are structured as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Status</th>
<th>Reading</th>
<th>Writing</th>
<th>Archiving</th>
<th>Deleting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runtime</td>
<td>Online</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Archive</td>
<td>Online</td>
<td>Yes</td>
<td>Indirect 1)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Archive (archived)</td>
<td>Online</td>
<td>Yes</td>
<td>Indirect 1)</td>
<td>Yes</td>
<td>Yes 2)</td>
</tr>
<tr>
<td>Archive (deleted)</td>
<td>Offline</td>
<td>No</td>
<td>Indirect 1)</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

1) Pending changes in the CAL segment are transferred to the archive segment during the backup.
2) Can only be deleted if no changes to the data were carried out after the last archiving.
The following section describes the hardware requirements for Process Historian.

Overview of the configuration

The hardware configuration shown here refers to the SIMATIC Process Historian and the Information Server. The simple configuration of Process Historian provides a clear overview of the topology.

The following figure illustrates a simple configuration:

A sufficiently powerful PC system is capable of handling all tasks involved. This configuration is suitable for small-scale installations with corresponding quantity frameworks.

Hardware example for small quantity frameworks

For a data volume of up to three servers and a maximum archiving load of 1000 values per second and server, you can use a SIMATIC IPC 847C.

This includes the following hardware:
**CPU** | Core i7-610E (2C/ 4T, 2.53 GHz, 4 MByte Cache, TB, VT-x, VT-d, EM64-T)  
---|---  
**Work memory (RAM)** | 8 GByte DDR3 SDRAM (2 x 4 GByte), DIMM, ECC, Dual Channel  
---|---  
**Hard disks** | 1 x 100 GByte SSD SATA; internal Operating system and software  
---|---  
**RAID controller** | HW-RAID Controller PCIe X8 in PCIe X16 Slots incl. Batterie Backup Unit (BBU)  
---|---

The specified RAID 5 system has a capacity of approximately 1.8 TByte.  
All SAS HDDs are connected to the hardware RAID controller.

**Process Historian and Information Server on the same system**

Process Historian and Information Server can be installed and operated on the same system.  
In this case the two server applications share the available hardware resources. It is advisable to install higher-grade equipment in order to be prepared for higher data request rates from the WinCC client systems and Information Server clients. We recommend 16 GBByte in this case.

**Hardware example for medium quantity frameworks**

For a data volume of up to 12 servers and an archiving load of up to 12,000 values per second, you use a system with hardware comparable to the following example.

The configuration of a PRIMERGY TX300 S6 with minimum equipment as follows:

| CPU | Intel Xeon X5690 6C/ 12T 3.46 GHz 12 MB  
---|---  
**Work memory (RAM)** | 4 x 8 GB DDR3 1333 MHz PC3-10600  
---|---  
**Hard disks** | RAID 1; 2 x HD SAS 6G 300 GB 10K HOT PL 2.5" Operating system and software  
---|---  
**RAID controller** | SAS 6G 5/ 6 512 MB (D2616); BBU expansion RAID 5/ 6 V16  
---|---

The RAM and the number of processors and hard disks can be expanded with this configuration.

The hardware configuration described is based on the use of internal hard disks for:

- Operating system, SQL server software,
- Process Historian Database
- And transaction log.

You can expand the scale in regard to database size and performance by using a Storage Area Network (SAN).
The creation and distribution of the database over several symmetric database groups on physically separate RAID systems also allows for a scaling of performance.

**Hardware example for large quantity frameworks**

For a data volume from several projects and an archiving load of more than 12,000 values per second, you use a system with hardware comparable to the following example.

The configuration of a PRIMERGY RX300 S7 with minimum equipment as follows:

<table>
<thead>
<tr>
<th>CPU</th>
<th>2 x XEON E5-2690 16C/32T 2.9 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work memory (RAM)</td>
<td>49152 MB</td>
</tr>
<tr>
<td>Hard disks (internal)</td>
<td>4 x 300 GB 2 x RAID 1</td>
</tr>
<tr>
<td>Storage Area Network</td>
<td>4 x RAID 1 (je 2 x HD SATA 2 TByte)</td>
</tr>
<tr>
<td></td>
<td>PH Database: 4 tag data groups from 0 to 3</td>
</tr>
<tr>
<td></td>
<td>6 TByte (3 x RAID 1, je 2 x HD SATA 2 TByte)</td>
</tr>
<tr>
<td></td>
<td>PH Database: Alarms, BATCH data, configuration data tags and alarms</td>
</tr>
<tr>
<td></td>
<td>3 TByte (3 x RAID 1, je 2 x HD SATA 1 TByte)</td>
</tr>
<tr>
<td></td>
<td>PH Database: Transaction log, general data groups</td>
</tr>
<tr>
<td>RAID controller</td>
<td>SAN Infortrend DS S24F-G2840-4 (14 x 2 TB, 6 x 1TB)</td>
</tr>
</tbody>
</table>

