



# Load Balancing Microsoft Print Server

Version 1.2.2

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# 1. About this Guide

This document provides a quick reference guide on how to load balance Microsoft Print Servers using Loadbalancer.org appliances.

# 2. Loadbalancer.org Appliances Supported

All our products can be used with Microsoft Print Server. For full specifications of available models please refer to <https://www.loadbalancer.org/products>.

Some features may not be supported in all cloud platforms due to platform specific limitations, please check with Loadbalancer.org support for further details.

# 3. Loadbalancer.org Software Versions Supported

- v8.3.8 and later

**Note** | The screenshots used throughout this document aim to track the latest Loadbalancer.org software version. If using an older software version, note that the screenshots presented here may not match the WebUI exactly.

# 4. Microsoft Windows Server Versions Supported

- Windows Server 2012 & later

# 5. Related Documentation

For additional information, please refer to the [Administration Manual](#) and the relevant [Quick Start / Configuration Guide](#).

# 6. Load Balanced Ports / Services

Ports	Uses	Transport Layer Protocol
445	SMB	TCP
515	LPD	TCP

# 7. Load Balancer Configuration

## Deploy the Loadbalancer.org Appliance

Deploy the Loadbalancer.org appliance as described in the relevant [Quick Start / Configuration Guide](#).

## Accessing the WebUI

The WebUI is accessed using a web browser. By default, user authentication is based on local Apache .htaccess files. User administration tasks such as adding users and changing passwords can be performed using the WebUI menu option: *Maintenance > Passwords*.

**Note**

A number of compatibility issues have been found with various versions of Internet Explorer and Edge. The WebUI has been tested and verified using both Chrome & Firefox.

**Note**

If required, users can also be authenticated against LDAP, LDAPS, Active Directory or Radius. For more information, please refer to [External Authentication](#).

1. Using a browser, access the WebUI using the following URL:

**https://<IP-address-configured-during-network-setup-wizard>:9443/lbadmin/**

2. Log in to the WebUI:

**Username:** loadbalancer

**Password:** <configured-during-network-setup-wizard>

**Note**

To change the password, use the WebUI menu option: *Maintenance > Passwords*.

Once logged in, the WebUI will be displayed as shown below:

- System Overview
- Local Configuration
- Cluster Configuration
- Maintenance
- View Configuration
- Reports
- Logs
- Support
- Live Chat

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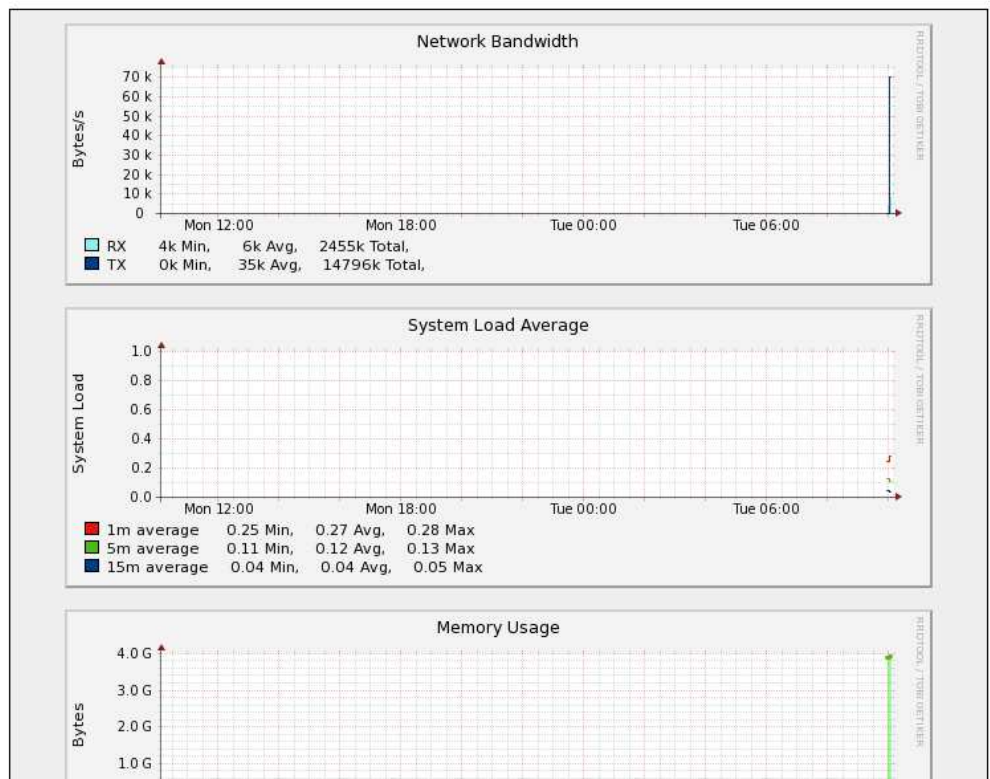
System Overview ?

