LOADBALANCER

DEPLOYMENT GUIDE

Load Balancing Kofax ControlSuite®

Version 1.2.0

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1. About this Guide

This guide details the steps required to configure a load balanced Kofax ControlSuite environment utilizing Loadbalancer.org appliances. It covers the configuration of the load balancers and also any Kofax ControlSuite 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 Administration Manual.

2. Loadbalancer.org Appliances Supported

All our products can be used for load balancing Kofax ControlSuite. 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. Software Versions Supported

3.1. Loadbalancer.org Appliance

- V8.3.8 and later

ℹ 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.

3.2. Kofax ControlSuite

- All versions

4. Kofax ControlSuite

Kofax ControlSuite integrates a print management solution. 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. A capture application that captures, processes, and routes paper and electronic documents in a business environment. It lowers costs and improves operational efficiency for organizations of all sizes by automating document handling processes. With output management that gives organizations control of what, when, and how they produce and deliver information. Output Manager is designed to route documents through a centralized system into a single solution.

5. Load Balancing Kofax ControlSuite

5.1. Introduction and Overview of Different Modes

This guide details the configuration of a high availability ControlSuite deployment using a Loadbalancer.org appliance.

For a Kofax ControlSuite deployment, the preferred and default load balancer configuration uses Layer 4 DR Mode (Direct Routing, aka DSR / Direct Server Return) where possible. 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".

6. Load Balancer Deployment Methods

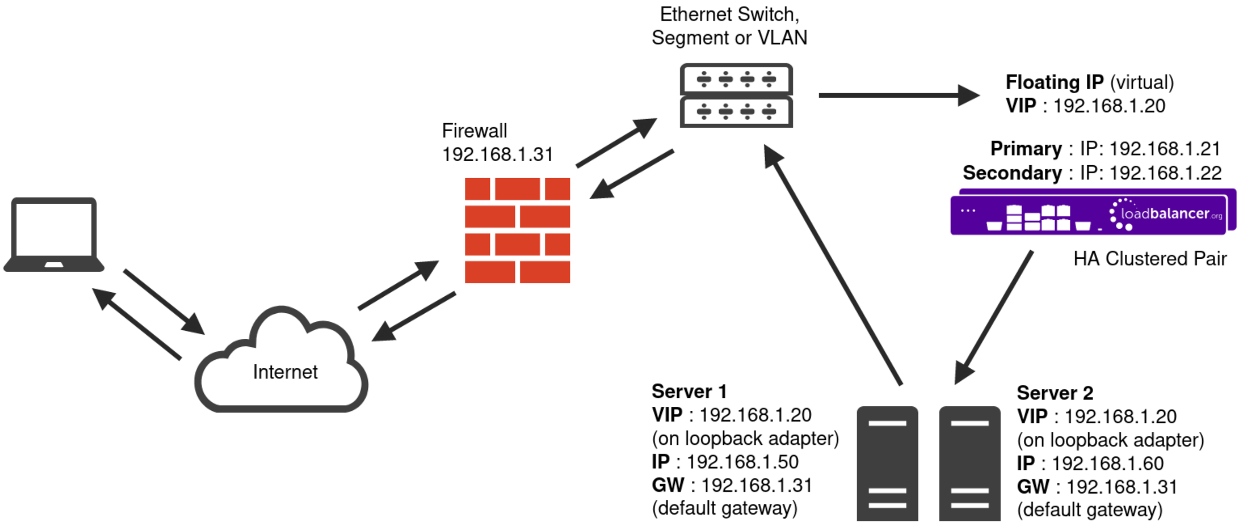
The load balancer can be deployed in 4 fundamental ways: ***Layer 4 DR mode***, ***Layer 4 NAT mode***, ***Layer 4 SNAT mode*** and ***Layer 7 SNAT mode***. However, we will only be using ***Layer 4 DR mode***, ***Layer 4 NAT mode*** or ***Layer 7 SNAT*** modes in this guide.

6.1. Layer 4 DR Mode

One-arm direct routing (DR) mode is a very high performance solution that requires little change to your existing infrastructure.

Note

Kemp, Brocade, Barracuda & A10 Networks call this *Direct Server Return* and F5 call it *nPath*.

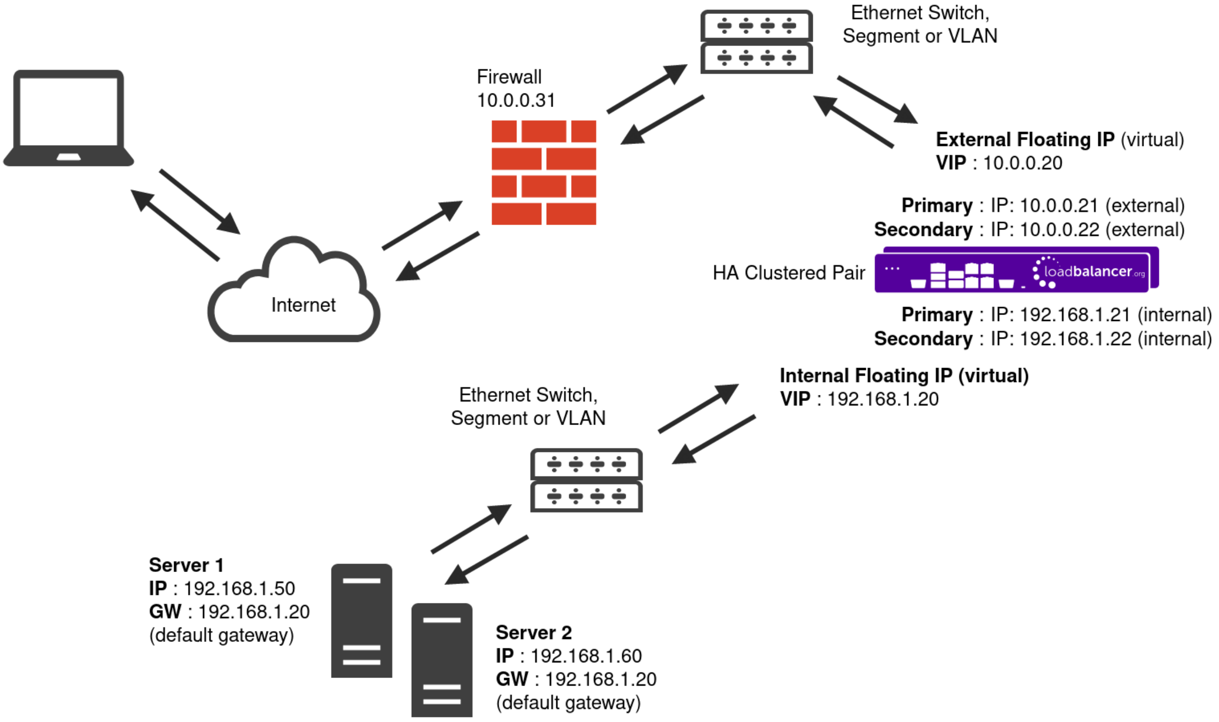


- DR mode works by changing the destination MAC address of the incoming packet to match the selected Real Server on the fly which is very fast.
- When the packet reaches the Real Server it expects the Real Server to own the Virtual Services IP address (VIP). This means that you need to ensure that the Real Server (and the load balanced application) respond to both the Real Server's own IP address and the VIP.
- The Real Servers should not respond to ARP requests for the VIP. Only the load balancer should do this. Configuring the Real Servers in this way is referred to as ***Solving the ARP problem***. For more information please refer to DR Mode Considerations.
- On average, DR mode is 8 times quicker than NAT for HTTP, 50 times quicker for Terminal Services and much, much faster for streaming media or FTP.
- The load balancer must have an Interface in the same subnet as the Real Servers to ensure layer 2 connectivity required for DR mode to work.

- The VIP can be brought up on the same subnet as the Real Servers, or on a different subnet provided that the load balancer has an interface in that subnet.
- Port translation is not possible with DR mode, e.g. VIP:80 → RIP:8080 is not supported.
- DR mode is transparent, i.e. the Real Server will see the source IP address of the client.

6.2. Layer 4 NAT Mode

Layer 4 NAT mode is a high performance solution, although not as fast as layer 4 DR mode. This is because real server responses must flow back to the client via the load balancer rather than directly as with DR mode.



- The load balancer translates all requests from the Virtual Service to the Real Servers.
- NAT mode can be deployed in the following ways:
  - **Two-arm (using 2 Interfaces)** (as shown above) - Here, 2 subnets are used. The VIP is located in one subnet and the load balanced Real Servers are located in the other. The load balancer requires 2 interfaces, one in each subnet.

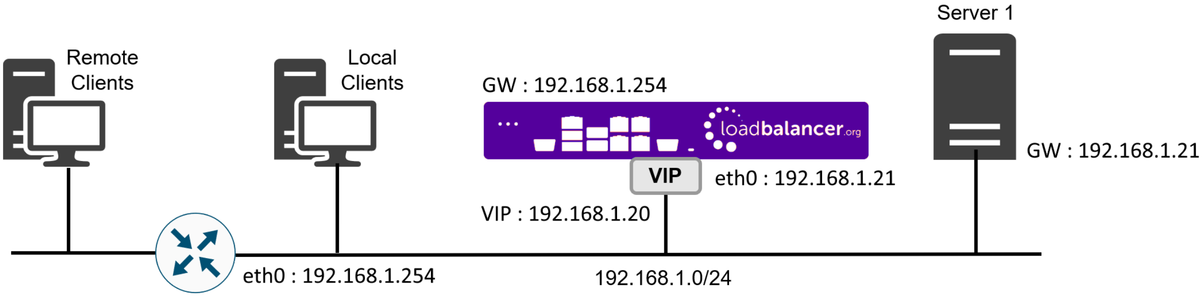
> ℹ Note
>
> This can be achieved by using two network adapters, or by creating VLANs on a single adapter.

  - Normally **eth0** is used for the internal network and **eth1** is used for the external network although this is optional. Any interface can be used for any purpose.
  - If the Real Servers require Internet access, ***Autonat*** should be enabled using the WebUI menu option: *Cluster Configuration > Layer 4 - Advanced Configuration*, the external interface should be selected.
  - The default gateway on the Real Servers must be set to be an IP address on the load balancer.

> **Note**
>
> For an HA clustered pair, a floating IP should be added to the load balancer and used as the Real Server's default gateway. This ensures that the IP address can 'float' (move) between Primary and Secondary appliances.

- Clients can be located in the same subnet as the VIP or any remote subnet provided they can route to the VIP.

