



Hyper Historian Redundancy Setup Options



APPLICATION NOTE

September 2013

Description: Guide to configuring Hyper Historian redundancy settings

OS Requirement: Vista x64/ Windows 7 x64/ Windows 8 x64/ Windows Server 2008 x64/ Windows Server 2008 R2 x64/ Windows Server 2012.

General Requirement: Hyper Historian installed

Introduction

GENESIS64 supports redundancy for both 64-bit and 32-bit Servers. This means that in GENESIS64 you can set up redundant servers for:

- Data redundancy (OPC DA, UA DA)
- Alarm redundancy (OPC AE)
- Historical redundancy using Hyper Historian (OPC HDA, UA HDA)

For instructions on how to set up GENESIS64 redundancy, please refer to the application note entitled, **GENESIS64 - Redundancy Setup Options**. Focus on the section "Best Practice For Setting Up Redundancy", as the same instructions can be used for the Hyper Historian redundancy settings.

As shown in Figure 1, the FrameWorX server connects to other GENESIS64 and GENESIS32 servers to provide data to the GENESIS64 clients. As multiple communication protocols are involved in this transfer of data, multiple redundancy modules also exist.

Redundancy Architecture

Figure 1 shows OPC UA redundancy in green (on the left), and classic OPC redundancy in orange (on the right).

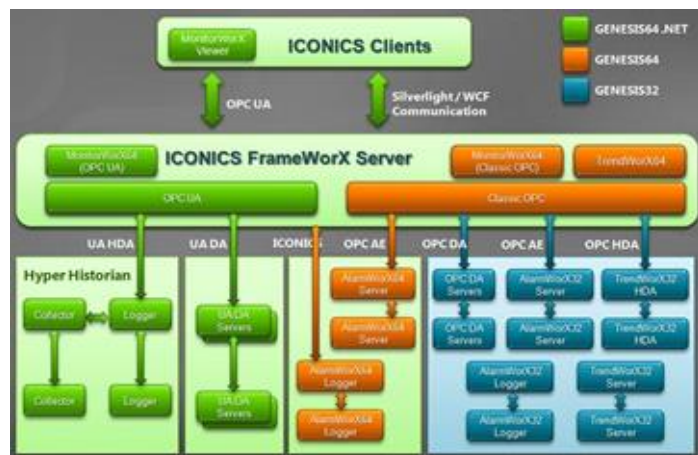


Figure 1 - Redundancy Architecture

If you have stand-by or secondary servers for your primary servers, make sure you define them as redundant. The Hyper Historian Logger can have a redundant stand-by Logger. Any Hyper Historian Collector or all the Hyper Historian Collectors can have a redundant stand-by Collector as well. In addition, data connection and Hyper Historian data reply can be configured as redundant.

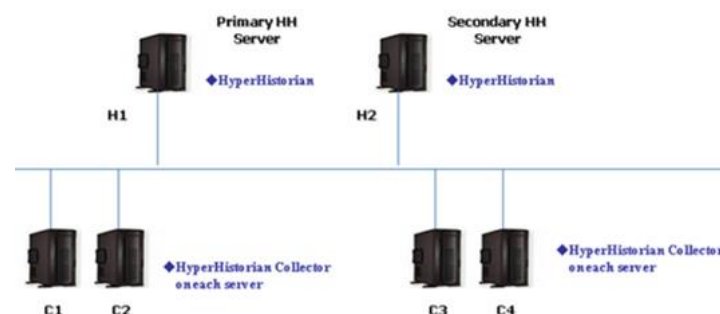


Figure 2 - Example Scenario of Hyper Historian Redundancy

Hyper Historian Redundancy

The purpose of Hyper Historian Redundancy is to prevent data loss in the event of a failure. The redundancy can be set up by configuring two loggers and two collectors which are available to log data from OPC servers. On the other hand, FrameWorX Server Redundancy (or OPC UA Redundancy) is designed to allow playback in the event of a failure; this is done by providing two FrameWorX Servers which can then provide data to the clients. As these are two different things; they are set up in two different places:

- Access to Hyper Historian data is done via OPC UA, hence redundancy for access Hyper Historian data is set up in OPC UA redundancy (described below in the "OPC UA History Data Replay" section).
- Hyper Historian Configurator is used to set up redundant collectors and loggers. (Described below in the "Nodes and Redundancy in Hyper Historian" section).