2022-06-14 10:07:30 UTC

**Would you like to run the Setup Wizard?**

VIRTUAL SERVICE | IP | PORTS | CONNS | PROTOCOL | METHOD | MODE

No Virtual Services configured.



Note

The WebUI for the VA is shown, the hardware and cloud appliances are very similar. The yellow licensing related message is platform & model dependent.

- You'll be asked if you want to run the Setup Wizard. Click **Dismiss** if you're following a guide or want to configure the appliance manually. Click **Accept** to start the Setup Wizard.

Note

The Setup Wizard can only be used to configure Layer 7 services.

### Main Menu Options

- System Overview** - Displays a graphical summary of all VIPs, RIPs and key appliance statistics
- Local Configuration** - Configure local host settings such as IP address, DNS, system time etc.
- Cluster Configuration** - Configure load balanced services such as VIPs & RIPs

**Maintenance** - Perform maintenance tasks such as service restarts and taking backups

**View Configuration** - Display the saved appliance configuration settings

**Reports** - View various appliance reports & graphs

**Logs** - View various appliance logs

**Support** - Create a support download, contact the support team & access useful links

**Live Chat** - Start a live chat session with one of our Support Engineers

## Configure the Virtual Service (VIP)

1. Using the WebUI, navigate to: *Cluster Configuration > Layer 4 – Virtual Services* and click **Add a New Virtual Service**.
2. Enter the following details:

Virtual Service		
Label	<input type="text" value="PrintServerVIP"/>	<a href="#">?</a>
IP Address	<input type="text" value="192.168.100.10"/>	<a href="#">?</a>
Ports	<input type="text" value="445,515"/>	<a href="#">?</a>
Protocol		
Protocol	<input type="text" value="TCP"/>	<a href="#">?</a>
Forwarding		
Forwarding Method	<input type="text" value="Direct Routing"/>	<a href="#">?</a>

- Define the required *Label* (name) for the VIP, e.g. **PrintServerVIP**.
  - Set the *Virtual Service IP address* field to the required IP address, e.g. **192.168.100.10**.
  - Set the *Virtual Service Ports* field to **445,515**.
  - Leave the *Protocol* set to **TCP**.
  - Leave the *Forwarding Method* set to **Direct Routing**.
3. Click **Update**.
  4. Now click **Modify** next to the newly created Virtual Service.
    - Scroll to the *Health Checks* section.
    - Ensure the *Health Check* is set to **Connect to Port**.
    - Click [**Advanced**] and set the *Check Port* to **445**.
  5. Click **Update**.

## Define the Real (Print Server) Servers

1. Using the WebUI, navigate to: *Cluster Configuration > Layer 4 – Real Servers* and click **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

Label	<input type="text" value="PS1"/>	<a href="#">?</a>
Real Server IP Address	<input type="text" value="192.168.100.20"/>	<a href="#">?</a>
Weight	<input type="text" value="100"/>	<a href="#">?</a>
Minimum Connections	<input type="text" value="0"/>	<a href="#">?</a>
Maximum Connections	<input type="text" value="0"/>	<a href="#">?</a>

- Enter an appropriate label for the Real Server, e.g. **PS1**.
- Change the *Real Server IP Address* field to the required address, e.g. **192.168.100.20**.

3. Click **Update**.

4. Repeat the above steps to add your other Print Server(s).

## 8. Print Server Configuration

### Step 1 - Initial Configuration

Complete the following on each Print Server:

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 & share the printers (use the same share names and permissions across all servers).

