



Load Balancing Nuance Equitrac[®]

Deployment Guide
v1.0.0

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1. About this Guide

This guide details the steps required to configure a load balanced Nuance Equitrac environment utilizing Loadbalancer.org appliances. It covers the configuration of the load balancers and also any Nuance Equitrac configuration changes that are required to enable load balancing.

For more information about initial appliance deployment, network configuration and using the Web User Interface (WebUI), please also refer to the relevant Administration Manual:

- [v7 Administration Manual](#)
- [v8 Administration Manual](#)

2. Loadbalancer.org Appliances Supported

All our products can be used for load balancing Nuance Equitrac. The complete list of models is shown below:

Discontinued Models	Current Models *
Enterprise R16	Enterprise R20
Enterprise VA R16	Enterprise MAX
Enterprise VA	Enterprise 10G
Enterprise R320	Enterprise Ultra
	Enterprise VA R20
	Enterprise VA MAX
	Enterprise AWS **
	Enterprise AZURE **

* For full specifications of these models please refer to: <http://www.loadbalancer.org/products/hardware>

** Some features may not be supported, please check with Loadbalancer.org support

3. Loadbalancer.org Software Versions Supported

- V7.6.4 and later

4. Nuance Equitrac Software Versions Supported

- Nuance Equitrac – all versions

5. Nuance Equitrac

Nuance Equitrac is a print management solution designed to simplify printer management.

Printing costs can be monitored, and can be reduced by forcing users to follow budget saving printing habits. Secure and regulations compliant printing is made possible by allowing users 'pick up' and print their secure documents in person at any printer. Flexible printing is achieved as users can print from anywhere, at anytime, and print from wherever they like.

6. Load Balancing Nuance Equitrac

INTRODUCTION AND OVERVIEW OF DIFFERENT MODES

This guide details the configuration of a high availability DCE cluster for Equitrac Office and Express, using a Loadbalancer.org appliance.

For a Nuance Equitrac deployment, the preferred and default load balancer configuration uses Layer 4 DR Mode (Direct Routing, aka DSR / Direct Server Return). This is a very high performance solution that requires little change to your existing infrastructure. It is necessary to solve "the ARP problem" on the real print servers. This is a straightforward process, and is detailed in the section "Configuring Print Servers for Load Balancing".

It is also possible to load balance a Nuance Equitrac deployment using Layer 7 SNAT Mode. This mode might be preferable if making changes to the real print servers is not possible, although some Windows Registry keys need to be added. Due to the increased amount of information at layer 7, performance is not as fast as at layer 4. Also note that load balanced connections at layer 7 are not source IP transparent, which is not usually an issue when load balancing print servers but should still be considered.

PREREQUISITES

A load balanced Nuance Equitrac environment requires the following:

- Microsoft Windows Server environment
- Installation of DCE server and Couchbase in High Availability setup*

*For installation instructions, please refer to the *Nuance Equitrac Office and Express Print Release High Availability Setup Guide*, which can be found here:

https://download.equitrac.com/271828/EO5.7/Docs/Print_Release_HA.pdf

OVERVIEW OF STEPS REQUIRED

Setting up a load balanced Nuance Equitrac environment can be summarised as follows:

- Create a virtual service (VIP) on the load balancer that listens on the required ports
- Associate the print servers to the virtual service, i.e. define them as 'real servers' (RIPs) for the VIP
- Install and configure the Nuance Equitrac DCE Windows print servers
- Configure registry settings on the print servers to enable them to be accessed via a shared name
- Configure name resolution related settings on the print servers
- Point users at the VIP to access the print server and the printer shares

7. Appliance Configuration for Nuance Equitrac – Using DR Mode

Note:

The steps listed here are for a version 8.x Loadbalancer.org appliance, however the steps are similar for all versions

CONFIGURING THE VIRTUAL SERVICE (VIP)

- Using the web user interface, navigate to *Cluster Configuration > Layer 4 – Virtual Services* and click on **Add a new Virtual Service**
- Define the *Label* for the virtual service as required, e.g. **EQDCEHA**
- Set the *Virtual Service IP Address* field to the required IP address, e.g. **10.10.10.190**
- Set the *Ports* as needed, depending on your MFP vendor:
 - For Lexmark and Ricoh, use port **2939**
 - For HP OXPd, use ports **2939** and **7627**
- Click **Update** to create the virtual service
- Click **Modify** next to the newly created VIP
- Make sure that the *Persistent* checkbox is not selected
- Set the *Check Port* for server/service online to **2939**
- Click **Update**

LAYER 4 - MODIFY VIRTUAL SERVICE			
Label		EQDCEHA	?
Virtual Service	IP Address	10.10.10.190	?
	Ports	2939	?
Protocol		TCP	?
Forwarding Method		Direct Routing	?
Balance Mode		Weighted Least Connection	?
Persistent		<input type="checkbox"/>	?
Health Checks	Check Type	Connect to port	?
	Check Port	2939	?
Feedback Method		None	?

