GENESYS™

GVP Deployment Guide

Resource Manager HA (Windows)

4/21/2025

Resource Manager HA (Windows)

Task Summaries and Procedures

Task Summary: Configuring the RM in HA Active Standby Mode (Windows)

Objective	Related Procedures and Actions
1. Configure NLB on the Resource Manager hosts.	See Procedure: Configuring Resource Manager HA (Windows).
2. Configure the member IDs and NLB script path in the Resource Manager Applications.	See Procedure: Configuring the Resource Manager HA-Pair.
3. Configure the virtual IP address of the HA-pair in the INIT and NLB script files.	See Procedure: Configuring the INIT and NLB Script Files (Windows).
4. Specify the NICs that require monitoring (optional).	See Procedure: Specifying the NICs to Monitor (Windows). **Note:** In Windows environments, NICs monitoring is optional. If there are only two NICs installed on the host, omit this procedure. For more information about monitoring the NICs, see Monitoring the NICs.
5. If you are installing Resource Manager HA on Windows, configure a network account with Administrator privileges.	See Procedure: Configuring the Resource Manager Service (Windows). **Note:** Windows does not support the NLB command /PASSW argument for remote procedure calls. Therefore, the Resource Manager Service must run as a network account that has Administrator privileges.

Objective	Related Procedures and Actions
6. Complete finals steps before starting the Resource Manager HA-pair in NLB mode.	See Start Resource Manager HA-pair in NLB mode.

Task Summary: Configuring the RM in HA Active Active Mode (Windows)

Objective	Related Procedures and Actions
1. Configure the member IDs in the Resource Manager Applications.	See Procedure: Configuring the Resource Manager HA-Pair.
2. Configure the virtual IP in the Media Control Platform, Call Control Platform, and CTI Connector Applications.	See Procedure: Integrating Application Objects with Resource Manager and Procedure: Configuring the Call Control Platform. **Note:** When you use these procedures to configure active active HA mode, the virtual IP is used as the Resource Manager IP.
3. Configure the external load balancer.	See the vendor documentation for the type of load balancer you are using (for example, F5 or Radware).

You can configure the Resource Manager in HA active standby mode by using the Windows NLB service. Use the procedures in this section to configure the Resource Manager HA-pair on Windows.

Procedure: Configuring Resource Manager HA (Windows)

To set up NLB by configuring Windows, perform this procedure on each of the Resource Manager hosts in the NLB cluster, specifying a unique ID for each host.

1. Verify that the Resource Manager hosts must conform to the prerequisites for Windows. See Prerequisites.

2. From the Windows Start menu, select **Administrative Tools > Server Manager**.

3. In the Feature Summary section, click **Add Features**.
   The Add Features Wizard appears.

4. Click the check box beside **Windows Network Load Balancing**.

5. Click **Install**.
   Network Load Balancing is installed on Windows.

Configuring the Cluster

6. In Administrative Tools, select **Network Load Balancing Manager**.

7. Right-click **Network Load Balancing Clusters**, and click **New Cluster**.

8. In the Host field, enter the name of the Resource Manager host that you are adding to the cluster for example, ResMgr1.

9. Click **Connect**.

10. Select the interface that will host the HA-pair's virtual IP address, and click **Next**. The interface selected cannot be used for the private communication between the Resource Manager nodes (for example, the IP address that is associated with this NIC cannot be used in the `[cluster] member.[n]` configuration parameter). This interface hosts the virtual IP address, which receives and load-balances the client traffic.

11. Enter the information on the Host Parameters and Cluster Parameters section, as shown in the table below:

Table: Properties of NLB Service

Section	Field	Description
Host parameters	Priority (unique host identifier)	Enter 1 for the first Resource Manager host in the cluster. Enter 2 for the second Resource Manager host in the cluster. This parameter specifies a unique ID for each host.
Cluster IP Address		Click **Add** to enter the IP address that is shared by the hosts in the HA-pair. The shared IP address for the HA-pair must be static. NLB disables DHCP on every interface that it configures, as it does not support DHCP.
Cluster parameters	IP Address	Enter the virtual IP address of this cluster.
	Subnet mask	Enter the subnet mask for your network. (The subnet mask is not required for IPv6 addresses.)
Cluster operation mode	Unicast	Enable this radio button. In Unicast mode, the MAC address of the cluster is assigned to the network adapter for the computer, and the built-in MAC address of the network adapter is not used.