**Redundant Process Historian servers**

A redundant Process Historian system consists of symmetrically configured servers for Master (Principal) and Standby (Mirror) operation (e.g. PRIMERGY TX300 S6).

We recommend a dedicated redundancy connection with a minimum bandwidth of 1 Gbit between the redundant Process Historian servers.

The Witness server component for scenarios with automatic redundancy failover is also installed on an additional server of the plant, depending on availability of an Information Server or WinCC server.
3 Management console

3.1 Overview

The management console is included in the installation of the Process Historian. It is used for diagnostics and configuration of the Process Historian system and is automatically started upon logon. For a manual start, open the management console by using "Start > Programs > Siemens Automation > SIMATIC > Process Historian > Process Historian Management Console".

The following table shows the dashboards of the management console and their tasks:

<table>
<thead>
<tr>
<th>Dashboard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Historian Management</td>
<td>• Display of fundamental hardware indicators and performance indicators for the PC and operating system&lt;br&gt;• Display of basic indicators for the status and current activity of the Process Historian server&lt;br&gt;• Display of the license status&lt;br&gt;• Redundancy status&lt;br&gt;• Changing the operating state</td>
</tr>
<tr>
<td>System structure</td>
<td>• Display of incorporated projects&lt;br&gt;• Display of the OS server systems&lt;br&gt;• Display of the PC name</td>
</tr>
<tr>
<td>I/O systems</td>
<td>• Display of the available input and output devices&lt;br&gt;• Display of the memory space used&lt;br&gt;• Detailed information about the load</td>
</tr>
<tr>
<td>Diagnostics</td>
<td>• Diagnostic messages of the Process Historian&lt;br&gt;• Messages from the event display of the operating system</td>
</tr>
<tr>
<td>Backup/Restore</td>
<td>• Display of the segments of the &quot;Runtime&quot; type&lt;br&gt;• Display of the segments of the &quot;Archive&quot; type&lt;br&gt;• Creating segment backups&lt;br&gt;• Restoring backed-up segments</td>
</tr>
<tr>
<td>Compression</td>
<td>• Display of the compression state&lt;br&gt;• Turning on and turning off the post-compression&lt;br&gt;• Configuration of the number of uncompressed archive segments</td>
</tr>
<tr>
<td>Segmentation</td>
<td>• Display of the current segmentation setting&lt;br&gt;• Changing the segmentation settings</td>
</tr>
</tbody>
</table>
3.2 Process Historian Management dashboard

The "Process Historian Management" dashboard includes information about:

- Basic indicators for monitoring the PC:
  - Processor load (CPU)
  - Free memory (RAM)
  - Hard disk load (data medium load)
- Basic indicators on Process Historian:
  - Number of connected data sources
  - Stored tags per second
  - Stored messages per second
- Operating state of the Process Historian server
- Redundancy status of the Process Historian
- Licensing status of the Process Historian

### Dashboard Description

<table>
<thead>
<tr>
<th>Dashboard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redundancy</td>
<td>• Display of the redundancy status</td>
</tr>
<tr>
<td></td>
<td>• Switchover/ disconnection of principal (master) and mirror (standby)</td>
</tr>
<tr>
<td></td>
<td>• Redundancy configuration</td>
</tr>
<tr>
<td>Licensing</td>
<td>• Display of the current license status of server and project</td>
</tr>
</tbody>
</table>

**Note**

Process Historian does not archive data

If the Process Historian does not archive data, check the Microsoft Message Queueing (MSMQ) and the databases.
Status control

Process Historian status: Changing the operating mode

The operating state of the Process Historian can be changed on the "Process Historian Management" dashboard.

