



Description: Guide to setting up GENESIS64 redundancy.

OS Requirement: Windows XP x64/Server 2003 x64/Vista x64/ Server 2008 x64/Windows 7 x64/ Server 2008 R2 x64

General Requirement: GENESIS64 v10.6 installed

Introduction

Redundancy is installed as part of the full GENESIS64 installation. With the appropriate license, it allows you to run GENESIS64 servers and clients in redundant mode such that if a primary server becomes unavailable the project will automatically continue running on the secondary server and all clients will re-connect to the secondary server for data. This protects against losing valuable production data and operability.

GENESIS64 redundancy supports OPC standards, increasing the reliability and availability of OPC data by allowing multiple OPC servers to be configured into redundant pairs. These redundant OPC server pairs appear as a single OPC server to any OPC client application. Redundancy can be added to an existing OPC server/client application without reconfiguring those applications. The only required action is a restart of the FrameWorX64 Server after setting the redundancy options.

To set up GENESIS64 redundancy you must have the clients and servers connected via a network, ready to be configured as redundant machines. All machines in the redundancy project should have their clocks synchronized. For detailed instructions to achieve this please refer to the Application note entitled “GENESIS64 - Synchronizing Machine Time”.

GENESIS64 supports redundancy for 64-bit client applications (GraphWorX64, AlarmWorX64, and TrendWorX64). It also supports the following OPC servers in both 64-bit and 32-bit:

- Classic OPC DA (any platform)
- OPC UA (any platform)
- Classic OPC HDA with TrendWorX32 Server (from GENESIS32 version 9, 32-bit)
- OPC UA HDA with Hyper Historian (64-bit)
- Classic OPC AE with both AlarmWorX64 and AlarmWorX32 Servers
- AlarmWorX32 Logger
- AlarmWorX64 Logger

NOTE: TrendWorX64 Logger does not support redundancy.

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 TrendWorX32 and Hyper Historian (OPC HDA, UA HDA)

Classic OPC Redundancy

Classic OPC redundancy works with the 64-bit and 32-bit OPC servers listed below. To set up redundancy for classic OPC servers you define one or more node pairs. A node pair specifies the primary server and the redundant (secondary) server. Use the steps in the “Setting up Classic OPC Redundancy” section to set up redundancy for the following types of servers:

- AlarmWorX64 Server*
- AlarmWorX64 Logger*
- AlarmWorX32 Server*
- AlarmWorX32 Logger*
- OPC DA Servers
- TrendWorX32 HDA*
- Third party DA servers

* **NOTE:** For redundant AlarmWorX64 Servers, AlarmWorX32 Servers, and TrendWorX32 Servers, the same redundant node pairs must be defined on each node. For example, if you have AlarmWorX32 Servers on PC1 and PC2 and FrameWorX64 on PC3, you must define the same node pairs on all three computers. The settings will also make sure that the input OPC tags configured in e.g. AlarmWorX32 or AlarmWorX64 Servers will switch the OPC server in case the primary OPC server becomes unavailable.

For AlarmWorX64 Server and Loggers, you can define node pairs through the GENESIS64 Workbench, but for AlarmWorX32 Server and TrendWorX32 Server and Logger, use the GenBroker Configurator application from GENESIS32 v9.0 or higher.

OPC UA Redundancy

OPC UA redundancy works with the 64-bit and 32-bit OPC servers listed below. Use the steps in the “Setting up OPC UA Redundancy” section to set up redundancy for the following types of servers:

- Hyper Historian Logger
- Hyper Historian Collectors
- UA (Data Access) Servers (like the ICONICS OPC Server Suite v5.x)

NOTE: OPC UA redundancy works with OPC UA for Data Access and Historical OPC UA servers. Alarms & Conditions OPC UA Servers are not supported.

Setting up Classic OPC Redundancy

1. Open Workbench and select the **FrameWorX Server** application from the Project Explorer.
2. Expand Localhost → Classic OPC and right-click on **GenBroker** to select Edit. GenBroker opens with its Channels tab showing.

NOTE: GenBroker communication options can be set here, too.