12. In the Port Rules section, click **Edit**.

13. Configure the port rules as shown in the table below:

Table: Port Rules Configuration

Section	Field	Value and Description
Port range	From	Accept the default value, 0.
	To	Accept the default value, 65535.
Protocols		Select **Both (TCP & UDP)**.
Filtering Mode	Multiple hosts	Enable this radio button.
	Affinity	Set to None.

14. Click **Finish**.
    To add another host to the cluster, right-click the new cluster, click **Add Host to Cluster**, and repeat

Steps 9 to 15.

15. Next, configure the Resource Manager Applications for HA. See Procedure: Configuring the Resource Manager HA-Pair.

> ### Tip
>
> The following information applies to NLB configuration on Windows:
>
> In active standby mode, when the active Resource Manager nodes NLB-dedicated NIC cannot be reached (due to an unplugged cable, a disabled NIC, or a shutdown host), it can take several seconds to several minutes before the traffic is re-routed to the standby Resource Manager node.
>
> When the active Resource Manager node cannot be reached, the standby node issues the wlbs command (see Procedure: Configuring the INIT and NLB Script Files (Windows)) as part of the failover sequence. If the dedicated NLB NIC of the currently active Resource Manager node cannot be reached, then the wlbs command can hang for several seconds and cause the failover to be delayed.
>
> In addition, if the failover occurred because the Resource Manager machine was shut down, the previously active Resource Manager might temporarily take over the traffic when the machine reboots. To resolve this issue:
>
> 1. In the Network Load Balancing Properties on both of the Resource Manager hosts in the cluster, go to the Host Parameters section.
>
> 2. In the Initial host state section, select Stopped from the Default state drop-down menu.

Procedure: Configuring the Resource Manager HA-Pair

Complete this procedure for each Resource Manager HA Application in the HA-pair. You will configure the member IDs and NLB script path in the Resource Manager HA Applications for active standby mode.

1. For active standby mode only, ensure NLB clustering is set up on each Resource Manager host in the cluster. See Procedure: Configuring Resource Manager HA (Windows), or Procedure: Configuring Simple Virtual IP Failover, or Procedure: Configuring Bonding Driver Failover.

2. Log in to Genesys Administrator.

3. On the Provisioning tab, select **Environment > Applications**.

4. Select the Resource Manager HA Application you want to configure.
   The Configuration tab appears.

5. On the Options tab, enter the mandatory information in the Cluster section as shown in the table below:

Table: Options Tab Cluster Section

Option Name	Value
members	Retain the default value of 1 2.
member.1	Enter <localhost_IP_add_1>:9801 ...where <localhost_IP_add_1> is the private IP address of the first Resource Manager host, which corresponds to the IP address of the network interface that does not have the virtual

Option Name	Value
	IP address assigned (not the IP address that is associated with the NLB cluster).
`member.2`	Enter `<localhost_IP_add_2>:9801` …where `<localhost_IP_add_2>` is the private IP address of the second Resource Manager host, which corresponds to the IP address of the network interface that does not have the virtual IP address assigned (not the IP address that is associated with the NLB cluster).
`hotstandby`	Enter `true`.
`mymemberid`	• For the Resource Manager HA Application that represents the first Resource Manager host in the HA-pair, enter 1. • For the Resource Manager HA Application that represents the second Resource Manager host in the HA-pair, enter 2. The first and second Resource Manager hosts must correspond to the first and second Resource Manager hosts that you specified in Step 5 or the table Properties of NLB Service in Procedure: Configuring the INIT and NLB Script Files (Linux). Also, if both Resource Manager instances are running, memberid 2 will be the active one.
`virtual-ip`	Enter `<virtual_IP_add>`, where `<virtual_IP_add>` is the designated Virtual IP address that is shared by all of the Resource Manager hosts in the HA-pair.
`virtual-ip-in-via`	Retain the default value of `true`.
`electiontimer`	Retain the default value of 3000.
`FailOverScript`	Retain the default value, `<Installation Directory>\bin\NLB.bat` where `<Installation Directory>` is the directory where the NLB.bat file is installed. **Tip** Configuration of this option is not required for active active HA mode.
`heartbeattimer`	Set to 2000.
`ha-mode`	Enter `active-active` or `active-standby`

Tip

Many other options can be configured for the Resource Manager HA-pair. For a complete list of the available options, and descriptions of them, see the GVP 8.5 User's Guide.