DEFINING THE REAL SERVERS (RIPS)

- Using the web user interface, navigate to *Cluster Configuration > Layer 4 – Real Servers* and click

- on **Add a new Real Server** next to the newly created VIP
2. Define the *Label* for the real server as required, e.g. **DCE1**
 3. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.100.20**
 4. Click *Update*
 5. Repeat these steps to add additional print servers as required

LAYER 4 ADD A NEW REAL SERVER - VIP_NAME

Label	<input type="text" value="DCE1"/>	?
Real Server IP Address	<input type="text" value="192.168.100.20"/>	?
Weight	<input type="text" value="100"/>	?
Minimum Connections	<input type="text" value="0"/>	?
Maximum Connections	<input type="text" value="0"/>	?

8. Appliance Configuration for Nuance Equitrac – Using SNAT Mode

Note:

The steps listed here are for a version 8.x Loadbalancer.org appliance, however the steps are similar for all versions

CONFIGURING THE VIRTUAL SERVICE (VIP)

1. Using the web user interface, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**
2. Define the *Label* for the virtual service as required, e.g. **PrintService**
3. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.10.10**
4. Set the *Ports* to **445**
5. Set the *Layer 7 Protocol* to **TCP Mode**
6. Click **Update**

LAYER 7 - ADD A NEW VIRTUAL SERVICE

Label	<input type="text" value="PrintService"/>	?	
Virtual Service	IP Address	<input type="text" value="192.168.10.10"/>	?
	Ports	<input type="text" value="445"/>	?
Layer 7 Protocol	<input type="text" value="TCP Mode"/>		?
Manual Configuration	<input type="checkbox"/>		?

DEFINING THE REAL SERVERS (RIPS)

1. Using the web user interface, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP
2. Define the *Label* for the real server as required, e.g. **DCE1**
3. Set the *Real Server IP Address* field to the required IP address, e.g. 192.168.10.20
4. Leave the *Real Server Port* field blank
5. Click **Update**
6. Repeat these steps to add additional print servers as required

LAYER 7 ADD A NEW REAL SERVER - PRINTSERVICE

Label	<input type="text" value="DCE1"/>	?
Real Server IP Address	<input type="text" value="192.168.10.20"/>	?
Real Server Port	<input type="text"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

7. Click on **Reload HAProxy** when prompted to do so in the blue box that appears. This will apply the new changes and put the new virtual service and its associated virtual servers into use

9. Configuring Print Servers for Load Balancing

The following steps should be carried out on each print server defined in the virtual service:

1. Join the server to the same domain as the client PCs
2. Install the **Print and Document Service** role / **Print Server** service
3. Install and share the printers (use exactly the same share names and permissions across all servers)
4. If DR mode is used, solve the “ARP problem” on each print server, to that DR mode will work. For detailed steps on solving the ARP problem for the various versions of Windows, please refer to Appendix 1 on page 11 for more information.

Note:

Important: When configuring the Loopback Adapter to solve the ARP Problem, the following options **must** also be checked (ticked):
Client for Microsoft Networks and File & Printer Sharing for Microsoft Networks

REGISTRY MODIFICATIONS

To enable the print servers to be accessed via a shared name (**EQDCEHA** in the example virtual service in this guide), add the following registry entries to each print server:

Key: HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Lsa

Value: DisableLoopbackCheck

Type: REG_DWORD

Data: 1

Key: HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\lanmanserver\parameters

Value: DisableStrictNameChecking

Type: REG_DWORD

Data: 1

Key: HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\lanmanserver\parameters

Value: OptionalNames

Type: REG_MULTI_SZ

Data: EQDCEHA

Note:

In the example presented here, EQDCEHA is the name that will be used to access the load balanced print servers via the virtual service (VIP) created on the load balancer. This can be set to any appropriate name. Whatever name is used, it must resolve to the IP address of the VIP as explained in the section below.