- **One-arm (using 1 Interface)** - Here, the VIP is brought up in the same subnet as the Real Servers.



- To support remote clients, the default gateway on the Real Servers must be an IP address on the load balancer and routing on the load balancer must be configured so that return traffic is routed back via the router.

> **Note**
>
> For an HA clustered pair, a floating IP should be added to the load balancer and used as the Real Server's default gateway. This ensures that the IP address can 'float' (move) between Primary and Secondary appliances.

- To support local clients, return traffic would normally be sent directly to the client bypassing the load balancer which would break NAT mode. To address this, the routing table on the Real Servers must be modified to force return traffic to go via the load balancer. For more information please refer to One-Arm (Single Subnet) NAT Mode.

- If you want Real Servers to be accessible on their own IP address for non-load balanced services, e.g. RDP, you will need to setup individual SNAT and DNAT firewall script rules for each Real Server or add additional VIPs for this.
- Port translation is possible with Layer 4 NAT mode, e.g. VIP:80 → RIP:8080 is supported.
- NAT mode is transparent, i.e. the Real Servers will see the source IP address of the client.

NAT Mode Packet re-Writing

In NAT mode, the inbound destination IP address is changed by the load balancer from the Virtual Service IP address (VIP) to the Real Server. For outbound replies the load balancer changes the source IP address of the Real Server to be the Virtual Services IP address.

The following table shows an example NAT mode setup:

Protocol	VIP	Port	RIP	Port
TCP	10.0.0.20	80	192.168.1.50	80

In this simple example all traffic destined for IP address 10.0.0.20 on port 80 is load-balanced to the real IP address 192.168.1.50 on port 80.

Packet rewriting works as follows:

1) The incoming packet for the web server has source and destination addresses as:

Source	x.x.x.x:34567	**Destination**	10.0.0.20:80

2) The packet is rewritten and forwarded to the backend server as:

Source	x.x.x.x:34567	**Destination**	192.168.1.50:80

3) Replies return to the load balancer as:

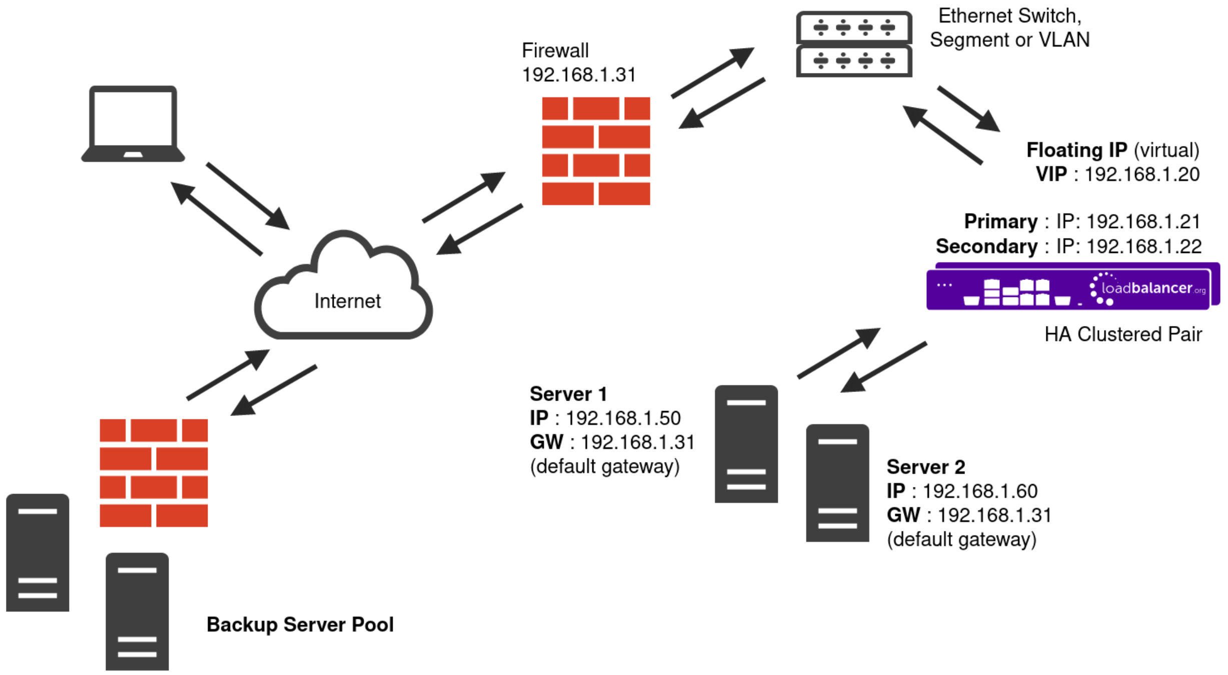
Source	192.168.1.50:80	**Destination**	x.x.x.x:34567

4) The packet is written back to the VIP address and returned to the client as:

Source	10.0.0.20:80	**Destination**	x.x.x.x:34567

6.3. Layer 7 SNAT Mode

Layer 7 SNAT mode uses a proxy (HAProxy) at the application layer. Inbound requests are terminated on the load balancer and HAProxy generates a new corresponding request to the chosen Real Server. As a result, Layer 7 is typically not as fast as the Layer 4 methods. Layer 7 is typically chosen when either enhanced options such as SSL termination, cookie based persistence, URL rewriting, header insertion/deletion etc. are required, or when the network topology prohibits the use of the layer 4 methods.



- Because layer 7 SNAT mode is a full proxy, any server in the cluster can be on any accessible subnet including across the Internet or WAN.
- Layer 7 SNAT mode is not transparent by default, i.e. the Real Servers will not see the source IP address of the client, they will see the load balancer's own IP address by default, or any other local appliance IP address if preferred (e.g. the VIP address). This can be configured per layer 7 VIP. If required, the load balancer can be configured to provide the actual client IP address to the Real Servers in 2 ways. Either by inserting a header that contains the client's source IP address, or by modifying the Source Address field of the IP packets and replacing the IP address of the load balancer with the IP address of the client. For more information on these methods please refer to Transparency at Layer 7.
- Layer 7 SNAT mode can be deployed using either a one-arm or two-arm configuration. For two-arm deployments, **eth0** is normally used for the internal network and **eth1** is used for the external network although this is not mandatory.
- Requires no mode-specific configuration changes to the load balanced Real Servers.
- Port translation is possible with Layer 7 SNAT mode, e.g. VIP:80 → RIP:8080 is supported.
- You should not use the same RIP:PORT combination for layer 7 SNAT mode VIPs and layer 4 SNAT mode VIPs because the required firewall rules conflict.

7. Appliance Configuration for Kofax Equitrac – Using DR Mode

7.1. Prerequisites

A load balanced Kofax Equitrac environment requires the following:

- Microsoft Windows Server environment
- Installation of DCE server

7.2. Overview of steps required

Setting up a load balanced Kofax 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 Kofax 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

7.3. Configuring the virtual service (VIP)

1. Using the web user interface, navigate to *Cluster Configuration > Layer 4 – Virtual Services* and click on **Add a new Virtual Service**.

2. Define the *Label* for the virtual service as required, e.g. **EQDCEHA**.

3. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.85.190**.

4. 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**

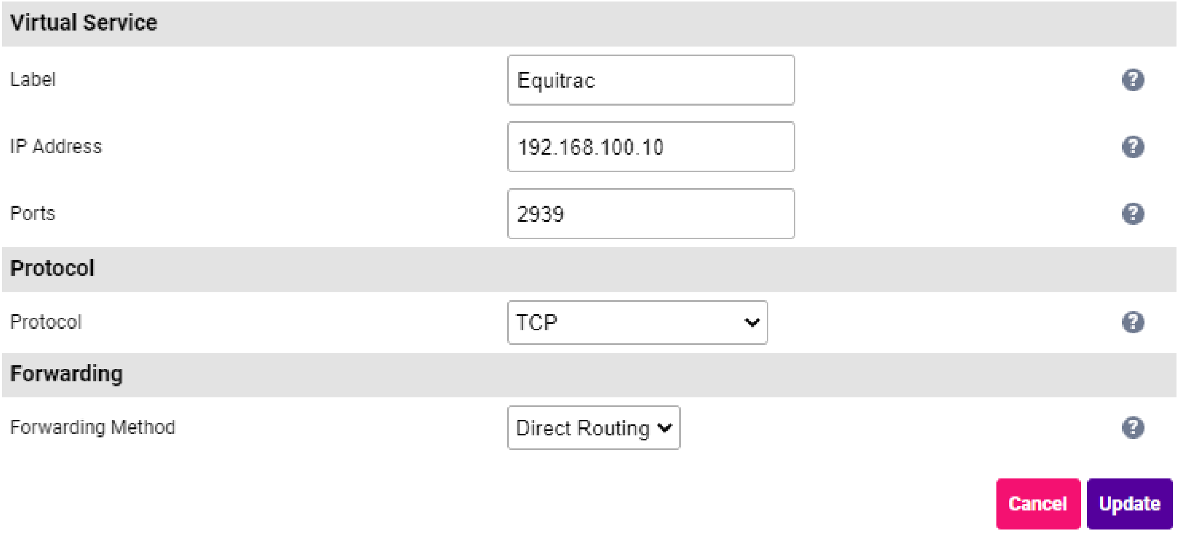
5. Click **Update** to create the virtual service.

6. Click **Modify** next to the newly created VIP.

7. Make sure that the *Persistent* checkbox is not selected.

8. Set the *Check Port* for server/service online to **2939**.

9. Click **Update**.



Virtual Service

Label	Equitrac
IP Address	192.168.100.10
Ports	2939

Protocol

Protocol	TCP

Forwarding

Forwarding Method	Direct Routing

7.4. Defining the Real Servers (RIPs)

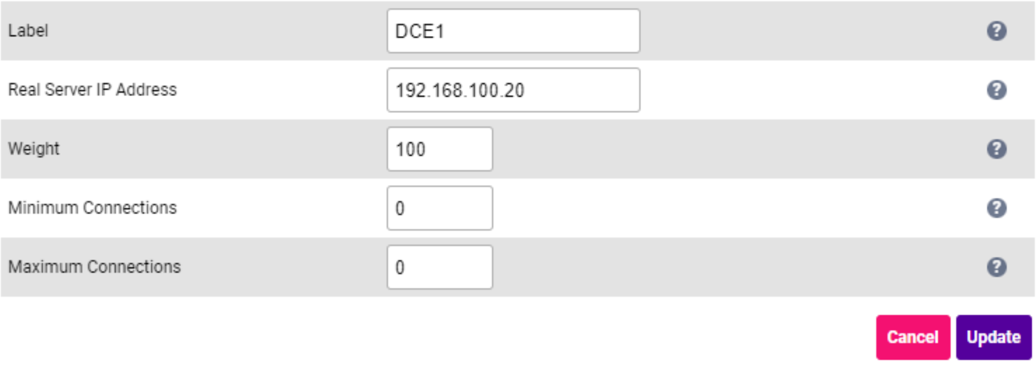
1. Using the web user interface, navigate to *Cluster Configuration > Layer 4 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.