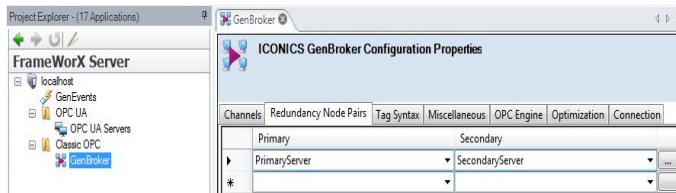


Figure 1 - Setting up Primary and Secondary Redundant Servers

3. Click on the Redundancy Node Pairs tab. On this tab, you will identify the primary server that will be active by default and the secondary server that will become active if the primary fails.
4. Specify the primary server in the Primary column.
5. Specify secondary server in the Secondary column.
6. For each pair, click the Node Properties button to set the node's properties.

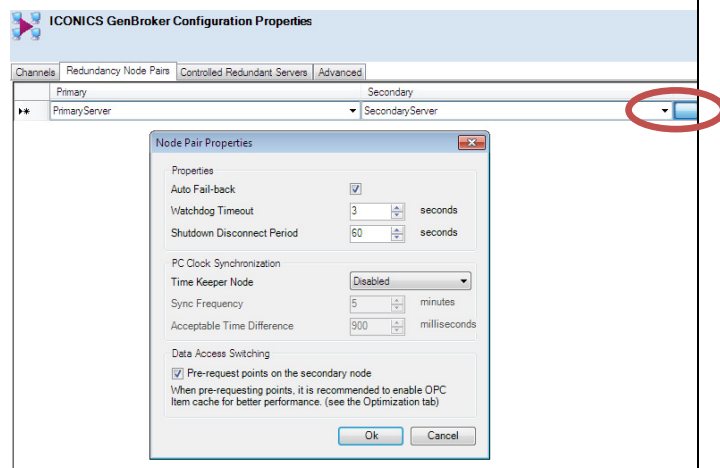


Figure 2 - Server Node Properties

7. Repeat steps 4-6 for each primary-secondary pair of machines hosting your classic OPC Servers.
8. Click on "Apply" when you are done.
9. Restart the FrameWorX Server.

NOTE: For details about setting up the classic OPC redundancy including OPC DA and ICONICS AlarmWorX32 Server and AlarmWorX32 Logger please refer to the GENESIS32 Application note entitled "DataWorX32 Professional – Getting Started with

Redundancy" and "DataWorX32 Professional – Recommended Redundancy Settings".

Setting up OPC UA Redundancy

1. Open Workbench and select the **FrameWorX Server** application from the Project Explorer.
2. Expand Localhost → BackEnd Servers → OPC UA and right-click on **OPC UA Servers** to select Edit.
3. For each server pair, enter the Server Name.

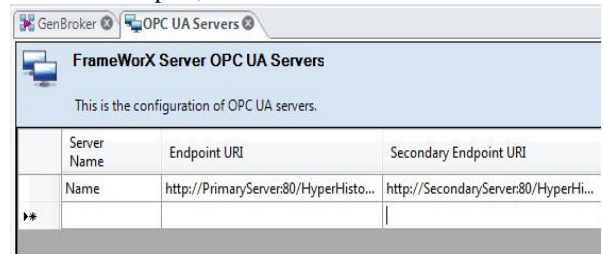


Figure 3 - Setting up Redundant UA Servers

4. Specify the primary server in the **Endpoint URI** column.
5. Specify the secondary server in the **Secondary Endpoint URI** column.
6. Restart the FrameWorX64 Server.

Setting up Client Machines

The client machines typically connect to the GENESIS64 server and read OPC data as well as security, licensing and other information. The GENESIS64 client machines can be easily connected to GENESIS64 servers by specifying the FrameWorX server location.

1. Open Workbench and in the Tools ribbon click on the Default FrameWorX Server Location icon.
2. This opens a dialog where you can specify your primary and secondary GENESIS64 server nodes, using either the HTTP or NET.TCP communication channels, as depicted in Figure 4. You will need to change the "PrimaryServer" and "SecondaryServer" placeholders to match your actual server node names.