MICROSOFT WINDOWS SERVER 2008 SPECIFIC REGISTRY CHANGE

If Microsoft Windows Server 2008 is used as the operating system for the printer servers, an additional registry entry change is required. The following registry entry should be changed from a DWORD to a QWORD:

Key: HKLM\SYSTEM\CurrentControlSet\Control\Print\DNSOneWire

Value: DnsOnWire

Type: REG_QWORD

Data: 1

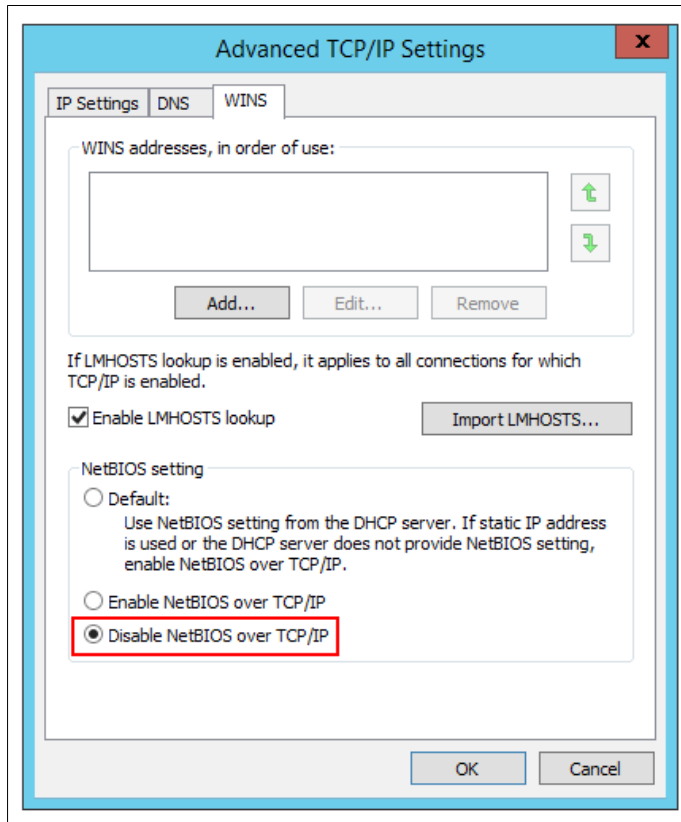
CONFIGURING NAME RESOLUTION

For printer load balancing to work, **either** DNS or NetBIOS name resolution should be configured as detailed below.

DNS NAME RESOLUTION (WINDOWS 2000 & LATER)

To configure DNS name resolution, the following steps should be completed:

1. NetBIOS over TCP/IP should be disabled on **all** interfaces of **each** print server, like shown



2. A host name and corresponding "Host (A)" record for the virtual DCE that matches the virtual IP (VIP) address for the load balancer should be created

When configuring printers to connect back to the highly available DCE, the DCE hostname / IP address should be the VIP address and not the individual DCE host name or IP address.

NETBIOS NAME RESOLUTION (LEGACY ENVIRONMENTS)

To configure NetBIOS name resolution, the following steps should be completed:

1. NetBIOS over TCP/IP should be **disabled on the main NIC** and **left enabled on the Loopback adapter** on **each** print server
2. Either a WINS server should be set up and all clients configured to use this, **or** pre-loaded entries in the LMHosts file of each client should be set up

Note:

As shown in the flow chart in [this Technet article](#), for a default H-node client, NetBIOS name resolution occurs in the following order:

1. Local NetBIOS cache
2. WINS server
3. NetBIOS broadcast
4. Local LMHosts file

Therefore, to avoid broadcast, LMHost entries must be declared as pre-loaded to ensure they are available in the local NetBIOS cache.

Configuring the LMHosts file

This is done by creating an entry like so:

```
EQDCEHA 192.168.100.10 #PRE
```

Entries with the #PRE directive are loaded into the cache on reboot, or can be forced using the command:

```
nbtstat -R
```

The following command can be used to view the cache and verify that the entry has been added:

```
nbtstat -c
```

FINALISING THE SERVER CONFIGURATION

To finalise the print server configuration changes, **each print server must be rebooted**.

TESTING THE LOAD BALANCED PRINT SERVICE

The load balanced print service can be tested, either by browsing to the virtual service IP address or the share name. In the example presented in this document, this would be done by going to

```
\\10.10.10.190
```

or

```
\\EQDCEHA
```

Any shared printers and shared folders that have been configured on the real print servers should be visible.