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. **172.24.11.30**.

4. Click **Update**.

5. Repeat these steps to add additional print servers as required.

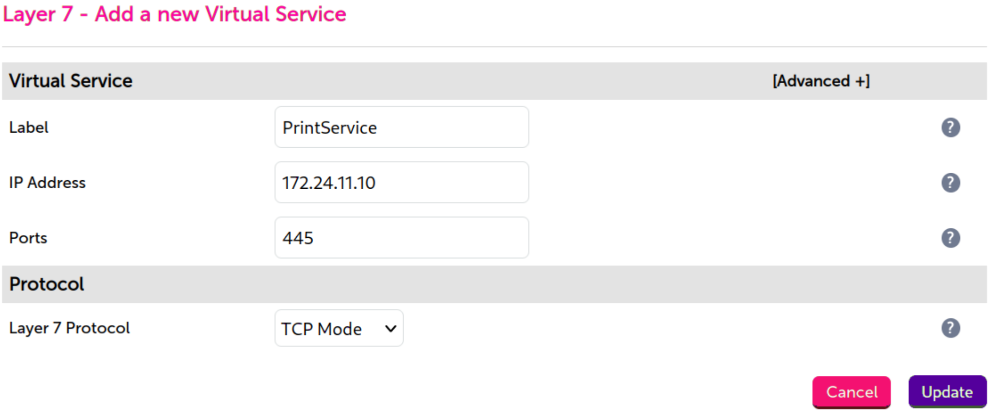


Label	DCE1
Real Server IP Address	192.168.100.20
Weight	100
Minimum Connections	0
Maximum Connections	0

8. Appliance Configuration for Microsoft Print Servers (Optional) – Using SNAT Mode

8.1. 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. **172.24.11.10**.
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

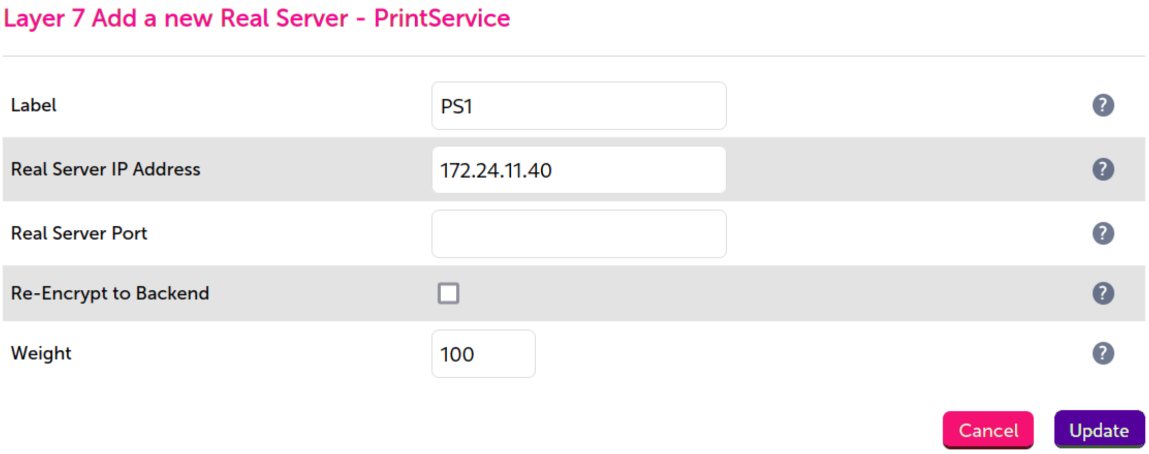
Virtual Service	[Advanced +]
Label	PrintService
IP Address	172.24.11.10
Ports	445
Protocol	
Layer 7 Protocol	TCP Mode

8.2. 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. **PS1**.
3. Set the *Real Server IP Address* field to the required IP address, e.g. **172.24.11.40**.
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	PS1
Real Server IP Address	172.24.11.40
Real Server Port	
Re-Encrypt to Backend	□
Weight	100

7. Click on **Reload HAProxy** when prompted to do so in the "Commit changes" 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 Solving the ARP Problem for more information.

Important

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

```
"Client for Microsoft Networks" & "File & Printer Sharing for Microsoft
Networks"
```

9.1. 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
```

> ℹ 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
```

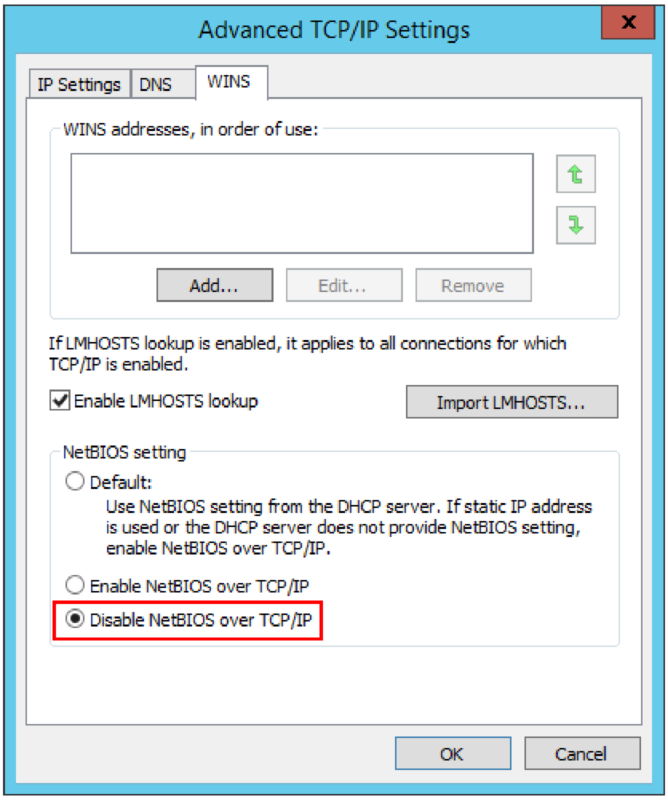
9.2. Configuring Name Resolution

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, as shown:



WINS addresses, in order of use:

If LMHOSTS lookup is enabled, it applies to all connections for which TCP/IP is enabled.

☑ Enable LMHOSTS lookup

NetBIOS setting

○ Default:
Use NetBIOS setting from the DHCP server. If static IP address is used or the DHCP server does not provide NetBIOS setting, enable NetBIOS over TCP/IP.

○ Enable NetBIOS over TCP/IP

● Disable NetBIOS over TCP/IP

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.

ℹ 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
```

9.3. Finalising the Server Configuration

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

9.4. 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