You can choose from the following operating modes:

- Start
- Shutting down
- Starting restore

For this purpose, select the respective entry from the drop-down list in the "Process Historian status" area.

Redundancy and licensing status

The status respectively displayed can be updated in the redundancy and licensing status fields.
3.3 Plant Structure dashboard

The "Plant Structure" dashboard displays all projects that are currently integrated in the system.

When you select a project the following information on the project is displayed:

- Name
- Type
- Description
3.4 I/O Systems dashboard

The "I/O Systems" dashboard displays the entire memory system to which there is read and write access and in which data is archived. The dashboard displays all hard drives integrated in the system. This includes hard drives that do not contain archive data.

The "I/O systems" dashboard displays the following information on the storage system:

- Name and drive letter of the hard drives
- File system
- Total storage space: Capacity
- Absolute available storage space
- Free storage space in percent
- Absolute storage space used

The states of the input and output devices are graphically monitored by the system. If you select a drive, you receive the following detailed information on the selected drive:

- Idle time of the hard drive: Idle time
- Average duration per transfer
- Average length of queue for read access
- Byte per second with read access to data medium
- Average length of queue for write access
- Reading speed in Byte per second
- Writing speed in Byte per second
3.5 Diagnostics dashboard

The upper area of the "Diagnostics" dashboard displays the last 1000 diagnostic messages from the Process Historian event log.

The event log of the Process Historian contains the following information:

- Log entry ID
- Severity of the message
- Time stamp
- Name of application domain
- Process ID
- Message

The lower section of the dashboard includes the last 100 entries from the event log for Windows applications. The following information is displayed:

- Time stamp
- Message
- Category
- Source
3.6 Backup/Restore dashboard

3.6.1 Introduction

Backup types

The Process Historian saves process values and messages in temporally defined segments. Back up the contents of the Process Historian database correspondingly by segment.

When an archive segment is backed up, the runtime data is stored in the backup file. The stored data includes:

- Process values
- Messages
- Configuration data

You can plan the backup of data using the "Settings ..." button in the "Archive segments" area of the 'Backup/Restore' dashboard.

You can make selected archive segments available as runtime data once again by using the "Restore ..." button in the 'Restore segments' area.
3.6.2 Creating segment backups

Requirement

- The segment to be backed up has the "Archive" status.

Note
During backup or restore, the Process Historian briefly switches to the "Deactivated" state up to two times.
Your access to the database is limited in this operating state.

Procedure

Manual backup
1. Select the "Backup/Restore" dashboard in the navigation of the management console.
2. Select the segment you want to back up in the "Archive segments" area.
### 3.6 Backup/Restore dashboard

3. Click the "Backup" button to launch backup.

4. Select the storage location for the backup file in the "Backup segment" dialog box that opens. Click "Backup".

   You can specify further identifiers and descriptions for the backup such as the name or number of the data medium.

**Automated backup**

You can plan the backup of data and automate backup processes using the "Settings ..." button in the 'Archive segments' area of the 'Backup/Restore' dashboard.

### Result

A backup is created and the date of the backup entered. The segment remains in the "Online" status and is not moved.

#### 3.6.3 Restoring a segment

If you want to access data that is stored in an archived segment, you must restore the respective segments. When restoring a segment, you must select the backup file corresponding to the segment.

---

**Note**

During backup or restore, the Process Historian briefly switches to the "Deactivated" state up to two times.

Your access to the database is limited in this operating state.

---

**Requirement**

- The corresponding backup file for the segment to be restored is available.
- The Process Historian is in the "Active" operating state.

**Procedure**

1. Select the "Backup/Restore" dashboard in the navigation of the management console.
2. Select the required segment in the "Restore segments" area.
3. Click on the "Restore" button.
4. In the "Backup segment" dialog, select the corresponding backup file for the segment that is to be restored.
5. Click "Restore".
Result

You can access the data of the restored segment from the OS Server, OS Client or the Information Server.

3.6.4 Deleting a segment

There are two types of segments in Process Historian, runtime segments and archive segments. Runtime segments are always online and cannot be deleted.

As soon as the runtime segment becomes an archive segment, you can perform a backup for it. The archive segment can be deleted (set offline) after successful backup.

The system only saves the information to restore the backed up segment.

Requirement

- There is a valid backup for the segment that is to be deleted.