INSTALLING AND CONFIGURING COUCHBASE AND EQUITRAC DCE

The Couchbase and Equitrac DCE software should be set up by following the steps outlined in the document *Nuance Equitrac Office and Express Print Release High Availability Setup Guide*, which can be found here:

https://download.equitrac.com/271828/EO5.7/Docs/Print_Release_HA.pdf

10. Technical Support

For more details about configuring the appliance and assistance with designing your deployment please don't hesitate to contact the support team using the following email address: support@loadbalancer.org

11. Further Documentation

The Administration Manual contains much more information about configuring and deploying the appliance. It's available here: <http://pdfs.loadbalancer.org/loadbalanceradministrationv8.pdf>

12. Conclusion

Loadbalancer.org appliances provide a very cost effective solution for highly available load balanced Nuance Equitrac environments.

13. Appendix

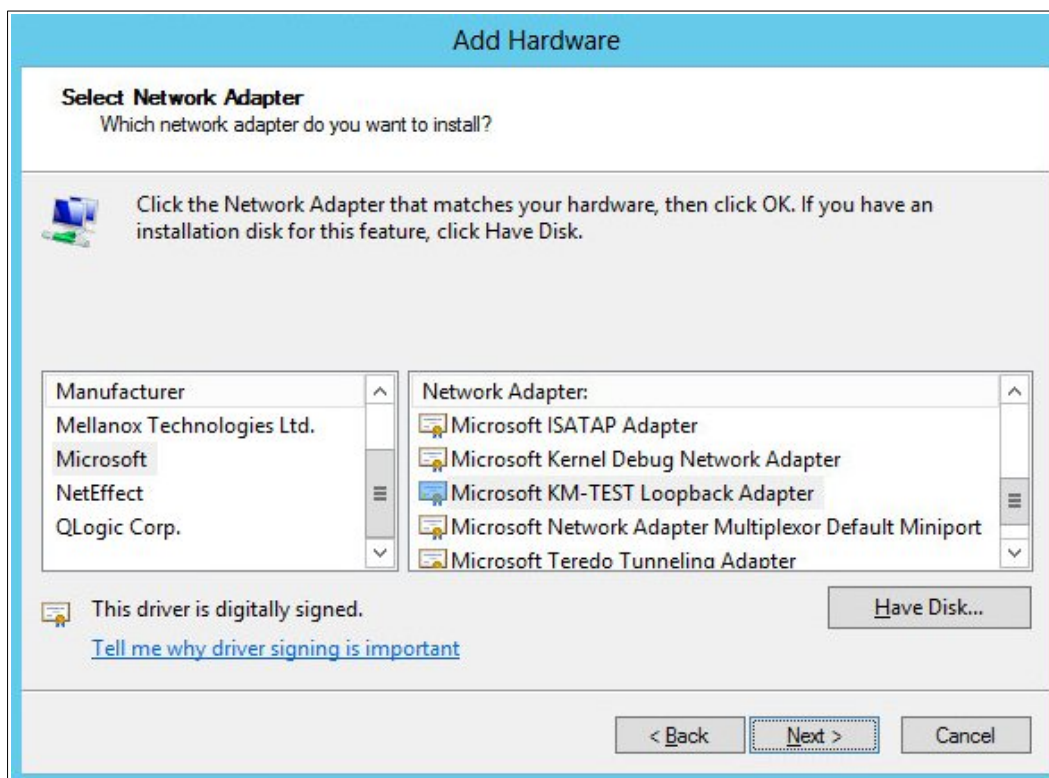
1 – SOLVING THE ARP PROBLEM

When using Layer 4 DR mode, the ARP problem must be solved. This involves configuring each Real Server to be able to receive traffic destined for the VIP, and ensuring that each Real Server does not respond to ARP requests for the VIP address – only the load balancer should do this.

The steps below are for Windows 2012 / 2016, for other versions of Windows please refer to chapter 6 in the [administration manual](#).