```
\\192.168.85.190
```

or

```
\\EQDCEHA
```

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

10. Kofax AutoStore

AutoStore is a server based middle-tier application that captures, processes, and routes paper and electronic documents in a business environment. It lowers costs and improves operational efficiency for organizations of all sizes by automating document handling processes.

AutoStore provides a flexible component-based server for capturing electronic and paper documents. Some of AutoStore’s capabilities include:

- 'Capture components' to capture documents from scanners and multifunction devices, fax, email, smartphones and tablets, XML data streams, PC desktops, office applications, and network and FTP locations.
- 'Process components' to support functionalities to detect, read, extract, store, convert, classify, and index content in captured documents.

- 'Route components' to deliver documents to virtually any destination such as fax, email, network folders, PCs, and document management systems.

11. Load Balancing Kofax AutoStore

> **Note** It's highly recommended that you have a working Kofax AutoStore environment first before implementing the load balancer.

11.1. Load Balancing & HA Requirements

In order to be successfully load balanced, a Kofax AutoStore deployment must feature the following components:

- Wide Area Network (WAN)
- Local Area Network (LAN)
- Firewall
- SQL Server
- Web Server
- Active Directory
- File Share

It is likely that a fully functional AutoStore deployment will already feature all of these components.

11.2. Persistence (aka Server Affinity)

MFDs from some vendors require source IP address persistence to be used for the AutoStore servers. This ensures that a particular client will connect to the same AutoStore server for the duration of the session.

MFDs from some vendors do not require session affinity at the load balancing layer.

Specific persistence settings for some of the most common vendors are described in the application configuration instructions later in this guide.

11.3. Virtual Service (VIP) Requirements

To provide load balancing and HA for AutoStore, a single VIP is required. The traffic that is load balanced and the ports that are used vary between vendors. Specific settings for some of the most common vendors are described in the application configuration instructions later in this guide.

11.4. Port Requirements

The following tables show the ports that are load balanced for four of the most common vendors:

Xerox EIP Connect

Port	Protocols	Use
3241	TCP	Capture server port

Konica Minolta

Port	Protocols	Use
3348	TCP/HTTP	AutoStore Web Server
13351	TCP/HTTP	OpenAPI Application
13353	TCP/HTTPS	OpenAPI Authority
13391	TCP/HTTP	WebDAV Session

Ricoh ESA

Port	Protocols	Use
8084	TCP	Capture
8753	TCP	DRS

Ricoh SOP

Port	Protocols	Use
3350	TCP	Capture
8753	TCP	DRS

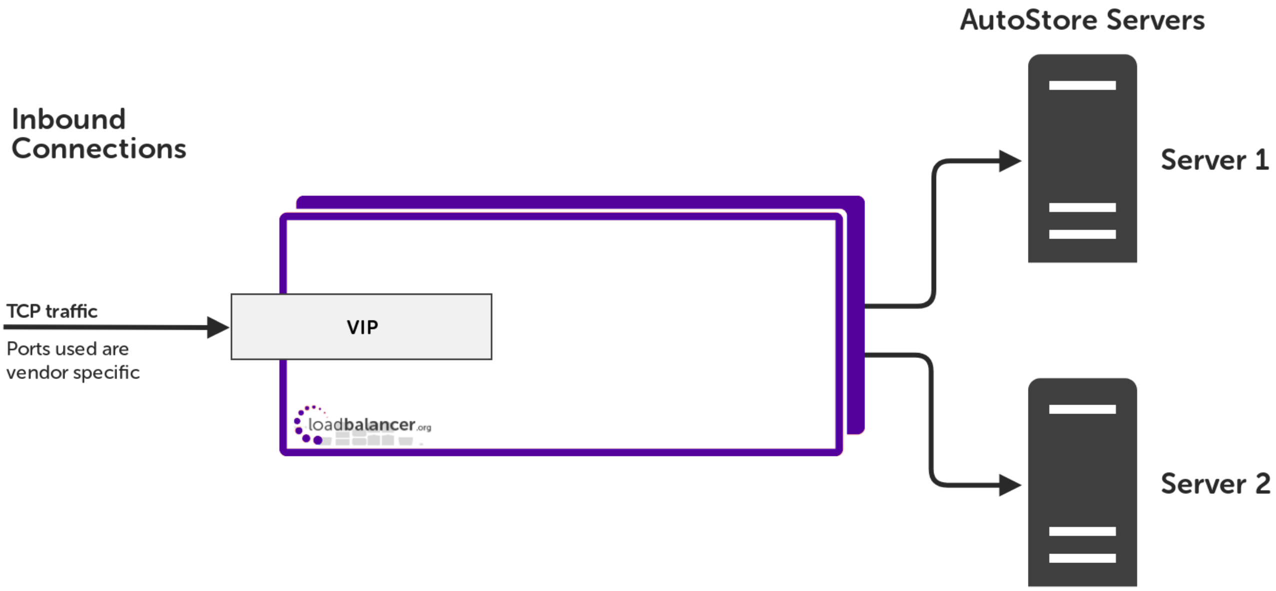
Other Vendors

If using a vendor that is not listed above, please follow the following hyperlink and refer to the port list for AutoStore provided by Kofax:

https://kofaximaging.custhelp.com/app/answers/detail/a_id/26545/~/default-ports-used-with-autostore-7-capture,-process,-and-route-components

The list includes the web application port / capture server port / web server port that should be used for a variety of vendors and services.

12. AutoStore Deployment Concept



VIPs = **V**irtual **IP** Addresses

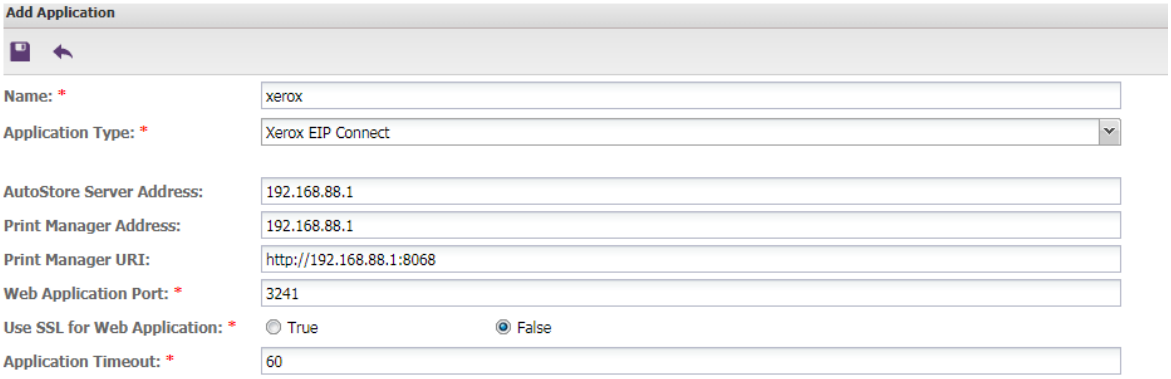
13. Configuring Kofax AutoStore for Load Balancing

13.1. Device Registration Service Configuration

Kofax AutoStore needs to be configured via the Device Registration Service (DRS) so that it is highly available and can be load balanced.

The information for the load balanced virtual service needs to be entered into the DRS in the *Add Application* section.

- Set an appropriate name, e.g. **xerox**.
- Select the appropriate *Application Type* from the drop-down list, e.g. **Xerox EIP Connect**.
- Set the *AutoStore Server Address* to the virtual IP (VIP) address that will be used for the AutoStore virtual service.
- Set the *Print Manager Address* to the VIP used for the Output Manager backend.
- Set the *Web Application Port* as needed, depending on the MFD vendor:
  - For Xerox EIP Connect, use port **3241**
  - For Konica Minolta, use port **3348**
  - For Ricoh ESA, use port **8084**
  - For Ricoh SOP, use port **3350**
  - For other vendors, refer to Other Vendors



Add Application

Name: *	xerox
Application Type: *	Xerox EIP Connect
AutoStore Server Address:	192.168.88.1
Print Manager Address:	192.168.88.1
Print Manager URI:	http://192.168.88.1:8068
Web Application Port: *	3241
Use SSL for Web Application: *	○ True ● False
Application Timeout: *	60

Note

If any configuration changes are made to the AutoStore real servers they will need to be unregistered and then re-registered in the Device Registration Service for the configurations to be accepted.

Note

Multi-function devices (MFDs) should be in the same group/folder in the Device Registration Service so that they inherit the same configuration.

13.2. Layer 4 DR Mode – Solving the ARP Problem

If using layer 4 DR mode, the 'ARP problem' must be solved on each real server for DR mode to work. For detailed steps on solving the ARP problem for Windows, please refer to Solving the ARP Problem for more information.

For a detailed explanation of DR mode and the nature of the ARP problem, please refer to Layer 4 DR Mode.

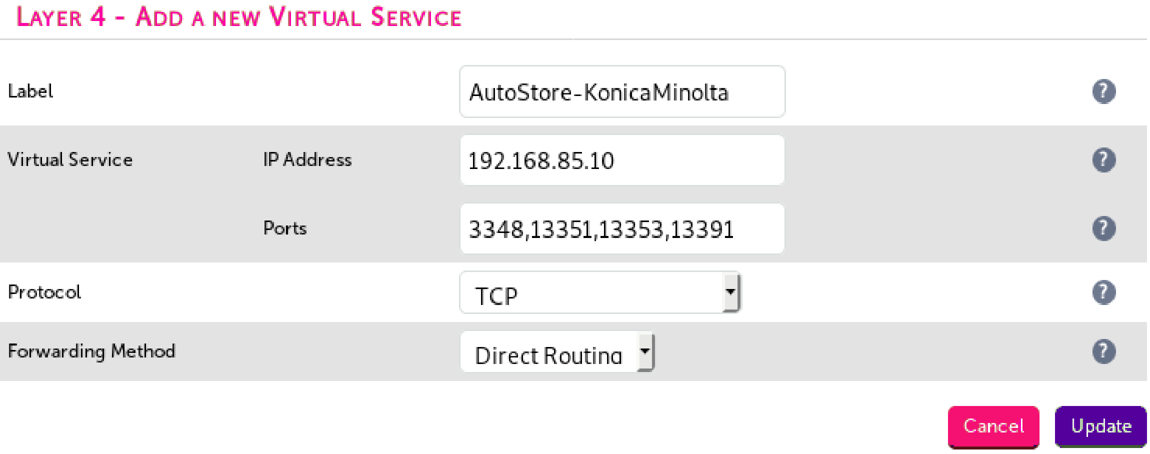
14. Appliance Configuration for Kofax AutoStore – Using Layer 4 DR Mode

14.1. Configuring the Virtual Service (VIP)

1. Using the web user interface, navigate to *Cluster Configuration > Layer 4– Virtual Services* and click on **Add a new Virtual Service**.
2. Define the *Label* for the virtual service as required, e.g. **AutoStore-KonicaMinolta**.
3. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.85.10**.
4. Set the *Ports* field as needed, as a comma separated list, depending on the MFD vendor:
   - For Xerox EIP Connect, use port **3241**
   - For Konica Minolta, use ports **3348**, **13351**, **13353**, and **13391**
   - For Ricoh ESA, use ports **8084** and **8753**
   - For Ricoh SOP, use ports **3350** and **8753**
   - For other vendors, refer to Other Vendors
5. Leave the *Protocol* set to **TCP**.

6. Leave the *Forwarding Method* set to **Direct Routing**.

7. Click **Update** to create the virtual service.



LAYER 4 - ADD A NEW VIRTUAL SERVICE

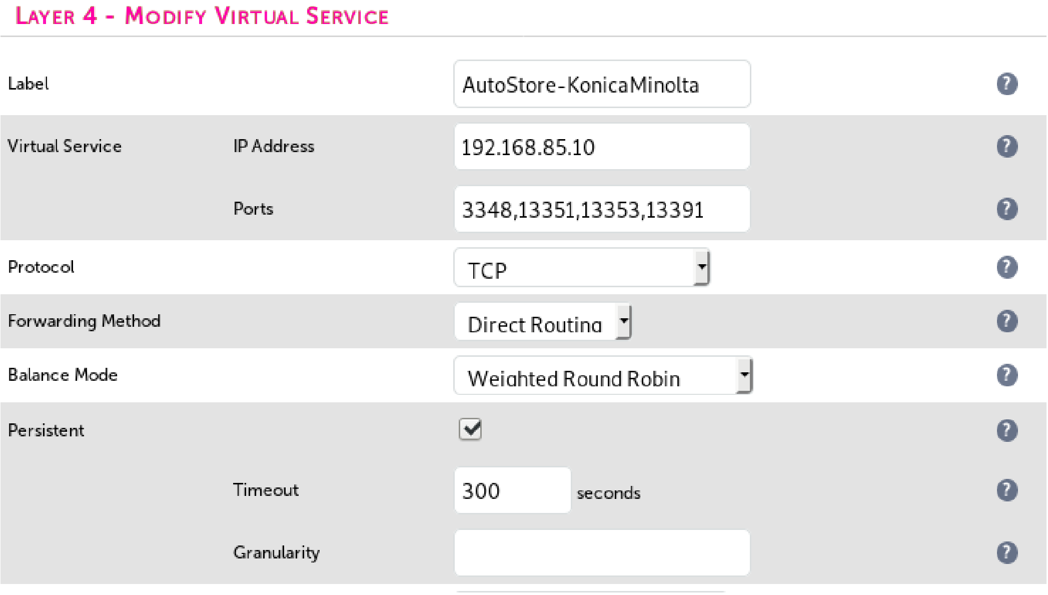
Label		AutoStore-KonicaMinolta
Virtual Service	IP Address	192.168.85.10
	Ports	3348,13351,13353,13391
Protocol		TCP
Forwarding Method		Direct Routing

8. Click **Modify** next to the newly created VIP.

9. Set *Balance Mode* to **Weighted Round Robin**.

10. Set the persistence settings as required, depending on the MFD vendor:
    - For Xerox EIP Connect and Konica Minolta:
        - Make sure that the ***Persistent*** checkbox is checked
        - Set the *Timeout* value to **300** (the units are seconds)
    - For Ricoh ESA and Ricoh SOP, make sure that the ***Persistent*** checkbox is not selected

11. Click **Update**.



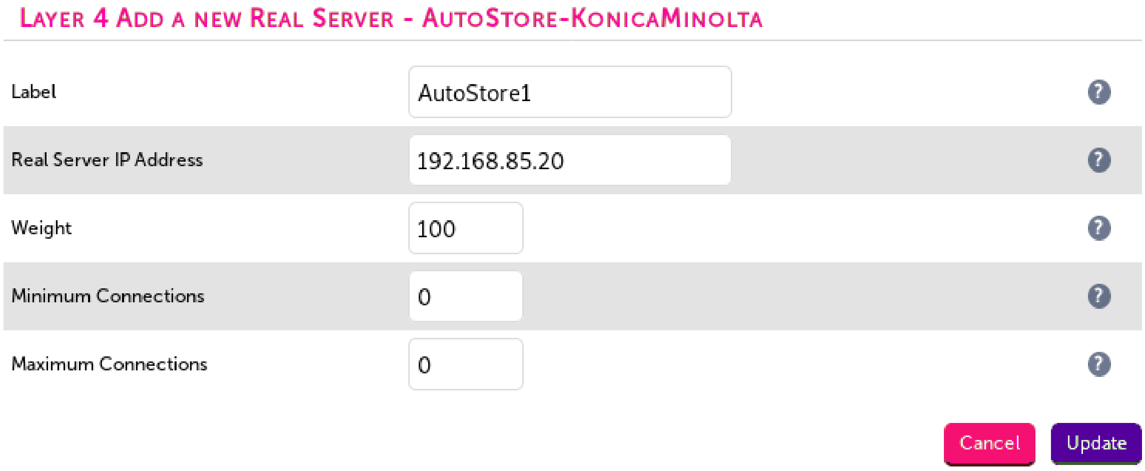
LAYER 4 - MODIFY VIRTUAL SERVICE

Label		AutoStore-KonicaMinolta
Virtual Service	IP Address	192.168.85.10
	Ports	3348,13351,13353,13391
Protocol		TCP
Forwarding Method		Direct Routing