Note

You can only use the "Set offline" button if a backup of the selected segment has already been created and this segment is marked as "valid". A segment is, for example, marked as "invalid" if additional runtime data for the segment has accumulated after the creation of a backup. In this case, create a backup of the relevant segment again.

You can only delete segments individually.

Procedure

1. Select the "Backup/Restore" dashboard in the navigation of the management console.
2. Select the segment you want to delete in the "Archive segments" area.
3. Click the "Set offline" button.

Result

The segment is deleted from the database.
3.7 Compression dashboard

On the "Compression" dashboard, you can see the current compression state as well as the current default number of uncompressed segments contained. The contained uncompressed segments are counted starting from the first archive segment.

Note

The archive segments are compressed automatically in the background. You can set the number of archive segments that are not to be compressed. The possible compression factor depends on additional influences, such as the number and archiving cycles of the process values.

Procedure

1. Select the "Compression" dashboard in the navigation of the management console.
2. Select the "Activate" option in the 'Configuration' area for 'Post compression'.
3. Specify the number of uncompressed segments you want to keep in the "Configuration" area.
4. Click "Apply".

Result

The settings for the compression of archive segments have been reconfigured.
3.8 Segmentation dashboard

The "Segmentation" dashboard provides an overview of the current segmentation configuration.

You configure the segmentation of the Process Historian archives in the "Settings" area.

<table>
<thead>
<tr>
<th>Segment status</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed runtime segment</td>
<td>Gray</td>
</tr>
<tr>
<td>Current segment</td>
<td>Green</td>
</tr>
<tr>
<td>Prepared segment</td>
<td>Blue</td>
</tr>
</tbody>
</table>

The segment states are color coded:

1. Segmentation anchor point:
   - Hour
   - Date

2. Time period for segments:
   - Unit (period)
   - Factor

3. Number of segments:
   - Number of future segments
   - Total number of runtime segments
The "Database Installation Wizard" supports you in the installation of the Process Historian database. By default, the following presettings are made for the segmentation during installation:

<table>
<thead>
<tr>
<th>Segment size</th>
<th>One week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of segments in runtime</td>
<td>Eight</td>
</tr>
<tr>
<td>Number of prepared segments</td>
<td>Three</td>
</tr>
</tbody>
</table>

**Note**

**Process Historian Installation Notes**

Additional information on defaults of the Process Historian database is available in the Installation Notes.

Depending on the quantity structure, the amount of data per segment can be very large. This applies to all segments in runtime. When the segments are created, the estimated required memory space is reserved.

The optimum settings for the segmentation are a compromise between the memory space used and the number of uncompressed data segments to be reserved.

**Note**

The Process Historian database is switched automatically to the "Deactivated" state to allow changes to the segmentation to be carried out. After the settings have been accepted, the database changes back to the "Active" state automatically.

**Procedure**

1. Select the "Segmentation" dashboard in the navigation of the management console.
2. In the "Number of segments" area, select the required number of segments to be prepared continuously.
3. In the "Number of segments" area, select the required total number of runtime segments.
4. Click "Apply".

**Result**

The segmentation of the Process Historian database is configured.
3.9 Dashboard Redundancy

You configure the redundancy of the Process Historian in the 'Redundancy' dashboard. You specify the configuration for a redundant system in the following areas:

- Redundancy status
- Remove redundancy
- Redundancy

To create a new redundant system, click the "Start redundancy configuration..." button in the 'Redundancy' area.

Follow the instructions of the "Process Historian Redundancy Wizard" to configure a new redundant system.

**Note**

**Process Historian Redundancy Wizard**

You will find detailed information on redundancy configuration in the Process Historian Installation Notes.
Redundant Process Historian servers

A redundant Process Historian system consists of symmetrically configured servers for master (principal) and standby (mirror) operation (e.g. PRIMERGY TX300 S6). We recommend a dedicated redundancy connection with a minimum bandwidth of 1 Gbit between the redundant Process Historian servers. The Witness server component for scenarios with automatic redundancy failover is also installed on an additional server of the system, depending on availability of an Information Server or WinCC server.

Note
Redundancy

More information on redundant systems can be found in the section 'Redundant system (Page 33)'.

---

Management console
3.9 Dashboard Redundancy
3.10 Licensing dashboard

Dashboard

The "Licensing" dashboard gives you an overview of the licenses used and available in the system.

The availability of the Process Historian license is displayed.

