Hyper Historian – Redundancy Setup Options

APPLICATION NOTE

July 2011

Description: Guide to configuring Hyper Historian redundancy settings.
OS Requirement: Windows Server 2003 x64/Vista x64/ Server 2008 x64/Windows 7 x64/ Server 2008 R2 x64
General Requirement: Hyper Historian installed on machine.

Introduction

GENESIS64 supports redundancy to 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)

NOTE: For instructions on how to set up GENESIS64 redundancy, see the application note entitled, *GENESIS64 - Redundancy Quick Start*.

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

Redundancy Architecture

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

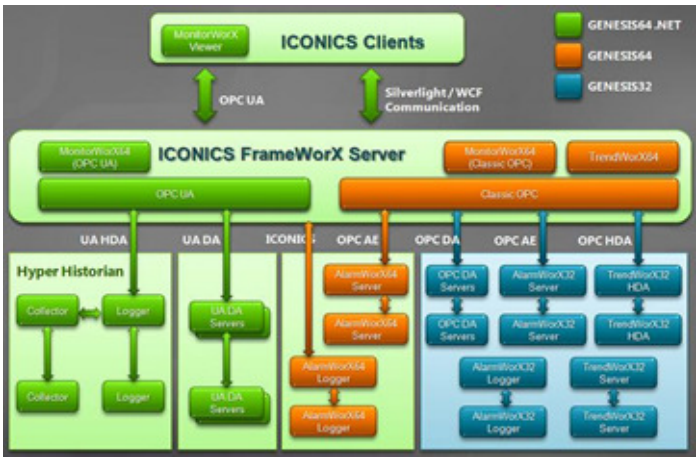

Figure 1 - Redundancy Architecture

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 or all Hyper Historian Collectors can have a redundant, stand-by Collector as well.

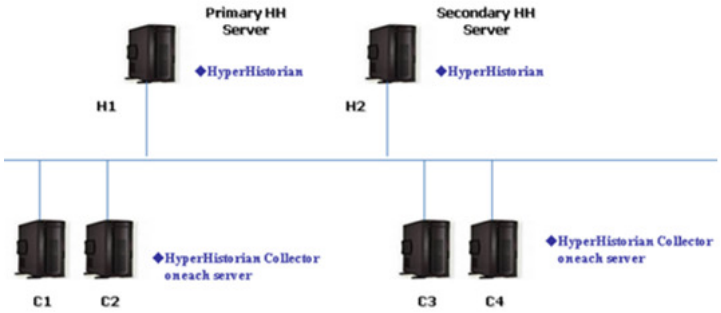

Figure 2 - Example Scenario of Hyper Historian Redundancy

Hyper Historian Redundancy

The purpose of Hyper Historian Redundancy is to prevent data loss in the event of a failure by having two loggers available to log data. FrameWorX Server Redundancy (or OPC UA Redundancy) is designed to allow playback in the event of a failure by providing two FrameWorX Servers which can provide data to clients. These are two different things; therefore they are set up in two places:

- Access to Hyper Historian data is done via OPC UA. For that reason, redundancy for access to Hyper Historian data is set up in OPC UA redundancy (described below in the "**OPC UA Redundancy**" section).
- Set up redundant collectors and loggers using the Hyper Historian Configurator (described below in the "**Nodes and Redundancy in Hyper Historian**" section).

Hyper Historian Redundancy requires that all machines (servers and clients) have synchronized clocks. 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.

OPC UA Redundancy

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 **OPC UA Servers**. The OPC UA Servers tab appears.

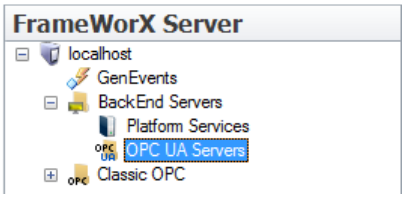

Figure 3 - OPC UA Servers

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.

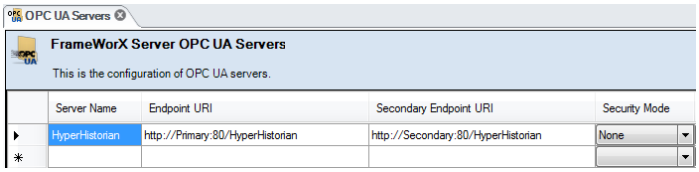

Figure 4 - OPC UA Server Redundancy

Nodes and Redundancy in Hyper Historian

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).

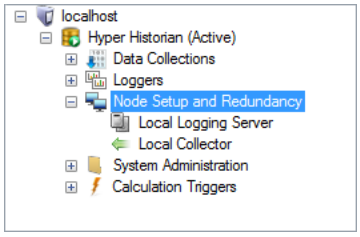

Figure 5 - Node Setup and Redundancy

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, right-click on the Node Setup and Redundancy icon in the navigation tree and select **Collector**, or double-click 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 information 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 node buffer is defined by xml setting 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.