Balance Mode		Weighted Round Robin
Persistent		☑
	Timeout	300 seconds
	Granularity	

14.2. Defining the Real Servers (RIPs)

1. 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. **AutoStore1**.
3. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.85.20**.
4. Click **Update**.
5. Repeat these steps to add additional AutoStore servers as required.



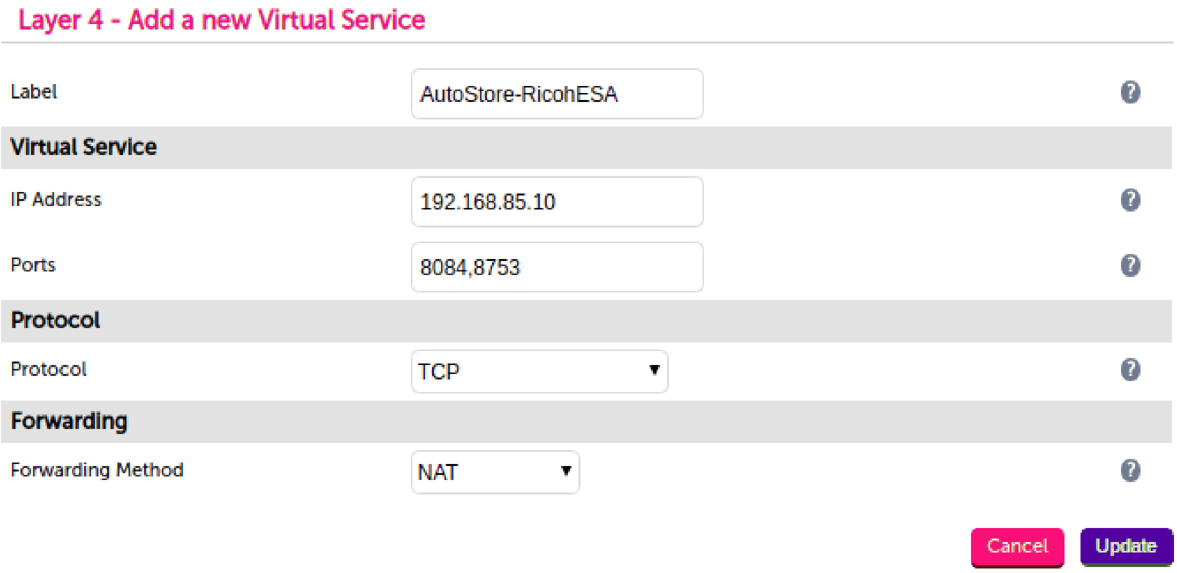
Layer 4 Add a new Real Server - AutoStore-KonicaMinolta

Label	AutoStore1
Real Server IP Address	192.168.85.20
Weight	100
Minimum Connections	0
Maximum Connections	0

15. Appliance Configuration for Kofax AutoStore – Using Layer 4 NAT Mode

15.1. Configuring the Virtual Service (VIP)

1. Using the web user interface, navigate to *Cluster Configuration > Layer 4 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter an appropriate name for the VIP in the *Label* field, e.g. **AutoStore-RicohESA**.
3. Set the *Virtual Service IP* address field to the required IP address, e.g. **192.168.85.10**.
4. Set the *Virtual Service Ports* field as needed, as a comma separated list, depending on the MFD vendor:
   - For Xerox EIP Connect, use port **3241**
   - For Konica Minolta, use ports **3348**, **13351**, **13353**, and **13391**
   - For Ricoh ESA, use ports **8084** and **8753**
   - For Ricoh SOP, use ports **3350** and **8753**
   - For other vendors, refer to Other Vendors
5. Set the *Forwarding Method* to **NAT**.

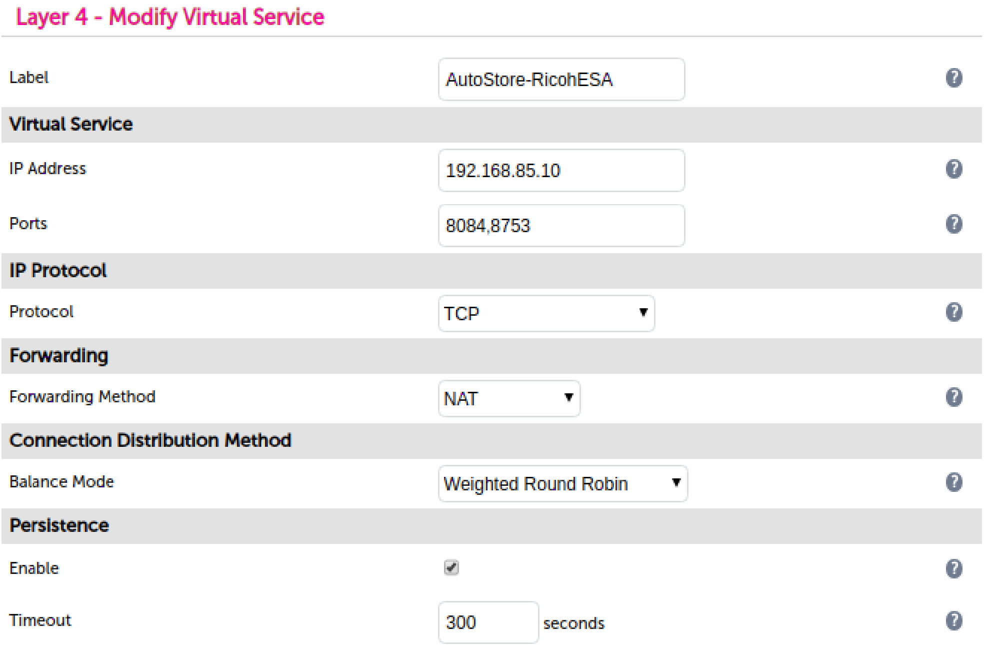


Layer 4 - Add a new Virtual Service

Label	AutoStore-RicohESA
Virtual Service	
IP Address	192.168.85.10
Ports	8084,8753
Protocol	
Protocol	TCP
Forwarding	
Forwarding Method	NAT

+

6. Click **Update** to create the virtual service.
7. Click **Modify** next to the newly created VIP.
8. Set *Balance Mode* to **Weighted Round Robin**.
9. Set the *Persistence Mode* settings as required, depending on the MFD vendor:
   - For Xerox EIP Connect and Konica Minolta:
     - Set *Persistence Mode* to **Source IP** persistence
     - Set the *Timeout* value to **300** (the units are seconds)
   - For Ricoh ESA and Ricoh SOP, set *Persistence Mode* to **None**
10. Click **Update**.

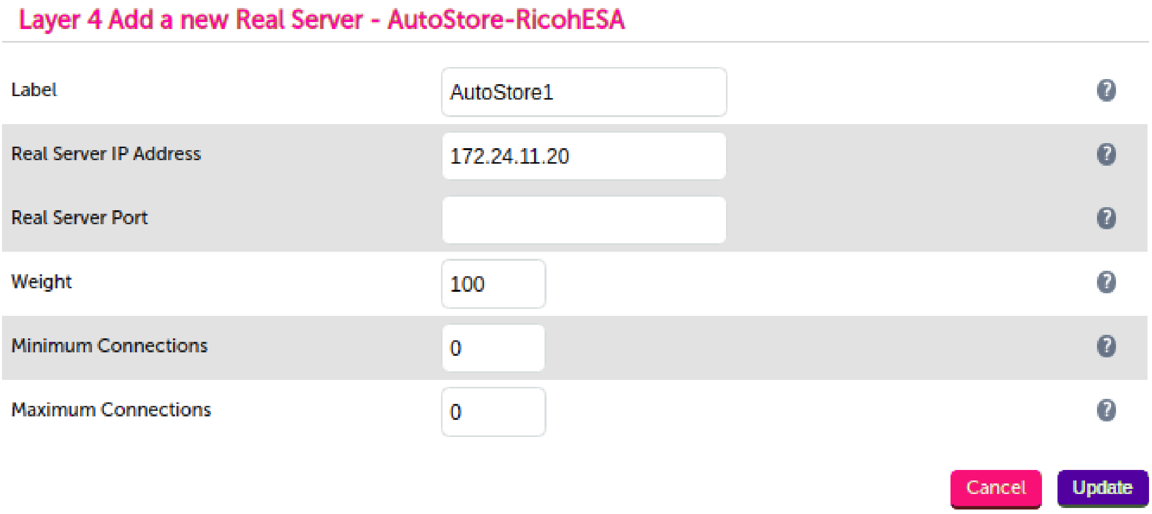


Layer 4 - Modify Virtual Service

Label	AutoStore-RicohESA
Virtual Service	
IP Address	192.168.85.10
Ports	8084,8753
IP Protocol	
Protocol	TCP
Forwarding	
Forwarding Method	NAT
Connection Distribution Method	
Balance Mode	Weighted Round Robin
Persistence	
Enable	☑
Timeout	300 seconds

15.2. Defining the Real Servers (RIPs)

1. 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. Enter an appropriate name for the server in the *Label* field, e.g. **AutoStore1**.
3. Change the *Real Server IP Address* field to the required IP address, e.g. **172.24.11.20**.
4. Leave the *Real Server Port* field empty.
5. Click **Update**.
6. Repeat these steps to add additional AutoStore servers as required.



Layer 4 Add a new Real Server - AutoStore-RicohESA

Label	AutoStore1
Real Server IP Address	172.24.11.20
Real Server Port	
Weight	100
Minimum Connections	0
Maximum Connections	0

16. Testing & Verification

Note

For additional guidance on diagnosing and resolving any issues you may have, please also refer to Diagnostics & Troubleshooting.

16.1. Testing Using a Multi-function Device

Once all configuration is complete on the AutoStore servers, in the Device Registration Service, and on the load balancer, it is possible to test the new load balanced service using a multi-function device.

1. Authenticate at a configured multi-function device.
2. Press the Kofax button and then select a scan template, for example to scan to home or scan to e-mail.
3. Set the scan options as appropriate, and complete a test scan.
4. AutoStore should recognise the user authenticated at the multi-function device and then route the test scan as requested. Verify that the test scan arrives at its intended destination.

16.2. Using the System Overview

The System Overview can be viewed in the WebUI. It shows a graphical view of all VIPs & RIPs (i.e. the AutoStore servers) and shows the state/health of each server as well as the state of the each cluster as a whole. The example below shows that all AutoStore servers are healthy and available to accept connections.

17. Kofax Output Manager

Kofax Output Manager gives organizations control of what, when, and how they produce and deliver information. Output Manager is designed to route documents through a centralized system.

Kofax Output Manager consolidates input from multiple platforms and applications. It centrally manages resources and documents, and provides end-to-end tracking and reporting. Although documents traditionally travel directly from origin to destination, there are considerable benefits to routing them through a centralized system. Output Manager is therefore built around these main concepts:

- Maximize the number of sources from which you can receive documents
- Provide greater control over documents than can be found in other products
- Manage and expand the number of document destinations
- Insure the security and integrity of documents throughout the send/receive cycle
- Produce a completely integrated audit trail and accounting functionality in order to monitor and control your costs
- Supply the tools necessary to convert document formats based upon the final destination
- Provide an observable process to a variety of audiences including administrators, print operators, end users, and management

18. Load Balancing Kofax Output Manager

> **Note** It's highly recommended that you have a working Kofax Output Manager environment first before implementing the load balancer.

18.1. Load Balancing & HA Requirements

The Output Manager components in a high availability environment require the following prerequisites to be installed and configured as per the Kofax Output Manager Installation Guide:

- Output Manager Core Server
- Output Manager Distributed Server
- Output Manager Web Server
- Output Manager Console
- Output Manager File Store
- Output Manager Web Client

18.2. Persistence (aka Server Affinity)

Kofax Output Manager does not require session affinity at the load balancing layer, as the back end uses an SQL database to handle session state.

18.3. Virtual Service (VIP) Requirements

To provide load balancing and HA for Product Name, the following VIPs are required:

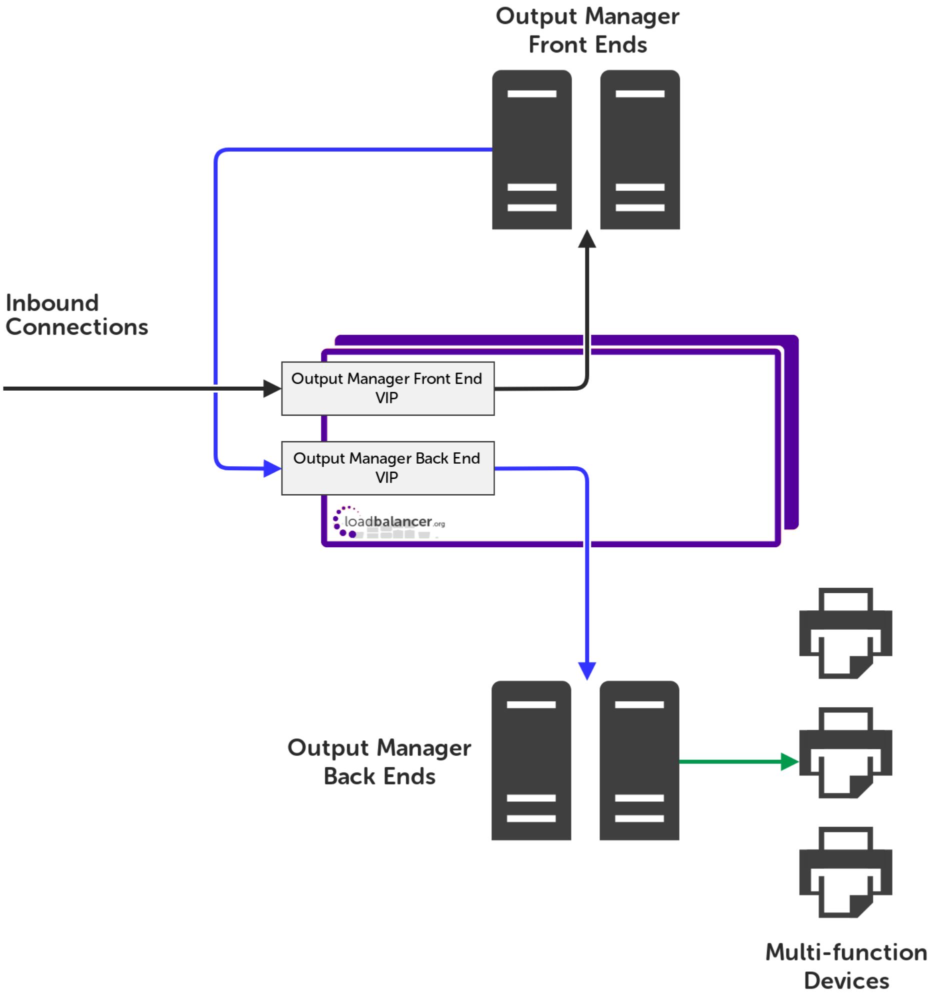
- Output Manager Front End
- Output Manager Back End (using either HTTP or HTTPS)

18.4. Port Requirements

The following table shows the ports that are load balanced:

Port	Protocols	Use
445	TCP/SMB	Output Manager front end
8068	TCP/HTTP	Output Manager back end over HTTP
8069	TCP/HTTPS	Output Manager back end over HTTPS

19. Output Manager Deployment Concept



VIPs = **V**irtual **IP** Addresses

ℹ Note	The load balancer can be deployed as a single unit, although Loadbalancer.org recommends a clustered pair for resilience & high availability. Please refer to Configuring HA - Adding a Secondary Appliance for more details on configuring a clustered pair.

20. Configuring Kofax Output Manager for Load Balancing

20.1. Registry Modifications

For the print servers that are going to be load balanced, to enable them to be accessed via a shared name (**XeroxPrintService** is the example used 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: XeroxPrintService
```