Hyper Historian Redundancy requires that all machines (servers and clients) are time synchronized. Please see the application note entitled *GENESIS64 - Synchronizing Machine Time* for suggestions on how to synchronize your machine clocks.

Hyper Historian Redundancy also requires an Enterprise Edition license for all logger and collector machines.

To check the license, open **MonitorWorX Viewer** -> **Licensing tab** -> **Genesis64** -> **HyperHistorian Enterprise Servers count**.



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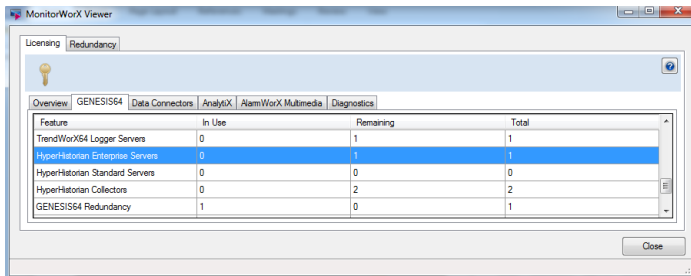


Figure 3 – MonitorWorX64 Viewer

Check the license settings in the Hyper Historian configuration as well. **Open Workbench -> Hyper Historian configuration -> System Administration -> System Settings.** It's recommended to leave the settings on "Auto Select License", but in some cases you would be able to change it manually to use Standard (non-redundancy, local collector) or Enterprise (redundancy, remote collectors) license.

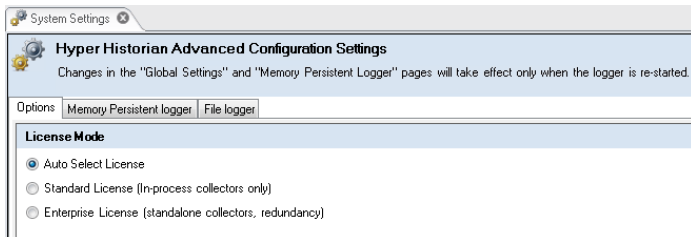


Figure 4 – Checking Hyper Historian license

Nodes and Redundancy in Hyper Historian – Four-node settings

The Hyper Historian installation initializes the Node Setup and Redundancy configuration. Its default settings are for a non-redundant single workstation setup (that is, a non-redundant Hyper Historian Logger with one local Collector).

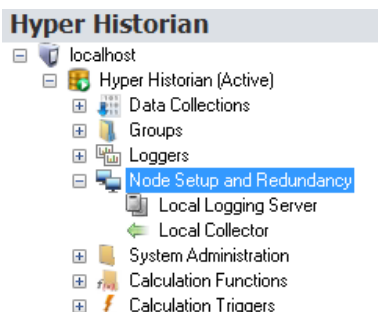


Figure 5 - Node Setup and Redundancy

Use the Node Setup and Redundancy configuration forms to perform any of the following changes:

- Modify properties of a collector or a logger
- Add or delete remote collectors (Enterprise Edition)
- Specify the redundancy settings for a collector (Enterprise Edition)
- Specify the redundancy settings for a logging server (Enterprise Edition)

Configuring a Collector Node

1. In Hyper Historian, either expand the database tree, right-click on "Node Setup and Redundancy" and select **Collector**, or double-click on an existing collector to edit it.
2. Enter the **name** for the Collector.
3. Ensure the **Enabled** check box is **checked**.
4. Enter a **description**, making it informative enough so that anyone maintaining the collector will understand its use.
5. Specify the details for the **Store and Forward** feature in the Store and Forward tab. Options are:
 - Memory and disk buffer sizes
 - Whether to send data to logger chronologically or start with the most recent

NOTE: The Store and Forward feature caches data if the connection to a logger is lost. When the connection to the logger is restored, the cache will be forwarded to the logger.