You also obtain detailed information about the states of the tag licenses:

- Available
- Required
- Free

The Process Historian does not require any archive tag licenses for the PCS 7 OS/WinCC sources.

When you select a project, you receive information on the project-specific license status with the following information:

- Project name
- Project type
- Number of tags
Redundant system

Redundancy

The redundant systems are based on the Microsoft SQL Server mirroring.

Process Historian requires a third system to monitor the availability of redundancy. The Information Server can usually be assigned the role of 'Witness'.

Note

Setting up redundancy

You start the Redundancy Wizard using the "Redundancy" dashboard of the Process Historian management console. You can find additional information in the section 'Dashboard redundancy' (Page 30) as well as in the Process Historian Installation Notes.

Scenarios for standard behavior

The following terms are used without product labels in this section for better readability:

- **Principal**: Process Historian Master
- **Mirror**: Process Historian Standby
- **Witness**: Information Server

Overview of redundancy scenarios
1. **The Mirror is temporarily inactive:**
   - The Principal and the Mirror are active and synchronized.
   - The Mirror is separated from the network, for example, for maintenance work.
   - There is no data synchronization between the Principal and the Mirror in this case.
   - The transaction log on the Principal is growing.
   - The Mirror is reactivated after a certain period.
   - The Principal and Mirror are in the resynchronization status.
   - Once the data is synchronized, the two server systems are once again synchronized and redundant.

2. **The Principal fails:**
   - The Principal and the Mirror are active and synchronized.
   - The Principal server system fails.
   - The Mirror queries the Witness, if it has an active connection to the Principal.
   - If the Witness does not have a connection to the Principal, the Mirror automatically switches to 'Principal' mode.
   - If the Witness has an active connection to the Principal, there is no automatic failover.
   - Before the Mirror switches to Principal mode, the pending data from the transaction log is processed.
     - This may take some time.
   - The connection to the Principal is re-established.
   - The previous Principal now takes on the role of the 'Mirror'.
   - The Principal and the Mirror are in the resynchronization status.
   - Once the data is synchronized, the two server systems are once again synchronized and redundant.

3. **The Witness fails:**
   - The Principal and the Mirror are active and synchronized.
   - The Witness server fails.
   - A failover is not necessary, because none of the archiving systems is affected.
   - An automatic failover is not possible in this case.
   - The Witness is active once again.
   - Automatic failover is possible once again.
4. **The Mirror is disabled and will not be available for a longer period of time.**
   - The Principal and the Mirror are active and synchronized.
   - The Mirror is separated from the network, for example, for maintenance work.
   - Data synchronization between the Principal and the Mirror does not take place.
   - The transaction log on the Principal is growing.
   - Redundancy synchronization (Mirroring) must be deactivated to prevent an overflow of the transaction log.
   - If it is not deactivated in time, Mirroring ends automatically as soon as the transaction log becomes too large for the hard disk capacity.
     This automatic function ensures the availability of the Principal.
   - The Mirror is active once again.
   - Data is not synchronized; Mirroring must be set up once again.

5. **The Mirror and the Principal are switched off and on in succession:**
   - Both servers, Principal and Mirror, are synchronized.
   - The data is redundant and identical on both servers.
   - The Mirror is switched off.
   - The data is still saved on the Principal.
     The data is no longer synchronized because the Mirror is switched off.
     This means the database on both servers is not identical.
     The transaction log of the Principal is growing.
   - The Principal is switched off.
   - No data can be saved.
   - The previous Mirror is switched on.
   - The Mirror works but data cannot be synchronized with the Principal.
     To prevent the risk of data loss, there is no automatic failover from Mirror for the Principal in this case.
     If a manual failover is forced, the previous Mirror would take over the role of the switched off Principal.
     If the actual Principal is switched on once again, it takes over the role of 'Mirror'.
     The previously saved data would be deleted in case of a synchronization with the new 'Principal' that is actually missing these databases.

These technical conflicts can be resolved in different ways with the Process Historian management console. The options for resolving these conflicts are described in the following section.
Conflict management with the Process Historian management console

1. Failover (switchover)
   - In case of a failover, the Principal and the Mirror swap roles.
   - This is only possible when the systems are synchronized.