ℹ Note	In the example presented here, XeroxPrintService 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.

20.2. Configuring Name Resolution

For printer load balancing to work, DNS name resolution should be configured. A host name and corresponding "Host (A)" record for the virtual service should be created, and should match the virtual IP (VIP) address defined on the load balancer.

20.3. Finalising the Configuration for Output Manager Back End Servers

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

In order to load balance Output Manager back end servers, Output Manager needs to be configured for high availability within the **Output Manager Server Configuration Utility**. This allows the user to select the **Use HA** check box where the user will be able to enter the associated load balancer virtual server IP address (VIP) or the DNS alias for the VIP created.

For further details on how to configure Output Manager back end servers please refer to page 37 of the 'Output

Manager Installation Guide Version 4.0 SP2'.

> ℹ Note
> Multi-function devices (MFDs) should be in the same group/folder in the Device Registration Service so that they inherit the same configuration.

20.4. Layer 4 DR Mode – Solving the ARP Problem

If using layer 4 DR mode, the 'ARP problem' must be solved on each real server for DR mode to work. For detailed steps on solving the ARP problem for Windows, please refer to Solving the ARP Problem for more information.

For a detailed explanation of DR mode and the nature of the ARP problem, please refer to Layer 4 DR Mode.

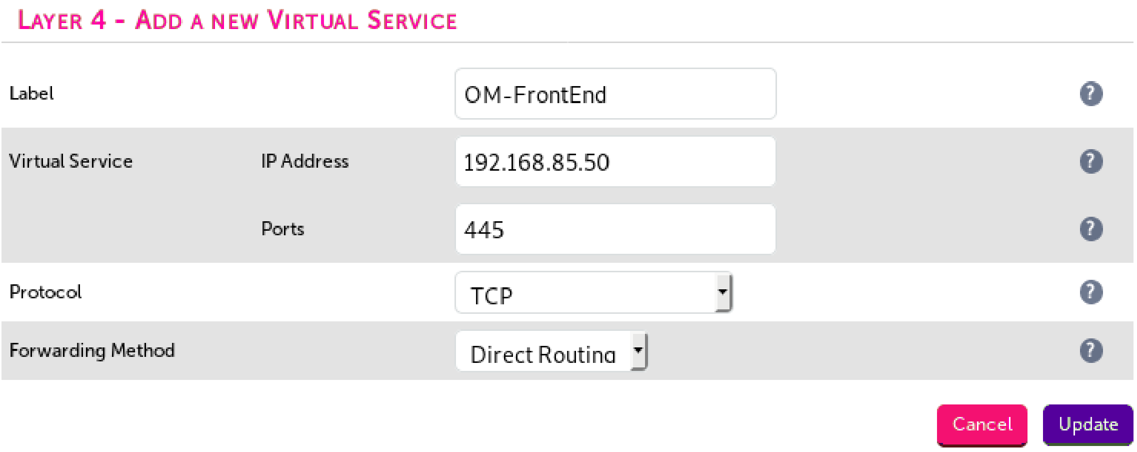
21. Appliance Configuration for Kofax Output Manager – Using Layer 4 DR Mode

When deploying Kofax Output Manager, two virtual services must be configured: a virtual service for the Output Manager front end, and a virtual service for the Output Manager back end.