6. Click **Save**.

7. Repeat Steps 3 to 5 for each Resource Manager HA Application in the HA-pair.

8. If you have not already done so, configure a connection to the Message Server in each Resource Manager Application in the HA-pair. See Procedure: Creating a Connection to a Server.

9. Specify the NICs you want to monitor (optional). See Procedure: Specifying the NICs to Monitor (Windows).

Procedure: Specifying the NICs to Monitor (Windows)

Specify the NICs that you want the Resource Manager to monitor. If the GVP section in the Resource Manager HA Application is not configured, all of the NICs installed on the host are monitored for network errors.

1. More than two NICs are configured on the same host and are fully functional.

2. Two NICs are configured as part of an HA-pair. See Procedure: Configuring Resource Manager HA (Windows) and Procedure: Configuring the Resource Manager HA-Pair.

3. Log in to Genesys Administrator.

4. On the Provisioning tab, select **Environment > Applications**.

5. Select the Resource Manager HA Application that you want to configure.

6. On the Options tab, scroll to the GVP section.

7. For the `nic.eth0` option, in the Value field, enter the MAC address of the first NIC that you want to monitor. For example: `nic.eth0 = 00-0F-1F-6D-EB-CA` (*this example assumes chosen network interfaces numbered 0 and 1*).
   This value must be provided for IP takeover, even if when a single NIC is used.

   - Repeat this step, to add `nic.eth1` and the MAC address of the second NIC that you want to monitor. For example: `nic.eth1 = 00-0F-1F-6D-EB-CA` (*this example assumes chosen network interfaces numbered 0 and 1*).

   - NICs must be configured with a value of 0 (zero) for IP takeover, even though a single NIC is used.

   - If more than two NICs exist, configure the nics option value to `0  1`.

8. Click **Save**.

9. To confirm that you have configured the NICs correctly, use the ipconfig/all command to query the MAC addresses of the NICs.

10. Configure the INIT.bat and NLB.bat script files. See Procedure: Configuring the INIT and NLB Script Files (Windows).

Procedure: Configuring the INIT and NLB Script Files (Windows)

Configure the INIT.bat and NLB.bat files on each Resource Manager host in the HA-pair.

1. Verify that NLB clustering has been set up on the hosts. See Procedure: Configuring Resource Manager HA (Windows).

   Configure the INIT.bat file

2. Open the INIT.bat file in a text editor.
   The INIT.bat file is located in `<Res_Mgr_Install_Dir>`\bin directory.

3. Follow the directions in the script file to change the virtual IP address and the IP address for members 1 and 2 of the HA-pair.

4. Click **File > Save**.
   Configure the NLB.bat file

5. Open the NLB.bat file in a text editor. The NLB.bat file is located in the <RM_Install_Dir>\bin directory.

6. Follow the directions in the script file to change the virtual IP address and the IP address for members 1 and 2 of the HA-pair. The private_ip_member1 and private_ip_member2 parameters represent the interfaces that are associated with the NLB interface.

7. Save the changes.

8. Execute the INIT.bat script on each host to disable NLB functionality on both hosts, enter INIT.bat.

9. Execute the NLB.bat script to re-enable NLB functionality on the host that will act as the master, enter
    NLB.bat enable X
    ...where X is the member ID of the host on which the virtual IP will accept traffic.
    Enter 1 or 2 for the value in the NLB.bat enable command, based on the member ID of the Resource Manager instance on that host.
    After NLB.bat script execution, the virtual IP will be active on the host that is identified as private_ip_member1 in the NLB.bat file. Confirm this by attempting to Remote Desktop into the virtual IP address, and once logged in, check the hostname to confirm it is the correct system.

10. If you are installing the cluster on Windows, configure the Resource Manager Service. See Procedure: Configuring the Resource Manager Service (Windows).