Step 1: Install the Microsoft Loopback Adapter

1. Click **Start**, then run **hdwwiz** to start the Hardware Installation Wizard
2. When the Wizard has started, click **Next**
3. Select **Install the hardware that I manually select from a list (Advanced)**, click **Next**
4. Select **Network adapters**, click **Next**
5. Select **Microsoft & Microsoft KM-Test Loopback Adapter**, click **Next**

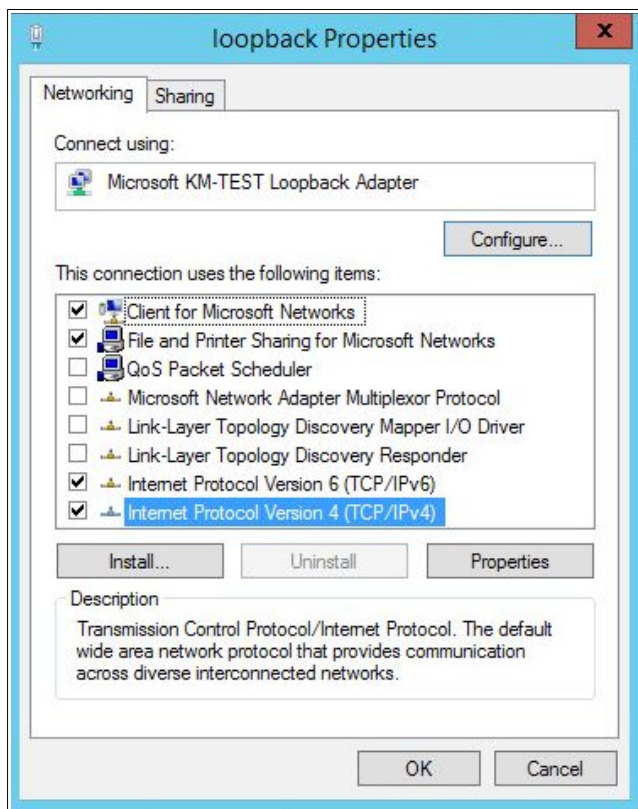


6. Click **Next** to start the installation, when complete click **Finish**

Step 2: Configure the Loopback Adapter

1. Open Control Panel and click **Network and Sharing Center**
2. Click **Change adapter settings**
3. Right-click the new Loopback Adapter and select **Properties**
4. Un-check all items except **Internet Protocol Version 4 (TCP/IPv4)** and **Internet Protocol Version 6**

(TCP/IPv6) as shown below:



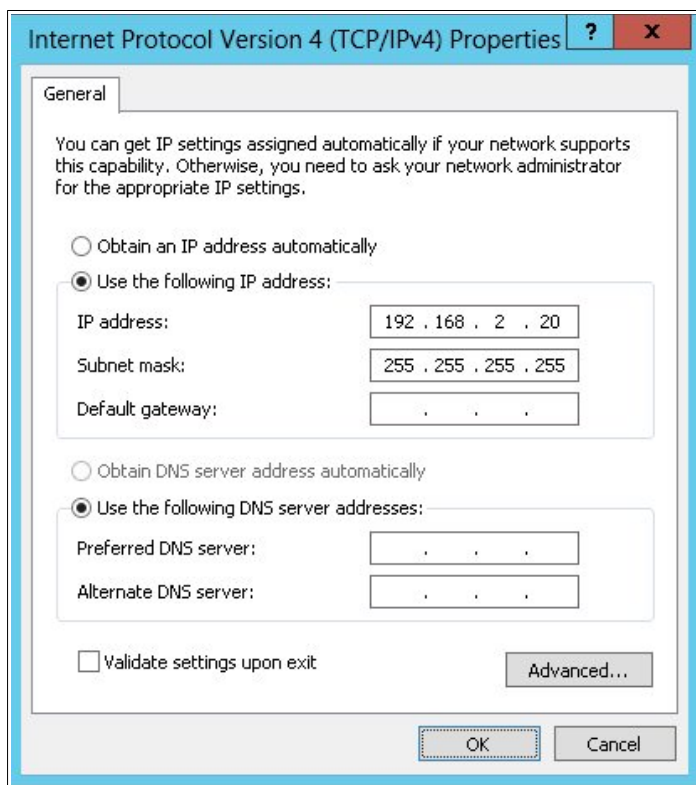
Note:

Leaving both checked ensures that both IPv4 and IPv6 are supported. Select one if preferred.