21.1. Configuring VIP 1 – Output Manager Front End

Configuring the Virtual Service (VIP)

1. Using the web user interface, navigate to *Cluster Configuration > Layer 4 – Virtual Services* and click on **Add a new Virtual Service**.
2. Define the *Label* for the virtual service as required, e.g. **OM-FrontEnd**.
3. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.85.50**.
4. Set the *Ports* to **445**.
5. Leave the *Protocol* set to **TCP**.
6. Leave the *Forwarding Method* set to **Direct Routing**.
7. Click **Update** to create the virtual service.



LAYER 4 - ADD A NEW VIRTUAL SERVICE

Label		OM-FrontEnd
Virtual Service	IP Address	192.168.85.50
	Ports	445
Protocol		TCP
Forwarding Method		Direct Routing

8. Click **Modify** next to the newly created VIP.

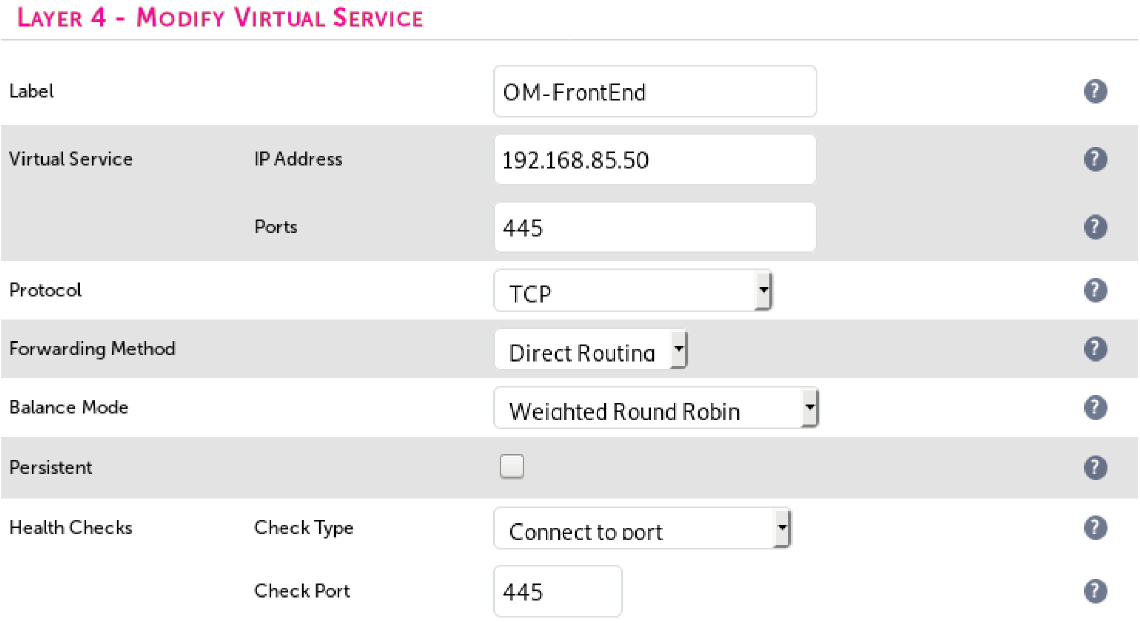
9. Set *Balance Mode* to **Weighted Round Robin**.

10. Make sure that the *Persistent* checkbox is not selected.

11. Set the *Health Checks Check Type* to **Connect to port**.

12. Set the *Check Port* to **445**.

13. Click **Update**.



LAYER 4 - MODIFY VIRTUAL SERVICE

Label		OM-FrontEnd	?
Virtual Service	IP Address	192.168.85.50	?
	Ports	445	?
Protocol		TCP	?
Forwarding Method		Direct Routing	?
Balance Mode		Weighted Round Robin	?
Persistent		□	?
Health Checks	Check Type	Connect to port	?
	Check Port	445	?

Defining the Real Servers (RIPs)

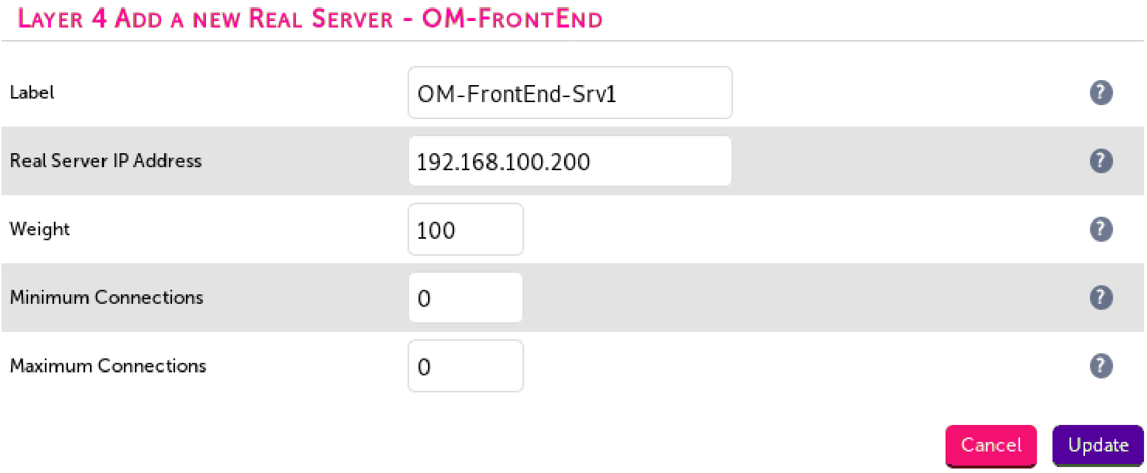
1. Using the web user interface, navigate to *Cluster Configuration > Layer 4 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.

2. Define the *Label* for the real server as required, e.g. **OM-FrontEnd-Srv1**.

3. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.100.200**.

4. Click **Update**.

5. Repeat these steps to add additional real servers as required.



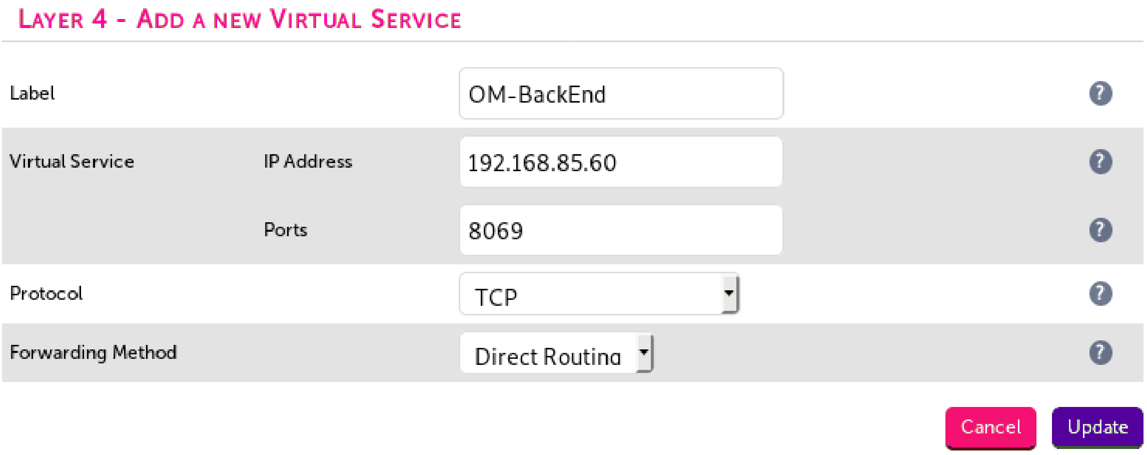
Layer 4 Add a new Real Server - OM-FrontEnd

Label	OM-FrontEnd-Srv1
Real Server IP Address	192.168.100.200
Weight	100
Minimum Connections	0
Maximum Connections	0

21.2. Configuring VIP 2 – Output Manager Back End

Configuring the Virtual Service (VIP)

1. Using the web user interface, navigate to *Cluster Configuration > Layer 4 – Virtual Services* and click on **Add a new Virtual Service**.
2. Define the *Label* for the virtual service as required, e.g. **OM-BackEnd**.
3. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.85.60**.
4. Set the *Ports* field as required, based on your setup:
   - If only HTTP traffic will be passed to the back end, set the *Ports* field to **8068**
   - If only HTTPS traffic will be passed to the back end, set the *Ports* field to **8069**
5. Leave the *Protocol* set to **TCP**.
6. Leave the *Forwarding Method* set to **Direct Routing**.
7. Click **Update** to create the virtual service.



Layer 4 - Add a new Virtual Service

Label		OM-BackEnd
Virtual Service	IP Address	192.168.85.60
	Ports	8069
Protocol		TCP
Forwarding Method		Direct Routing

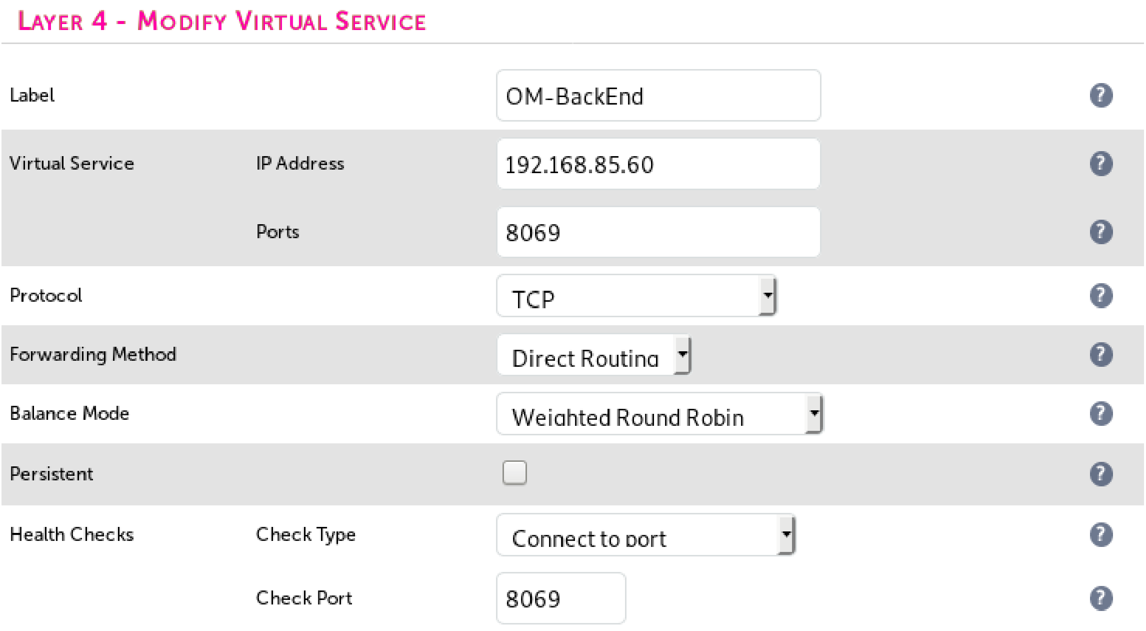
8. Click **Modify** next to the newly created VIP.
9. Set *Balance Mode* to **Weighted Round Robin**.