- Your discard policy (**Discard Oldest Data** first OR discard newest data first)
- The location of the node buffer is defined by xml settings unless you clear the checkbox **Use XML setting** and specify the path.

6. Next, select Standalone Collector. **Hyper Historian Redundancy cannot work with the In-Process Collector.**



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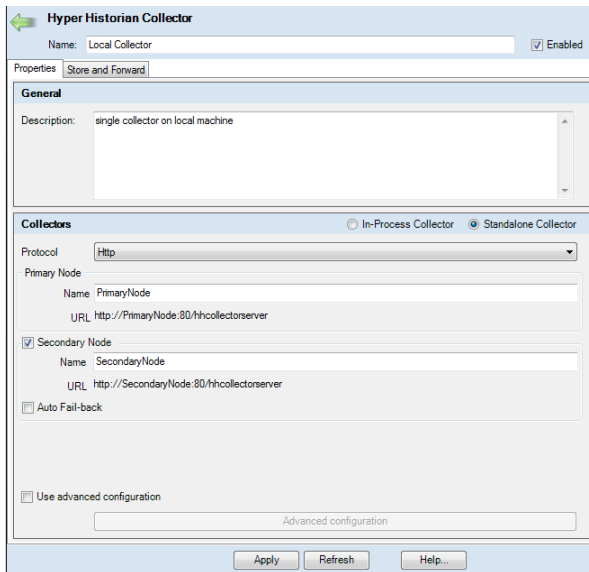


Figure 6 – Collector Setting

7. Use the **Protocol** drop-down list to select either HTTP or TCP.

NOTE: For the Windows XP collector machine you need to select TCP protocol, because HTTP protocol is not supported

8. Enter a Name for the **Primary Node**. The URL field below will be pre-filled from your primary node selection.
9. You now have the option to click the checkbox next to **Secondary Node**. The remaining steps assume you proceed with configuring a secondary node.
10. Enter a Name for the **Secondary Node**. The URL field below will be pre-filled from your backup node selection.
11. Click the checkbox next to **Auto Fail-back** to switch from the backup node to the primary node when the primary node becomes active again.
12. Click the checkbox next to **Use advanced configuration** to allow further configuration. Once the box is checked, you can click on the **Advanced Configuration** button at the bottom of the window. This opens the Advanced Redundancy Configuration window, which allows you to enter both the Primary Node URL and Backup Node URL directly.
13. Click the **Apply** button to enter the changes.

NOTE: For more information about Remote Collectors, refer to the *Hyper Historian – Remote Collectors* application note.

Configuring the Logging Server

1. In the Hyper Historian Node Setup and Redundancy tab, double-click on the existing **Local Logging Server**.
2. Edit the **name** for the Logging Server if needed.
3. Ensure the **Enabled** check box is **checked**.
4. Enter the optional **description** in the top "General" section, if desired.
5. In addition, if you wish to make the server's historical data read-only, put a checkmark in the **Disable HDA Editing** checkbox. If you do this, you won't be able to edit any Historical data being logged on the server using *any* programmatic interfaces.
6. You have the option to click the checkmark next to **Redundancy** to enable it. The following steps assume you have selected to enable Redundancy.
7. Select your desired Protocol (HTTP or TCP) by using the drop-down list.
8. Enter a name for the **Primary Node** or use the drop-down list to select one. The URL field below will be pre-filled depending on your selected primary node.
9. Enter a name for the **Secondary Node** or use the drop-down list to select one. The URL field below will be pre-filled depending on your selected secondary node.
10. Click the checkbox next to **Auto Fail-back** to switch from the backup node to the primary node when the primary node becomes active again.
11. Click the checkbox next to **Use advanced configuration** to allow further configuration. Once the box is checked, you can click on the **Advanced configuration** button at the bottom of the window. This opens the Advanced Redundancy Configuration window, which allows you to enter both the Primary Node URL and Secondary Node URL directly (rather than from the selection of the Primary/Backup Nodes in the main properties window). Note that changes to this configuration may require equivalent changes in the nodes configuration. Click **OK** to proceed.
12. When Redundancy is enabled, you can modify the Store and Forward information in the Store and Forward tab. The options are identical to those available for collectors as described in previous section.
13. Click the **Apply** button to enter the changes.