2. Disconnect(Separate)
   - In case of a disconnect, the current Mirror is declared as 'Principal' even if the systems are not synchronized at this time.
   - This results in a loss of data that is not synchronized.
   - This procedure is only available on the Mirror.
   - You should only use this function if the Principal is in an undefined state or if the automatic failover fails.

3. Remove (Delete)
   - Mirroring ends when the redundancy is removed.
   - This procedure is only available on the Principal.
   - You should only use this function if the Mirror does not respond or is not/will not be available for a long time.
   - This action terminates the growth of the transaction log.
Migration of CAS databases to the Process Historian

The following graphic shows the concept of migrating a CAS (Central Archive Server) database to the Process Historian in an PCS 7/ WinCC environment.

Legend
1. Setting up of a new computer with the Process Historian including the database migration tool.
2. Updating of the software of the Engineering Station.
3. Migrating the PCS 7 project.
4. Within the PCS 7 project:
   - Manual deleting of the PC station CAS (Central Archive Server).
   - Setting up a new PC station for the Process Historian.
5. Stopping of the servers/ individual stations and updating of the software.
6. Updating of the OS projects and restarting of the OS-Server/ individual stations.
7. The OS-PH communication is established automatically.
   The active OS-PH communication is mandatory, because the CAS databases cannot be
   assigned to a project otherwise.
8. Starting of the Migration Tool, selection of the CAS database server and starting of the
    migration process.

Migration of all the CAS databases is carried out in the background during running operation.

---

**Note**

**Configuration of the service CCCAPHServe**

The service for the Process Historian Ready must be configured before you restart the
updated OS-Server/ individual stations.

Additional information is available in the Process Historian Installation Notes, in the section
'Install Process Historian Ready component'.

---

**Replacing a CAS object in a PCS 7 project by a PH object**

The following steps have to be carried out for a PH Migration to an ES (Engineering System).

1. Remove the PC station with the 'CAS' role from the PCS 7 project.
2. Open the OS allocation dialog and and clear the CAS allocation at all OS Clients and OS-
   Server.
   
   If the CAS object is deleted on the ES, the paging paths for the archive backup files of the
   OS are not deleted automatically. They have to be deleted manually by the user.
   
   If the CAS computer does no longer exist and the paging paths are still listed, a process
   control message is output each time there is a segment change.
3. Setting up a new PC station for the Process Historian

---

**Note**

**Delete CAS paging paths/ deactivating backup**

The CAS paging paths must be deleted in the properties of the tag logging and alarm logging
archives. The backup must also be deactivated.
Process control messages

Overview

Process Historian contains process control messages that visualize specific system states. These pre-defined messages only contain information about process control states and do not return process status data.

The following table provides an overview of the process control messages generated in Process Historian:

<table>
<thead>
<tr>
<th>Message number</th>
<th>Message text</th>
</tr>
</thead>
<tbody>
<tr>
<td>1012500</td>
<td>PHRDY: Start recovery for Process Historian</td>
</tr>
<tr>
<td>1012501</td>
<td>PHRDY: Recovery for Process Historian complete</td>
</tr>
<tr>
<td>1012502</td>
<td>PHRDY: No communication with Process Historian possible</td>
</tr>
<tr>
<td>1012503</td>
<td>PHRDY: Communication with Process Historian is interrupted</td>
</tr>
<tr>
<td>1012504</td>
<td>PHRDY: Communication with Process Historian is restored</td>
</tr>
<tr>
<td>1012505</td>
<td>PHRDY: Process Historian server offline since @1%s@</td>
</tr>
<tr>
<td>1012506</td>
<td>PHRDY: Buffer limit channel @1%s@ exceeded</td>
</tr>
<tr>
<td>1012507</td>
<td>PHRDY: Buffer limit channel @1%s@ normal</td>
</tr>
<tr>
<td>1012600</td>
<td>PH: Data capacity @1%d@% full</td>
</tr>
<tr>
<td>1012601</td>
<td>PH: System out of resources</td>
</tr>
<tr>
<td>1012602</td>
<td>PH: Redundancy failed</td>
</tr>
<tr>
<td>1012603</td>
<td>PH: Redundancy restored</td>
</tr>
<tr>
<td>1012604</td>
<td>PH: Available licenses exceeded. Shutdown in @1%d@ days</td>
</tr>
<tr>
<td>1012605</td>
<td>PH: PH-Ready @1%s@ failed</td>
</tr>
</tbody>
</table>
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