### Step 2 - Solve the ARP Problem

Layer 4 DR (Direct Routing) mode works by changing the MAC address of the inbound packets to match the Real Server selected by the load balancing algorithm. To enable DR mode to operate, each Real Server must have a loopback adapter installed and configured with the VIP address and also the strong/weak host model must be modified. Configuring the Real Servers in this way is known as "solving the ARP Problem".

**Note** | For more details on the ARP problem, please refer to [DR Mode Considerations](#).

### Windows Server 2012 & Later

Windows Server 2012 and later support Direct Routing (DR) mode through the use of the Microsoft Loopback Adapter. The IP address allocated to the Loopback Adapter must be the same as the Virtual Service (VIP) address. If the Real Server is included in multiple DR mode VIPs, additional IP addresses can be added to the Loopback Adapter that correspond to each VIP. In addition, steps must be taken to set the strong/weak host behavior which is used to either block or allow interfaces to receive packets destined for a different interface on the same server.

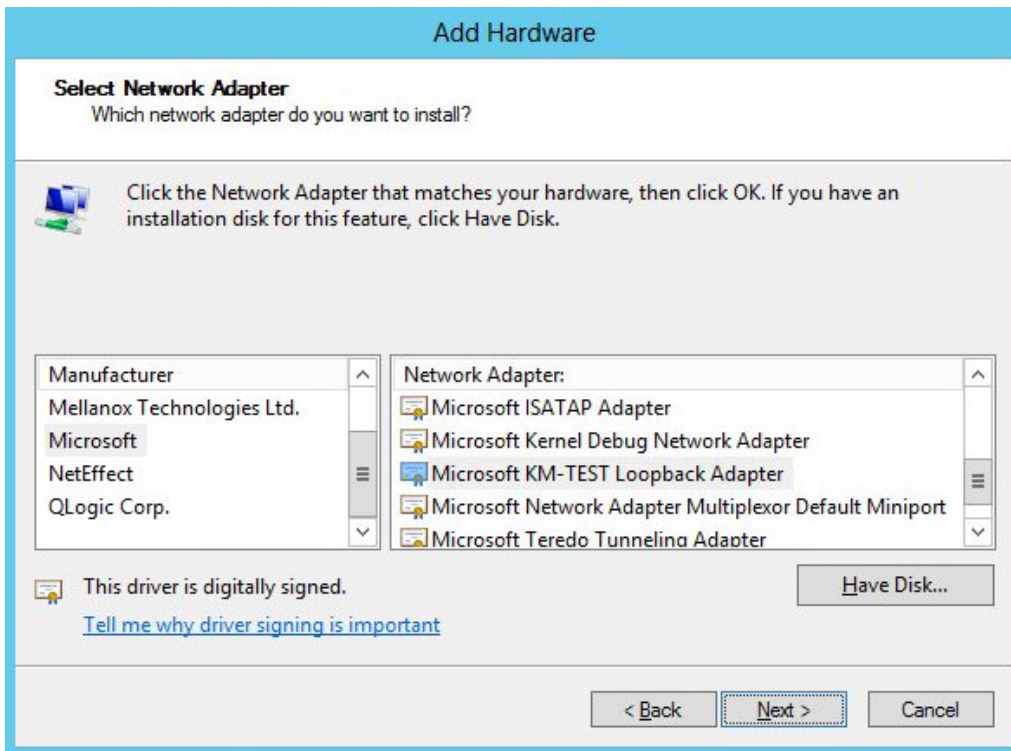
**Important** | The following 3 steps must be completed on each Real Server.