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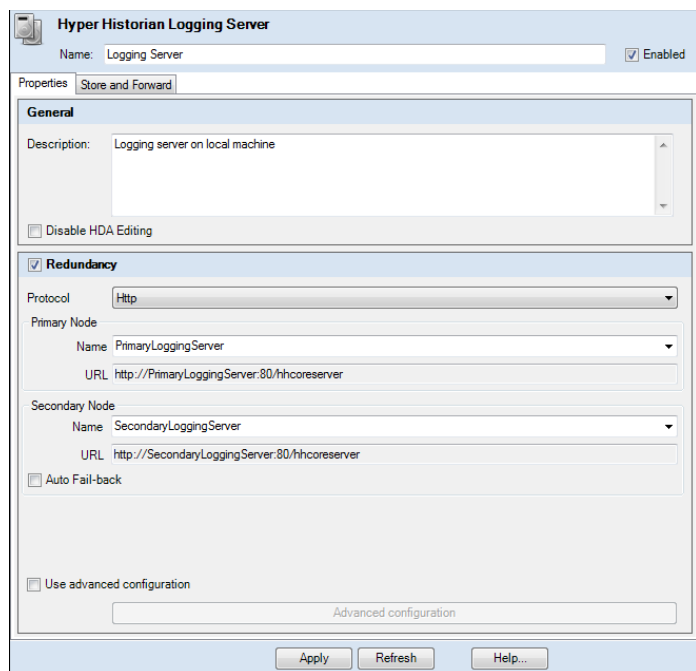


Figure 7 - Logging Server

Hyper Historian Redundancy in Redundancy Viewer

Figure 8 shows an example of the Redundancy viewer. This viewer shows the following:

- Both primary and secondary loggers are online and primary is active.
- There are 4 collectors, and both primary collectors are offline.

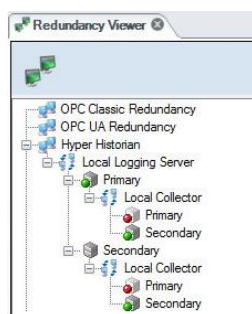


Figure 8 – MonitorWorX64 View

OPC UA History Data Replay

The following settings are needed for replaying historical data from the Hyper Historian Logger. These settings are made on primary and secondary Hyper Historian servers.

To set up redundancy for OPC UA servers:

1. In the Workbench64 Project Explorer, select the **FrameWorX Server** application.
2. Expand the tree and select **BackEnd Servers – OPC UA/.NET Servers**.

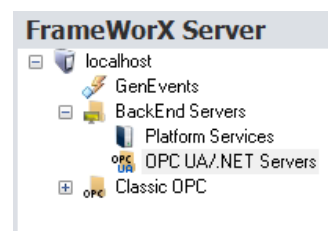


Figure 9 - OPC UA Servers

3. For each server pair, enter the **Server Name**, specify the primary server in the **Endpoint URI** column, and its secondary server in the **Secondary Endpoint URI** column.
4. Restart the FrameWorX Server.
5. The settings as shown in Fig. 10 are valid only for the Primary Hyper Historian logger. For the Secondary Hyper Historian logger it's recommended to set it up in the inverse order – Endpoint URI = Secondary server, Secondary Endpoint = Primary server. This is recommended due to the FrameWorX switch and for optimizing the performance.
6. In case the central configuration database is used, the settings are same on the primary and secondary servers
7. Open GraphWorX64 on the client machine and connect TrendWorX64 pen through Home-> OPC UA Servers -> HyperHistorian -> ...