Procedure: Configuring the Resource Manager Service (Windows)

Modify the Resource Manager Service in Window to run as a network account.
Complete this procedure on both servers (primary and backup) in the HA-pair.

1. At the Start menu, select **Control Panel > Administrative Tools > Services**.

2. Right-click the **Genesys VP Resource Manager Service**.

3. When the Genesys VP Resource Manager Service Properties dialog box opens, click the **Log On** tab.

4. Enable the **This account** radio button, and enter .\Administrator .

5. In the Password and Confirm Password fields, enter the Administrator's password.

6. Click the **Enable** button.

7. Click **OK**.

8. Start Resource Manager HA-pair in NLB mode (below).

Procedure: Starting Resource Manager HA-pair in NLB mode

1. Execute the INIT.bat file.
    When you execute this file, load balancing is disabled on both members in the HA-pair. Executing in NLB mode, the Resource Manager checks the status of other Resource Manager instance before it assumes Active Standby status.

2. Start both Resource Manager instances, running as a High Availability pair.

Resource Manager HA IP Address Takeover for Windows

Beginning with release 8.1.6, Resource Manager supports IP Address Takeover for Windows.

Resource Manager (RM) is used with SIP Server for Media Server applications, and with GVP for VoiceXML applications. Resource Manager provides an essential intelligence for GVP and media policy management, resource management and reporting. Resource Manager monitors the availability of media servers and directs SIP Server to connect sessions to the most suitable media server.

Resource Manager High Availability means that the RM function can be deployed as a pair of RM processes. You can configure RM pairs to send updates to each other regarding the status of requests and system states. RM pairs can be deployed in Active-Standby or Active-Active modes.

If SIP Server is sending requests to an RM Active-Active configuration, it requires that a load balancer be placed between SIP Server and the Resource Manager Pairs. F5, NLB, and Radware are examples of third party load balancers that can perform these functions. Active-Active designs require load balancing to maintain stickiness of the session between SIP Server and the RM selected.

If SIP Server is sending requests to an RM pair configured in Active-Standby, then SIP Server is directing requests only to the active RM, using a Virtual IP. The RMs have an internal selection mechanism to determine which node should be the active one. The standby RM is used to take over the role of the Primary only when the current active RM process fails. There are two ways to accomplish the takeover: you can use Windows NLB for monitoring and switching.

Or, you can use the Genesys Solution Control Server (SCS) to monitor alarms sent to it for RM; if the active RM goes down, then SCS can execute scripts that change the Virtual IP addressing between SIP Server to the formerly-standby-now-active RM. The RM also has its internal mechanism of performing failover using heartbeat monitoring between the pair. The active standby configuration does not require a load balancer, but does need an effective script solution.

Table: IP Address Takeover vs. Load Balancing A Comparison

RM Configuration	RM Scripts	RM Load Balancing	Pro	Con
Active-Standby (Load Balancing)	—	Windows NLB	Comes with the product, slightly easier config; supports Windows.	—
Active-Standby (IP Address Takeover)	IP-Takeover Patch with Scripts	—	Comes with the product, slightly easier configuration; supports Windows & Linux.	Still less reliable than NLB in this configuration for switchover timing; see the Resource Manager Release Note.
Active-Active (IP Address Takeover)	—	F5, NLB	Fast takeover.	Complex Config, 3rd Party sw, NLB is windows only.

RM Configuration	RM Scripts	RM Load Balancing	Pro	Con
Active-Active (Load Balancing)	—	Genesys SIP Server with internal load balancing	Comes with the product, easy configuration, baked-in function.	—

Procedure: Configure Resource Manager High Availability Using Virtual IP Address Takeover for Windows

1. New script files were added to the Resource Manager IP. Verify that the following four files are present in the installation-bin folder:

   - `INIT_IPTakeOver.bat`
   - `IPTakeOver.bat`
   - `Ping.vbs`
   - `Check_Ip.vbs`

2. Follow the instructions inside `INIT_IPTakeOver.bat` to set the parameters `VirtualIP` and `VirtualInterface`.

3. Follow the instructions inside `IPTakeOver.bat` to set the parameters `VirtualIP`, `VirtualInterface`, `GatewayIP`, `mymemberid` and `InterfaceForARPing` (Requires a Physical Device Identifier. See Procedure: Search the Windows Registry for a Physical Device Identifier).