#### Step 1 of 3: Install the Microsoft Loopback Adapter

1. Click **Start**, then run **hdwwiz** to start the Hardware Installation Wizard.



2. Once 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**.

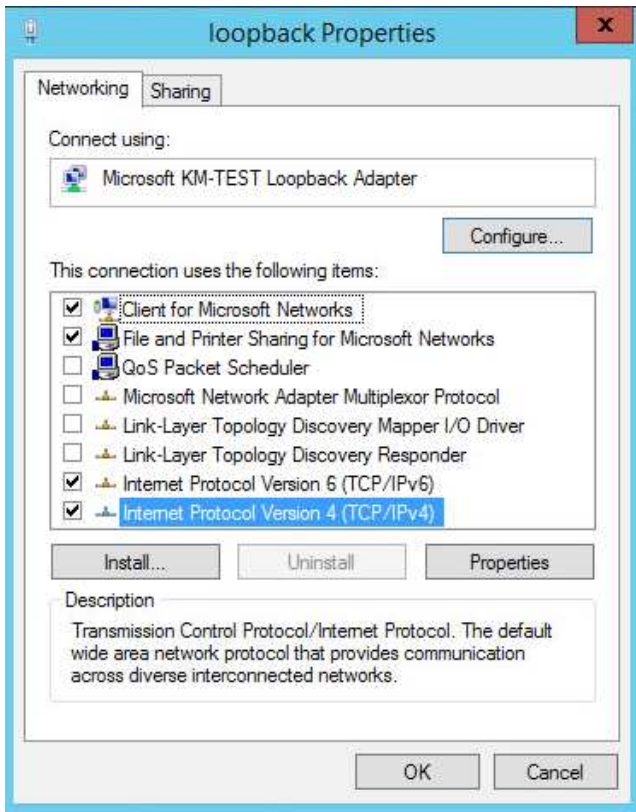


5. Select **Microsoft & Microsoft KM-Test Loopback Adapter**, click **Next**.
6. Click **Next** to start the installation, when complete click **Finish**.

### Step 2 of 3: 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. Uncheck all items except **Client for Microsoft Networks**, **File & Printer Sharing for Microsoft Networks**, **Internet Protocol Version 4 (TCP/IPv4)** and **Internet Protocol Version 6 (TCP/IPv6)** as shown below:





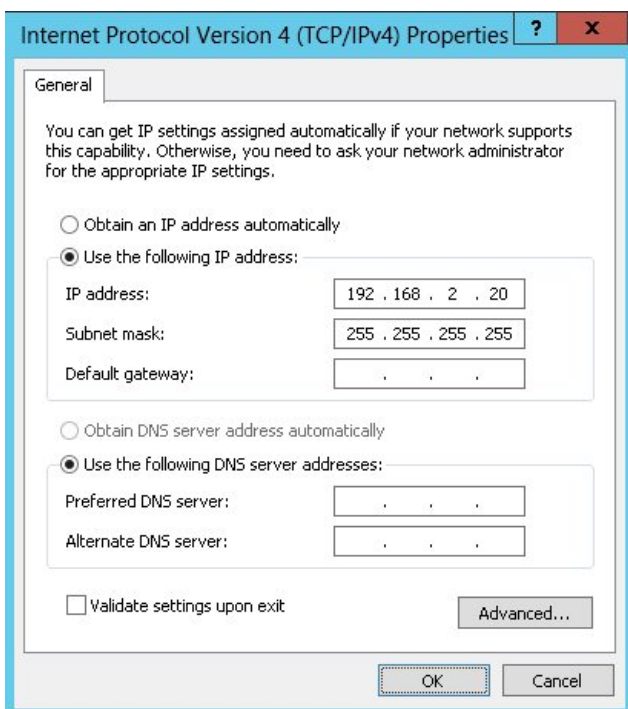
**Important**

Make sure that you also check (tick) **Client for Microsoft Networks** and **File & Printer Sharing for Microsoft Networks** as shown above.