Hyper Historian is actually the name you defined in the steps above. Requesting data from the logical server pair makes it possible to retrieve data from the secondary server if the primary server is not available.

FrameWorX Server OPC UA Servers			
This is the configuration of OPC UA servers.			
Server Name	Endpoint URI	Secondary Endpoint URI	Security Mode
HyperHistorian	http://Primary:80/HyperHistorian	http://Secondary:80/HyperHistorian	None
*			

Figure 10 - OPC UA Server Redundancy

Two-node Setup Redundancy

Hyper Historian is designed to run on multiple remote machines with number of remote collectors, but it is also capable of



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running on only two machines. Testing has shown that in this scenario Hyper Historian behaves best if the loggers are swapped, such that the primary logger is on the secondary machine and the secondary logger is on the primary machine, as shown in Figure 11.

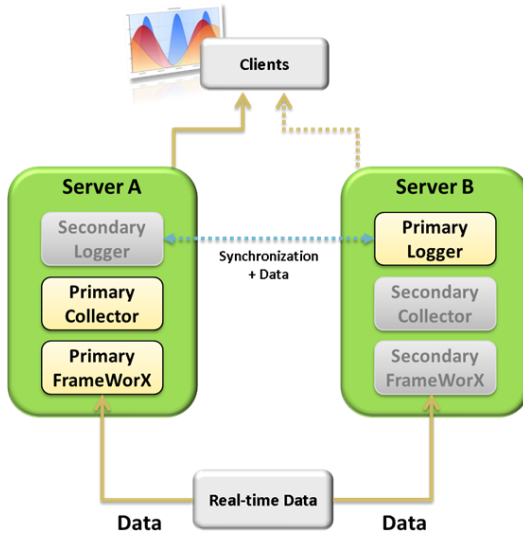


Figure 11 – Two Node Setup

Figure 12 – Swapped loggers settings

NOTE: Optional: The Collectors may be switched in configuration instead of the loggers, but if the source OPC Servers are on these two machines as well it's best to be sure that the primary collector is on the same machine as the primary OPC server, which is why ICONICS recommends that the Logger is active on secondary instead of the Collector.

The reason for this cross-over setup is that if one machine fails, only the logger or the collector needs to switch to the active machine. **ICONICS strongly recommends this cross-over**

scenario when using only two nodes for Hyper Historian Redundancy.

OPC DA, UA, FrameWorX Redundancy on the Hyper Historian Remote Collector

Remote Hyper Historian collector considers OPC DA, UA and FrameWorX redundancy, defined **directly on Hyper Historian remote collector**.

All these settings are defined directly on the Remote collector using special configurators.

1. Settings up OPC DA Redundancy on Remote Collector

- Open GenBroker Configuration from the start menu
- Select Node Pairs and define your OPC DA server pairs
- Save as GenBroker64.gbx and place into folder C:\ProgramData\Iconics**

2. Setting up OPC UA Redundancy settings on Remote Collector

- Open OPC UA Servers Configuration from the Start menu
- Define the Server name and the Endpoint and the Secondary Endpoint URI
- Save the configuration

3. Settings up FrameWorX Redundancy settings on Remote collector

- Open FrameWorX Servers Configuration from the Start menu
- Define the Server Name, and Primary and Secondary Machine name
- Save the configuration

NOTE: For more information about the Genesis64 and Hyper Historian Redundancy settings, configuration databases, etc. see application note GENESIS64 - Redundancy Setup Options.