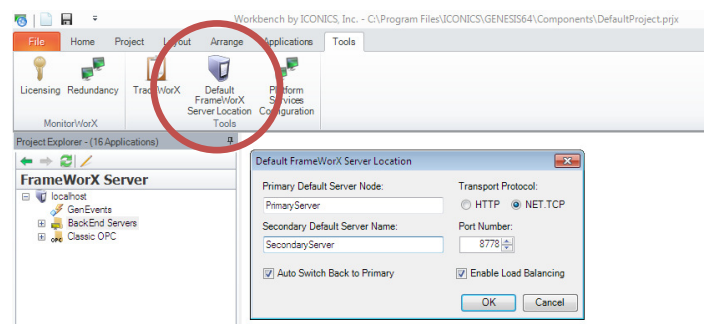


Figure 4 - Setting up Default FrameWorX Server Location

- Also note that “Auto Switch Back to Primary” can be enabled as to redirect all clients back to the Primary server from secondary when the Primary server is available again.
- For details about load balancing please refer to the GENESIS64 documentation.

Testing Redundant Servers

At this point, you have completed most of the process for setting up redundant servers. The one thing left to do is make sure that your primary and secondary servers have the same server configuration.

For example, if you are using the ICONICS OPC Server Suite in a redundancy scenario then both copies of the OPC Server Suite should be using the same .opf configuration file. If both OPC Server Suites are using their own copy of the file, this file must be kept identical. ICONICS recommends using a central data source for both servers, when possible, so that both servers will always be using the same exact configuration. Note that this central data source must be on a third (highly available) machine. If it is kept on the same machine as one of your redundant servers then you risk both OPC servers becoming unresponsive if the machine that holds the configuration becomes inaccessible.

This applies to alarm servers and data loggers as well. If you are using redundant AlarmWorX64 Servers, for example, you will want to be sure that both AlarmWorX64 Server instances are using identical copies of the configuration database or that they are both using the same database hosted on a (highly available) third machine.

NOTE: If your configurations are different on the primary and secondary servers, you will experience unpredictable behavior. Therefore, if you do keep the configuration in separate databases, please make sure that you update both when you make changes, and that the updates are exactly the same on both databases. The easiest way would be to copy the updated configuration database from the Primary to the Secondary server as you make changes.

When you are ready to test your redundancy you can use GraphWorX64 on a client machine. For the simplest test, you can browse to a point in the simulator. The syntax for this point must start with the primary server name. For example, if you are using the simulated Sine tag, your tag path should be similar to Figure 5, where “PrimaryServer” is either the name of your primary computer or its IP address.

@\\PrimaryServer\\ICONICS.SimulatorOPCDA.2\\Numeric.Sine.Value

Similarly to the way tags are configured in your AlarmWorX64 viewer, you need to add the primary server as the node name. Your setup should look similar to Figure 5, where “PrimaryServer” is the name of your primary computer.

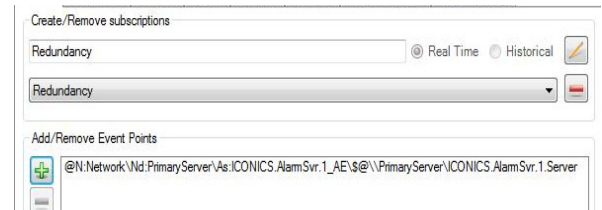


Figure 5 - Alarm Viewer Subscription

You can test that redundancy works by shutting down the primary server and observe that the client machine’s data source will switch to the secondary server, continuing to display valid data. Also notice the active server changes in Redundancy Viewer of the client machine.

Redundancy Viewer

To open the Redundancy Viewer, open the Workbench and select File → Tools → Redundancy.

Here you can observe states of redundant ICONICS Server and all OPC DA servers (including third party servers). The Redundancy Viewer also allows you to switch the states of the above mentioned OPC servers between Active and Secondary in real-time. This is mainly useful for planned maintenance on the server machines.

Right-click on a server and select “Make Active” to change the active server.

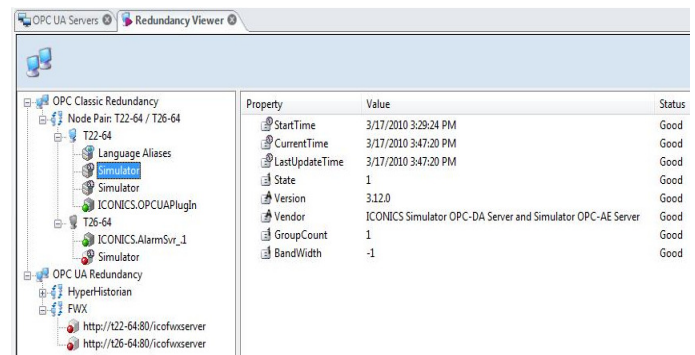


Figure 6 - Checking Redundancy Servers