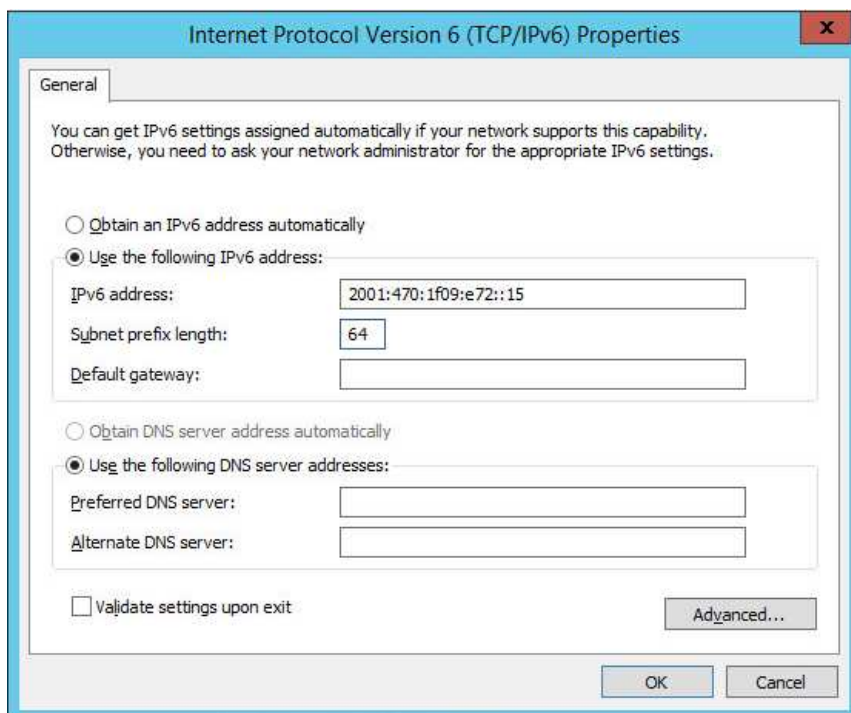
**Note**

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

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** then click **Close** to save and apply the new settings.

**Note**

For Windows 2012 & later, it's not necessary to modify the interface metric on the advanced tab and should be left set to Automatic.

**Step 3 of 3: Configure the strong/weak host behavior**

Either Network Shell (netsh) commands or PowerShell cmdlets can be used to set the required strong/weak host behavior.

The commands in this section assume that the LAN Adapter is named "net" and the Loopback Adapter is named "loopback" as shown in the example below:



**Important**

Either adjust the commands to use the names allocated to your LAN and loopback adapters, or rename the adapters before running the commands. Names are case sensitive so make sure that the interface names used in the commands match the adapter names exactly.

#### Option 1 - Using Network Shell (netsh) Commands

To configure the correct strong/weak host behavior run the following commands:

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 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
```

#### Option 2 - Using PowerShell Cmdlets

For IPv4:

```
Set-NetIpInterface -InterfaceAlias loopback -WeakHostReceive enabled -WeakHostSend enabled
-DadTransmits 0 -AddressFamily IPv4
```

```
Set-NetIpInterface -InterfaceAlias net -WeakHostReceive enabled -AddressFamily IPv4
```

For IPv6:

```
Set-NetIpInterface -InterfaceAlias loopback -WeakHostReceive enabled -WeakHostSend enabled
-DadTransmits 0 -AddressFamily IPv6
```

```
Set-NetIpInterface -InterfaceAlias net -WeakHostReceive enabled -AddressFamily IPv6
```

## Step 3 – Enable Print Server Load Balancing

To enable the load balanced print servers to be accessed via an appropriate hostname, complete the following steps:

#### Note

The configuration steps below assume the hostname for the VIP is **printserver-vip**. Change this to suit your requirements.

### Windows 2019 & Later

For Windows 2019 & later, host entries must be added to the local hosts file and a Registry Key must be added:

1. Add the following host entries to the local hosts file on each Print Server:

```
<local IP address> <printserver-vip>
<local IP address> <printserver-vip>.<domain>
```

For example, if you have 2 Print Servers - 192.168.100.20 and 192.168.100.21, add the following entries:

**On the 192.168.100.20 server:**

```
192.168.100.20 printserver-vip
192.168.100.20 printserver-vip.domain.com
```

**On the 192.168.100.21 server:**

```
192.168.100.21 printserver-vip
192.168.100.21 printserver-vip.domain.com
```

2. Add the following Registry Key to each Print Server:

```
Key: HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\lanmanserver\parameters
Value: OptionalNames
Type: REG_MULTI_SZ
Data: printserver-vip
```

**Note**

'printserver-vip' 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 be any appropriate name. Whatever name is used, it must be the **same name** that is used for the DNS entry described in the *Configure DNS Name Resolution* section below.

## Windows 2012 & 2016

For Windows 2012 & 2016, the following Registry Keys must be added 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: printserver-vip
```