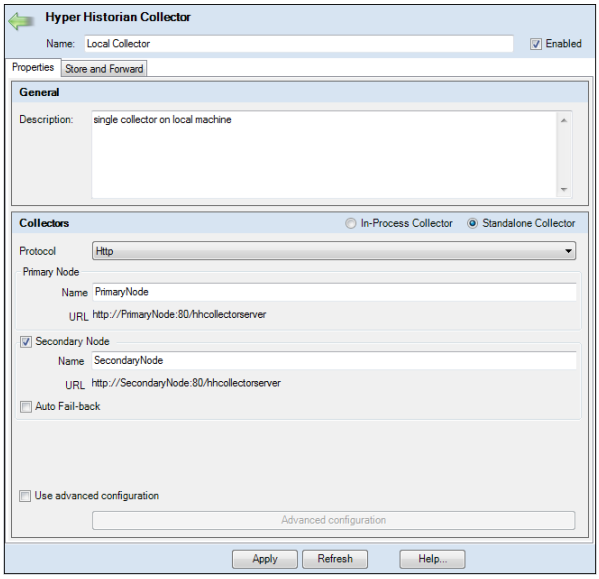

Figure 6 – Collector Setting

7. Use the **Protocol** drop-down list to select either HTTP or TCP.
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 have proceeded 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 Hyper Historian, double-click on the existing **Logging Server**.
4. Edit the **name** for the Logging Server.
5. Ensure the **Enabled** check box is **checked**.
6. Enter the optional **description** in the top "General" section, if desired.
7. Optionally, 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.
8. You have the option to click the checkmark next to **Redundancy** to enable it. The following steps assume you have selected to enable Redundancy.
9. Select your desired Protocol (HTTP or TCP) by using the drop-down list.
10. 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.
11. 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.
12. Click the checkbox next to **Auto Fail-back** to switch from the backup node to the primary node when it becomes active again.
13. 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.
14. 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.
15. Click the **Apply** button to enter the changes.

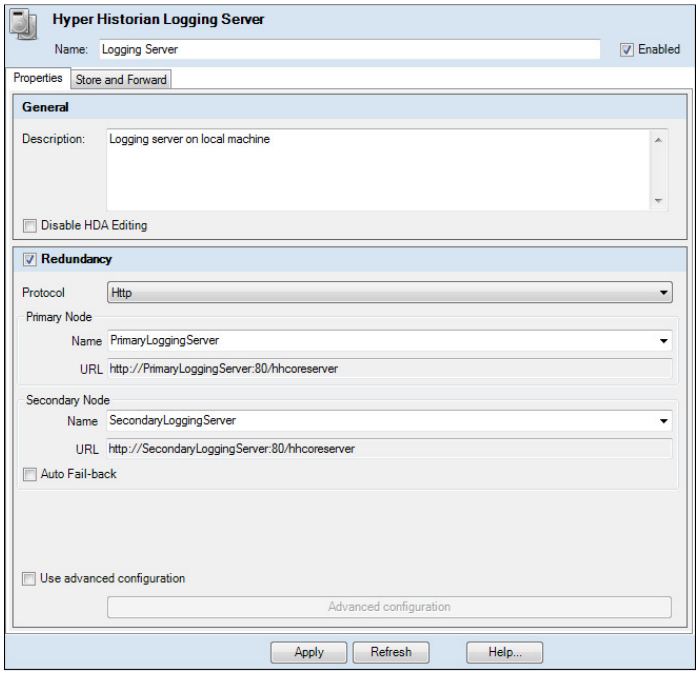

Figure 7 - Logging Server

Hyper Historian Redundancy in Redundancy Viewer

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

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

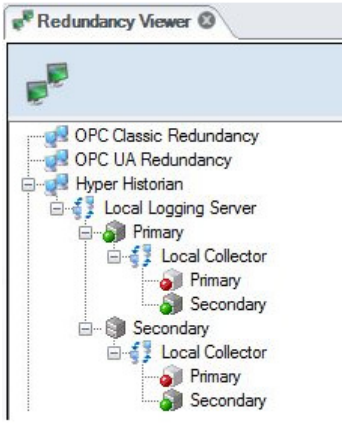

Figure 8 - MonitorWorX View

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 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 9, below.

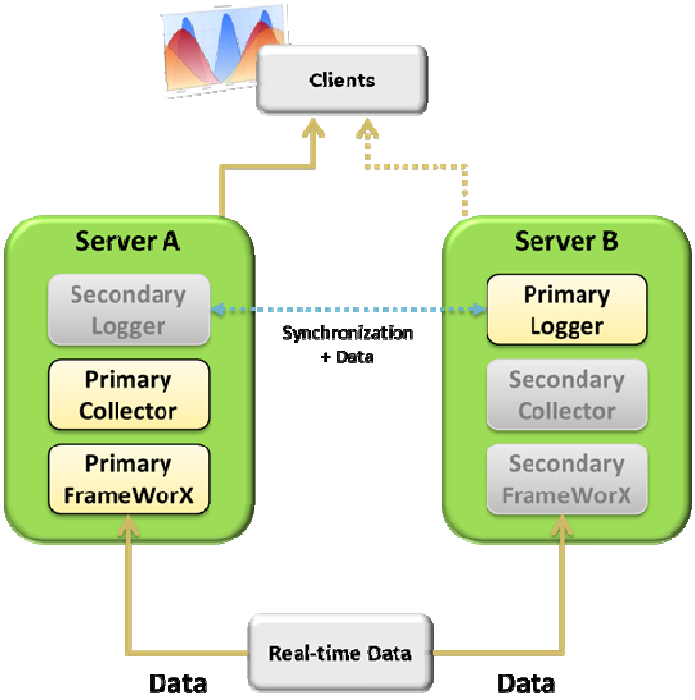

Figure 9 - Two Node Setup

NOTE: Optionally the Collectors may be switched 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 Loggers be switched instead of the Collectors.

The reason for this cross-over setup is that if one machine fails, only the logger or the collector needs to switch to active. ICONICS strongly recommends this cross-over scenario when using only two nodes for Hyper Historian Redundancy.