



WebHMI

Redundancy with Network Load Balancing



APPLICATION NOTE

October 2015

Description: Guide to setting up ICONICS WebHMI for redundant GENESIS64 systems.

OS Requirement: Windows Server 2008 x64/ Windows Server 2008 R2 x64/ Windows Server 2012/ Windows Server 2012 R2

General Requirement: Redundant GENESIS64 servers with working WebHMI.

Introduction

WebHMI is a tool that allows the management of a GENESIS64 system from off-site. This functionality is invaluable for systems where physical access to the server is impractical or impossible. When implementing a redundant system, it is typically desired for the WebHMI pages to behave in a redundant manner as well.

This Application Note will not describe the setup of a GENESIS64 redundant system; for more information on setting up GENESIS64 redundancy see the application note entitled, *GENESIS64 - Redundancy Setup Options*.

Setting up WebHMI

This Application Note is an advanced modification to WebHMI, and assumes that both systems have working WebHMI. In order to test this, ensure that a client machine without any ICONICS software installed is able to load a WebHMI page from both servers individually. Once functional WebHMI is verified, proceed to the next steps.

NOTE: Troubleshooting WebHMI issues should be done before proceeding any further, as the issues will be harder to isolate and resolve once Network Load Balancing has been enabled.

Installing Network Load Balancing

Network Load Balancing (NLB) is a feature of Windows Server class operating systems. NLB is typically used to ensure availability and scalability of mission-critical servers, especially for web-based applications. For WebHMI, this feature protects clients against any server-side failures that may occur. This is accomplished by creating a Cluster – one IP address that is used to access the machines in the cluster.

NLB must be installed on each server that is to be part of the cluster. Installation can be done through the Server manager, under “Add Roles and Features”. Once all servers have NLB installed, a cluster can be created to access them.

NOTE: More detailed instructions available on Microsoft’s website: <https://technet.microsoft.com/en-us/library/cc731695.aspx>

Creating a Cluster

Creating the cluster is a highly configurable process, and the process below will give an example of one configuration. Before proceeding, it is recommended to consult your IT department and verify any settings that need to be modified. In addition, the cluster will require the use of Static IP addresses, which may require some modification to the network hosting your servers.

A Cluster is used to create one access point for your servers. Begin by opening the Network Load Balancing Manager on a server that will be in the cluster (either your primary or secondary machine in the redundant system).

To create the cluster, open the Network Load Balancing Manager on a server that will be a part of the cluster. Here, you can click on Cluster → New.

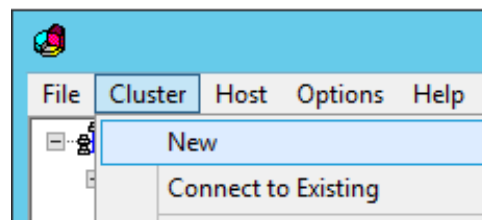


Figure 1 – New Cluster

The first prompt will ask you to connect a host that is to be part of the cluster. Entering either the machine name or IP address will produce a list of available network adapters to use for the cluster.

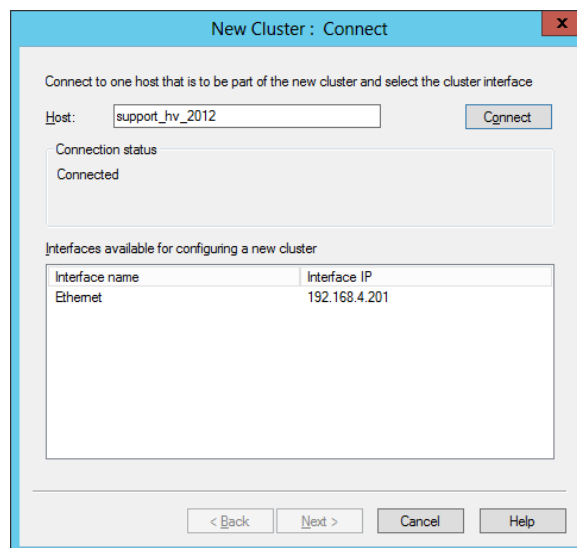


Figure 2 – Cluster setup



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Choose which adapter you would like to use, and proceed to the next step. The next prompt will ask you for a dedicated IP address for the host – this will be used if you ever need to connect directly to this machine.

Figure 3 - Host IP

NOTE: Many IT departments have strict IP address conventions – consult your IT department before assigning a static IP address.

Once the host has been configured, the setup dialog will ask for a Cluster IP. This will be the IP address used to access your machines via WebHMI. Be sure that the address you choose has not been taken by any other devices on the network. Once the IP address is configured, a summary page will display with the ability to choose the Cluster Operation Mode.

Figure 4 - Cluster Options

The choice for Cluster Operation depends on the system, but Unicast should work for most applications.

The last configuration step is to configure the ports to be forwarded to the hosts. The default options allow all ports to be forwarded – you can adjust the rule to meet your security needs.

Figure 5 - Cluster Port Rules

Once the cluster has been created, you can add your second host (the other redundant machine) by right-clicking the cluster and selecting “Add host to cluster”. For any additional hosts, the only configuration required is to select the adapter and assign a dedicated IP address.

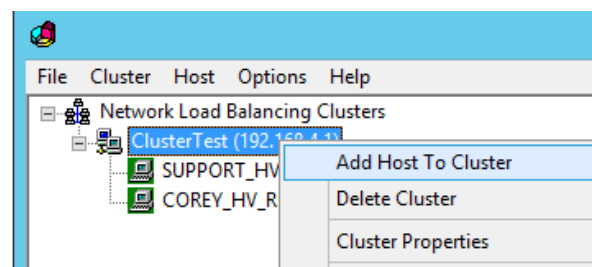


Figure 6 - Adding Additional Hosts

NOTE: Many options here are not required. Best practices are outlined in detail on Microsoft's website:
[https://technet.microsoft.com/library/cc740265\(v=WS.10\).aspx](https://technet.microsoft.com/library/cc740265(v=WS.10).aspx)

Changes to the Display

Now that the machines are in a cluster, the syntax for data points must be updated in order for the data to update properly.



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While a typical tag in GraphWorX may look like this:

```
@sim64:Float.Random(1,-50.0,50.0,0).Value
```

Or like this:

```
\\servername\\@sim64:Float.Random(1,-50.0,50.0,0).Value
```

When using Network Load Balancing, you can modify these to have the cluster IP in front like this:

```
\\192.168.1.1\\@sim64:Float.Random(1,-50.0,50.0,0).Value
```

With this change, every update will navigate through the load balanced cluster to get data. Once the tags are modified in this way, the data will continue to update on a WebHMI page even if the currently connected server goes down.

How to Publish for a Redundant System

When using Network Load Balancing, the web address used to access your displays is changed from the typical machine name used in the .htm files. This means that loading the displays in Internet Explorer won't operate correctly without modification.

The .htm file published by GraphWorX will automatically fill in the machine name or IP address of the server it's publishing to. The easiest method of updating the pages is to open them with a text editor (like Notepad) and use find-replace function to replace any instances of the server name or IP address with the cluster IP.