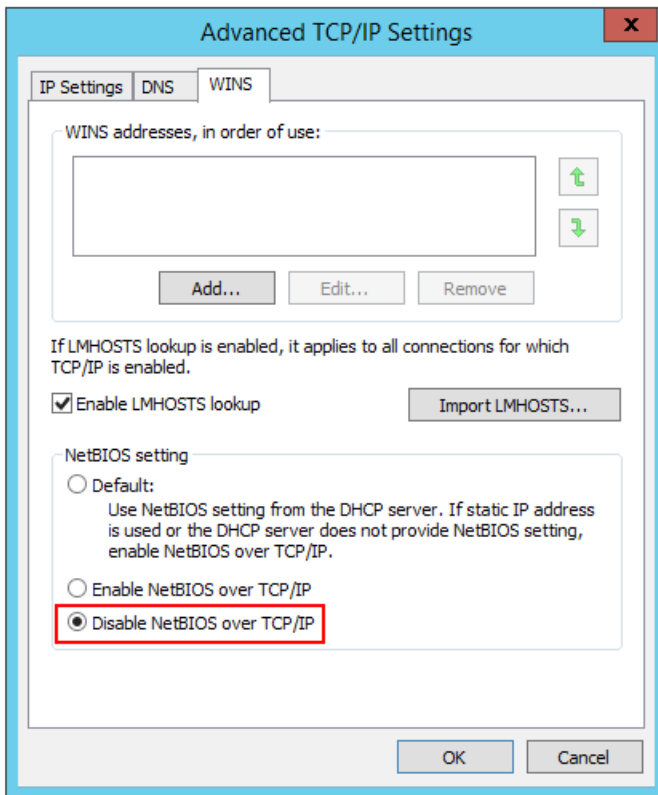
**Note**

'printserver-vip' 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 be any appropriate name. Whatever name is used, it must be the **same name** that is used for the DNS entry described in the *Configure DNS Name Resolution* section below.

## Step 4 – Configure DNS Name Resolution

To configure DNS name resolution, complete the following steps:

1. On each Print Server, disable NetBIOS over TCP/IP on all interfaces.



2. Create a DNS record for the hostname used for the VIP, in this example: **printserver-vip** → **192.168.110.10**.

## Step 5 – Server Reboot

To apply the changes, reboot each Print Server.

## 9. Testing & Verification

You should now be able to access your printers by browsing using either the Virtual Service IP address, or the share name. In this example, either:

\\192.168.100.10

\\printserver-vip

\\printserver-vip.domain.com

## 10. Deploying Load Balanced Printers via Group Policy

- Ensure that the name you've used for your load balanced Print Server cluster (e.g. **printserver-vip**) is resolvable by DNS as explained above.
- On one of your Print Servers, open: *Administrative Tools* > *Print Management*.

- Right-click Print Servers and click **Add/Remove Servers**.
- Specify the name you've used for your load balanced Print Server cluster, e.g. **printserver-vip** and click **OK**.
- Expand the *Print Servers* section then expand the new *printserver-vip* section.
- Select *Printers*.
- Right click the printer you want to deploy and click **Deploy with Group Policy**.
- Select the relevant GPO and configure the remaining settings according to your requirements.

## 11. Loadbalancer.org Technical Support

If you have any questions regarding the appliance or would like assistance designing your deployment, please don't hesitate to contact our support team: [support@loadbalancer.org](mailto:support@loadbalancer.org).

## 12. Document Revision History

Version	Date	Change	Reason for Change	Changed By
1.1.0	4 November 2019	Styling and layout	General styling updates	AH
1.1.1	9 June 2020	New title page Updated Canadian contact details	Branding update Change to Canadian contact details	AH
1.1.2	25 June 2021	Added print server load balancing configuration steps for Windows 2019	The steps listed for other versions of Windows do not work for Windows 2019	RJC
1.2.0	1 September 2022	Converted the document to AsciiDoc Updated links and instructions where necessary	Move to new documentation system Required updates	AH
1.2.1	3 November 2022	Removed configuration sections for Legacy environments Added section covering how to solve the ARP problem for Windows 2012 & Later Added port 515 to the VIP Added the OptionalNames Registry key for Windows 2019 & later	Section no longer needed / updated configuration requirements	RJC
1.2.2	7 November 2022	Added minimum software version sections Various minor tidy ups	Additional information	RJC



## About Loadbalancer.org

Loadbalancer.org's mission is to ensure that its clients' businesses are never interrupted. The load balancer experts ask the right questions to get to the heart of what matters, bringing a depth of understanding to each deployment. Experience enables Loadbalancer.org engineers to design less complex, unbreakable solutions - and to provide exceptional personalized support.



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