   > **Tip**
   >
   > `IPTakeOver.bat` also contains instructions that you should follow, for using the arping utility and other functions.
   >
   > Line 82 in IPTakeOver.bat should be commented out for Installations on Windows SP1 with the Hot fix installed. http://support.microsoft.com/kb/2811463/en-us:
   >
   > `REM @arping.exe -c 3 -i %InterfaceForArping% -S %VirtualIP% %GatewayIP% >> IPTakeOver.log`

4. In the RM's [cluster] section, set the `failoverscript` parameter to `$InstallationRoot$/bin/IPTakeOver.bat`.

5. Create alarm-based reaction scripts to execute the failover script which would disable VIP in case of RM crash or shutdown. To create these scripts, follow these steps:

   a. Create a new Third Party Server template.

   b. Create two Reaction Applications.

   c. Create and configure two Alarm Reaction scripts.

   d. Create two Alarm Conditions, one for each RM in RM HA configurations (Active-Active and Active-Standby), to send an alarm when either instance of RM is stopped intentionally.

   e. Create two Alarm Conditions, one for each RM in RM HA configurations (Active-Active and Active-Standby), to send an alarm when either instance of RM stops unexpectedly.

6. (Optional) Execute INIT_IPTakeOver.bat manually before starting RM in both HA nodes.

> ### Tip
> In some systems, the default heartbeat interval between the two RM nodes (2000 msec) is not suitable for the IP Takeover mechanism. To compensate, Genesys recommends setting the configuration option `cluster.heartbeattimer` to 8000.

NOTE: Virtual IP (VIP) Address Takeover for Windows is less reliable than a Windows NLB cluster configuration

Adding or removing an IP address using VIP Address Takeover is more complicated than enabling or disabling a port in the Windows NLB configuration. VIP Address Takeover fails when either command on the backup or the primary fails. By comparison, in the Windows NLB configuration there is no dependency on a backup command to succeed for most of the failover scenarios.

Netsh (the Microsoft utility used for IP Address Takeover) takes longer to modify the network configuration than it does to enable or disable a port in the NLB configuration. Also, the time may depend upon a particular NIC and its configuration. Normally, modification takes less than 15 seconds to execute, but in this situation it can take as long as 30-45 seconds.

In addition, the Netsh command can fail if the NIC configuration is already being accessed through the Network Properties User Interface.

Procedure: Search the Windows Registry for a Physical Device Identifier

The InterfaceForArping requires you to specify the correct device for the virtual interface. Use this procedure to get this information from the Windows registry.

1. Start **Regedit** and go to the directory `HKLM\SYSTEM\CurrentControlSet\Control\Network\`.
2. Identify the Key with the value `{Default}`, and the data Network Adapters.
   If the virtual interface is set for a Local Area Connection, then search the listed adapter (in the registry) for the value name that contains the data for the Local Area Connection. The Key that contains the Local Area Connection is the reference to the physical device identifier.
3. Pre-append `\Device\NPF_` to the Key and set this value for InterfaceForArping.

```
Example:

\Device\NPF_{85FEBE1C-9EEF-4E61-974B-1158DB270F6E}


From this key:

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Network\{4D36E9 72-E325-11CE-
BFC1-08002BE10318}\{85FEBE1C-9EEF-4E61-974B-1158DB270F 6E}
```

Use the device specification that this procedure acquires when you run the InterfaceForArping.

Virtual IP Interface Takeover Scripts

Find these scripts on your Installation CD or in the IP package that you downloaded over the internet:

- **Ping.vbs**—Pings the host and returns 1 if the ping successful, 0 if not, -1 if the target is not specified.

- **Check_ip.vbs**—Checks if the IP address (arg0) can be found on the host (arg1) and returns 1 if found, 0 if not, -1 if the address and the host are not specified.

- **INIT_IPTakeOver.bat**—Optional. Disables the Virtual IP interface in the Resource Manager box before starting the RM process. You can manually execute this batch script.

- **IPTakeOver.bat**—Enables or disables the Virtual IP interface in the RM box, during RM's own internal election process or when a failover event occurs.

For steps that configure the Resource Manager application, go to Procedure: Configuring the Resource Manager HA-Pair.