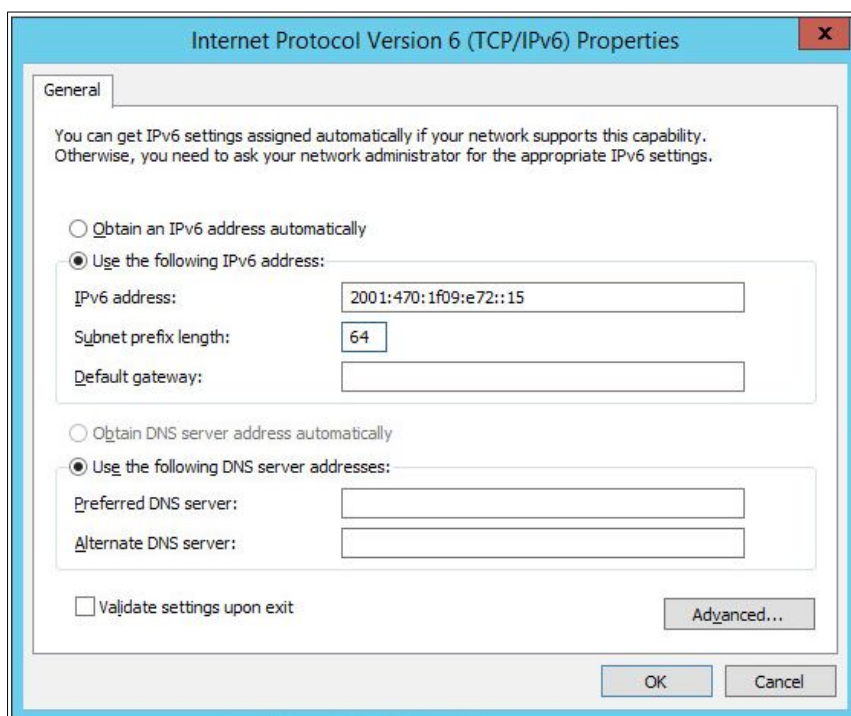
Important: When configuring the Loopback Adapter to solve the ARP Problem, the following options **must** also be checked (ticked):

Client for Microsoft Networks and File & Printer Sharing for Microsoft Networks

5. If configuring IPv4 addresses select **Internet Protocol Version (TCP/IPv4)**, click **Properties** and configure the IP address to be the same as the Virtual Service (VIP) with a subnet mask of 255.255.255.255 , e.g. 192.168.2.20/255.255.255.255 as shown below:



6. If configuring IPv6 addresses select **Internet Protocol Version (TCP/IPv6)**, click **Properties** and configure the IP address to be the same as the Virtual Service (VIP) and set the *Subnet Prefix Length* to be the same as your network setting , e.g. 2001:470:1f09:e72::15/64 as shown below:



7. Click **OK** on TCP/IP Properties, then click **Close** on Ethernet Properties to save and apply the new settings
8. Now repeat the above process on the other Windows 2012/2016 Real Servers

Step 3: Configure the strong/weak host behavior

Windows Server 2000 and Windows Server 2003 use the weak host model for sending and receiving for all IPv4 interfaces and the strong host model for sending and receiving for all IPv6 interfaces. You cannot configure this behavior. The Next Generation TCP/IP stack in Windows 2008 and later supports strong host sends and receives for both IPv4 and IPv6 by default. To ensure that Windows 2012/2016 is running in the correct mode to be able to respond to the VIP, the following commands must be run on each Real Server:

For IPv4 addresses:

```
netsh interface ipv4 set interface "net" weakhostreceive=enabled
netsh interface ipv4 set interface "loopback" weakhostreceive=enabled
netsh interface ipv4 set interface "loopback" weakhostsend=enabled
```

For these commands to work, the LAN connection NIC must be named "net" and the loopback NIC must be named "loopback" as shown below. If you prefer to leave your current NIC names, then the commands above must be modified accordingly. For example, if your network adapters are named "LAN" and "LOOPBACK", the commands required would be:

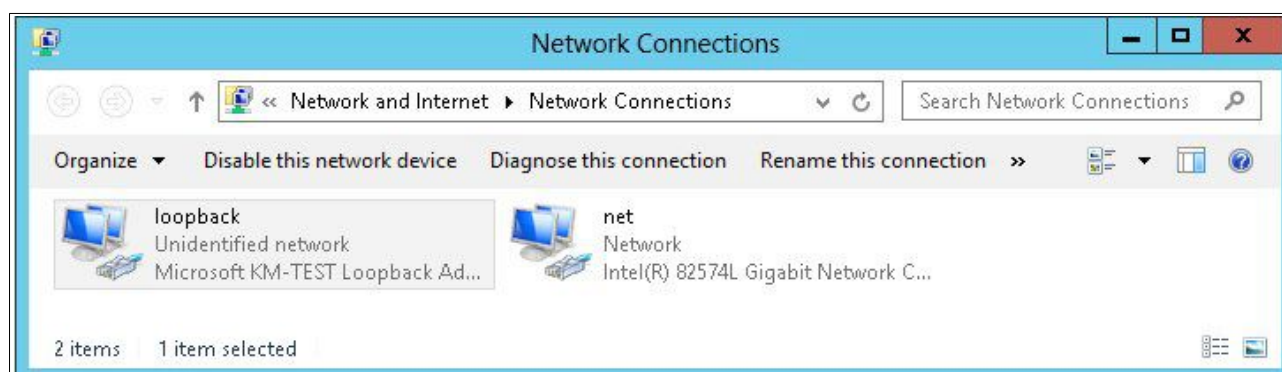
```
netsh interface ipv4 set interface "LAN" weakhostreceive=enabled
netsh interface ipv4 set interface "LOOPBACK" weakhostreceive=enabled
netsh interface ipv4 set interface "LOOPBACK" weakhostsend=enabled
```

For IPv6 addresses:

```
netsh interface ipv6 set interface "net" weakhostreceive=enabled
netsh interface ipv6 set interface "loopback" weakhostreceive=enabled
netsh interface ipv6 set interface "loopback" weakhostsend=enabled
netsh interface ipv6 set interface "loopback" dadtransmits=0
```

For these commands to work, the LAN connection NIC must be named "net" and the loopback NIC must be named "loopback" as shown below. If you prefer to leave your current NIC names, then the commands above must be modified accordingly. For example, if your network adapters are named "LAN" and "LOOPBACK", the commands required would be:

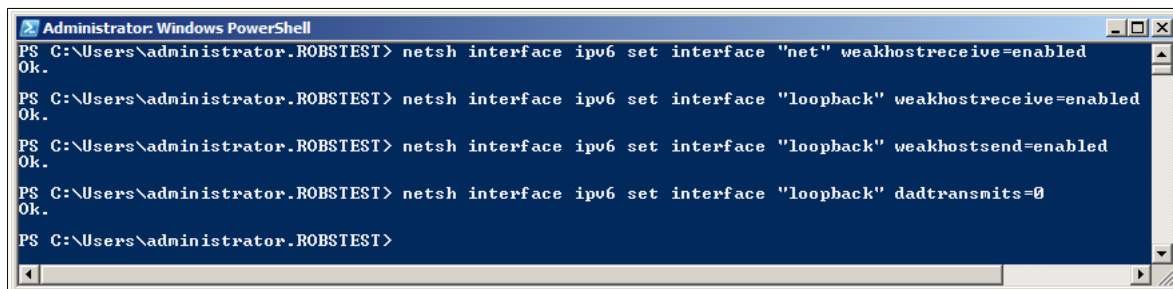
```
netsh interface ipv6 set interface "LAN" weakhostreceive=enabled
netsh interface ipv6 set interface "LOOPBACK" weakhostreceive=enabled
netsh interface ipv6 set interface "LOOPBACK" weakhostsend=enabled
netsh interface ipv6 set interface "LOOPBACK" dadtransmits=0
```



Note:

The names for the NICs are case sensitive, so make sure that the name used for the interface and the name used in the commands match exactly.

1. Start Powershell or use a command window to run the appropriate netsh commands as shown in the example below:



```
Administrator: Windows PowerShell
PS C:\Users\administrator.ROBSTEST> netsh interface ipv6 set interface "net" weakhostreceive=enabled
Ok.
PS C:\Users\administrator.ROBSTEST> netsh interface ipv6 set interface "loopback" weakhostreceive=enabled
Ok.
PS C:\Users\administrator.ROBSTEST> netsh interface ipv6 set interface "loopback" weakhostsend=enabled
Ok.
PS C:\Users\administrator.ROBSTEST> netsh interface ipv6 set interface "loopback" dadtransmits=0
Ok.
PS C:\Users\administrator.ROBSTEST>
```

Note:

This shows an IPv6 example, use the IPv4 commands if you're using IPv4 addresses.

2. Now repeat these 4 commands on the other Windows 2012 Real Servers

Note:

Solving the ARP problem for other version of Windows is similar. For full details, please refer to the [administration manual](#).

2 – COMPANY CONTACT INFORMATION

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