10. Make sure that the *Persistent* checkbox is not selected.

11. Set the *Health Checks Check Type* to **Connect to port**.

12. Set the *Check Port* to the same port defined under *Virtual Service Ports*, i.e. either **8068** or **8069**.

13. Click **Update**.



Layer 4 - Modify Virtual Service

Label		OM-BackEnd
Virtual Service	IP Address	192.168.85.60
	Ports	8069
Protocol		TCP
Forwarding Method		Direct Routing
Balance Mode		Weighted Round Robin
Persistent		□
Health Checks	Check Type	Connect to port
	Check Port	8069

Defining the Real Servers (RIPs)

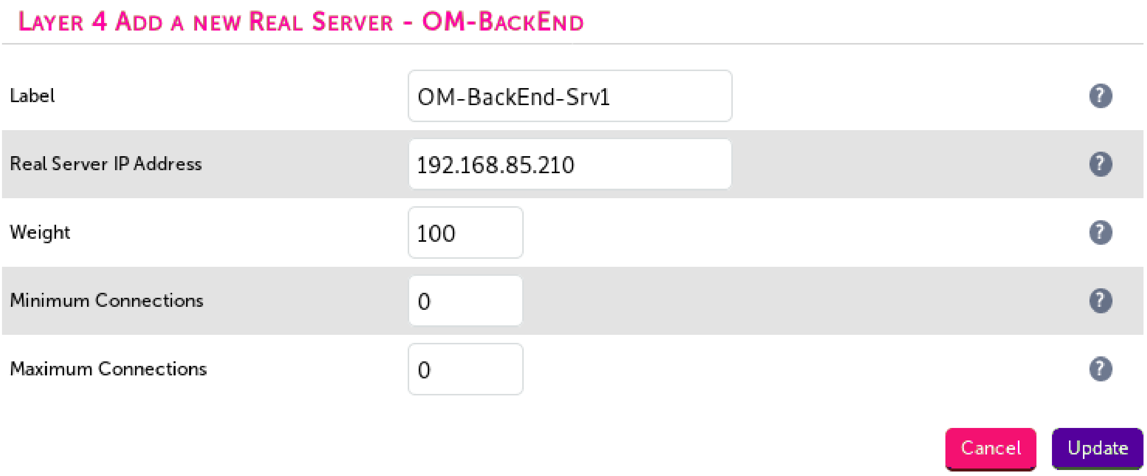
1. Using the web user interface, navigate to *Cluster Configuration > Layer 4 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.

2. Define the *Label* for the real server as required, e.g. **OM-BackEnd-Srv1**.

3. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.85.210**.

4. Click **Update**.

5. Repeat these steps to add additional real servers as required.



Layer 4 Add a new Real Server - OM-BackEnd

Label	OM-BackEnd-Srv1
Real Server IP Address	192.168.85.210
Weight	100
Minimum Connections	0
Maximum Connections	0

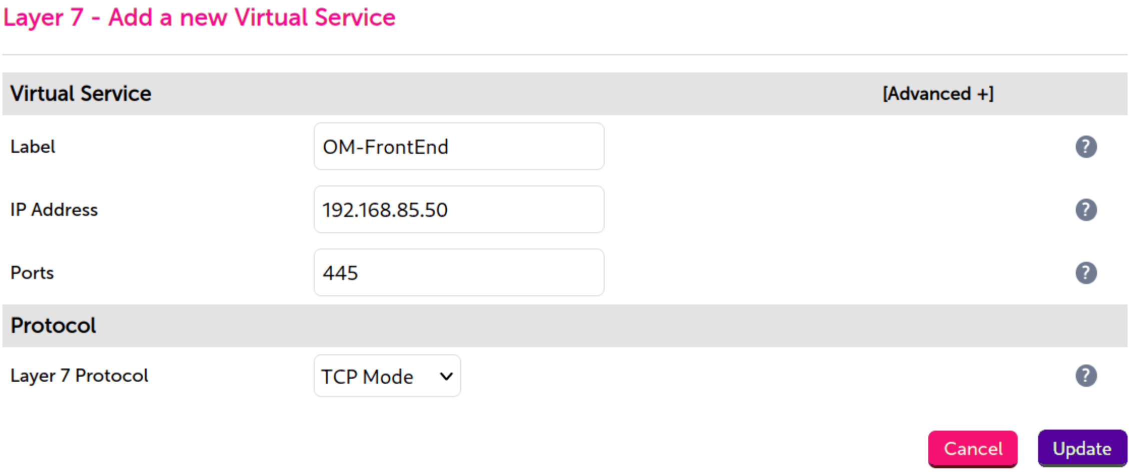
22. Appliance Configuration for Kofax Output Manager – Using Layer 7 SNAT Mode

When deploying Kofax Output Manager, two virtual services must be configured: a virtual service for the Output Manager front end, and a virtual service for the Output Manager back end.

22.1. Configuring VIP 1 – Output Manager Front End

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. **OM-FrontEnd**.
3. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.85.50**.
4. Set the *Ports* field to **445**.
5. Set the *Layer 7 Protocol* to **TCP Mode**.
6. Click **Update** to create the virtual service.



Layer 7 - Add a new Virtual Service

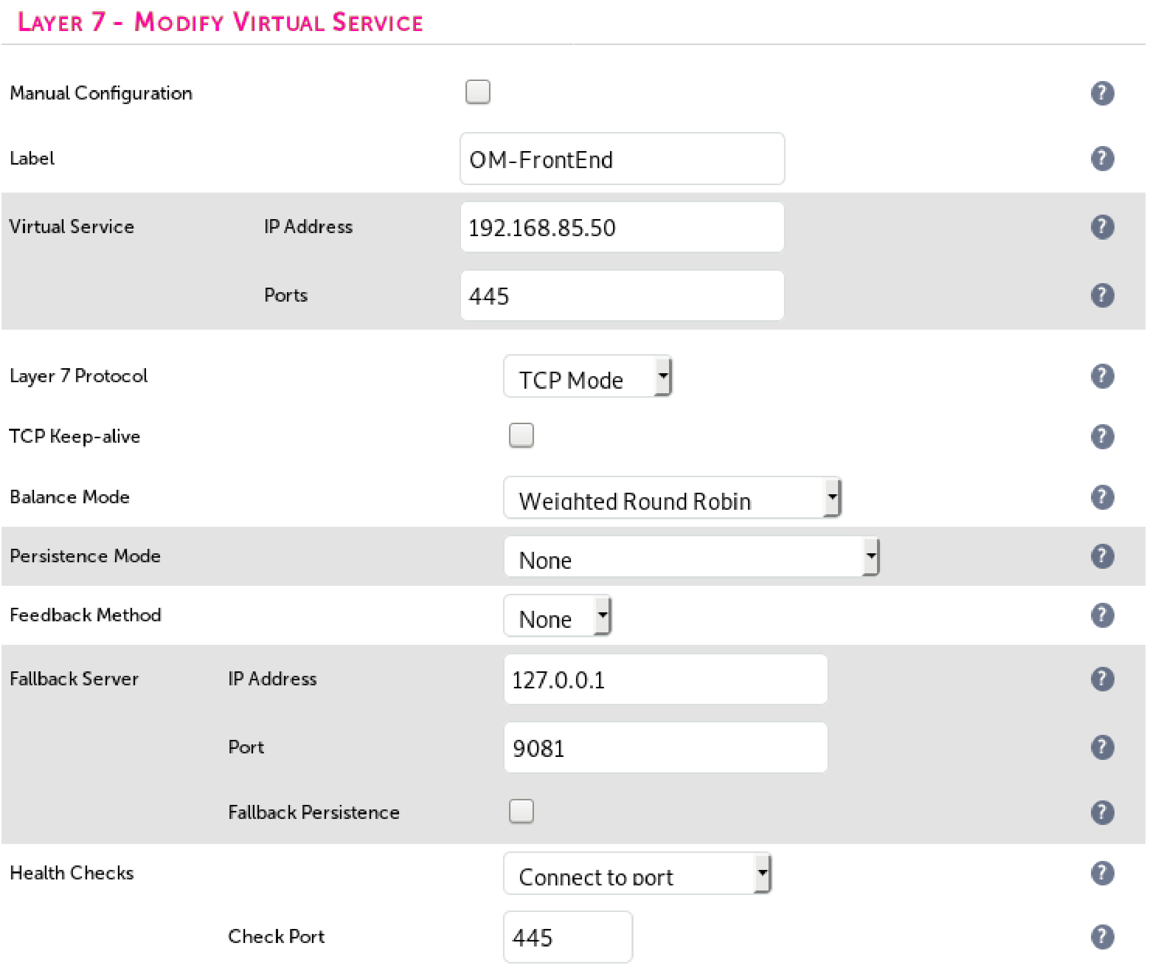
Virtual Service

Label	OM-FrontEnd
IP Address	192.168.85.50
Ports	445

Protocol

Layer 7 Protocol	TCP Mode

7. Click **Modify** next to the newly created VIP.
8. Set *Balance Mode* to **Weighted Round Robin**.
9. Set *Persistence Mode* to **None**.
10. Set *Health Checks* to **Connect to port**.
11. Set *Check Port* to the "Port" value, e.g. **445**.
12. Click **Update**.

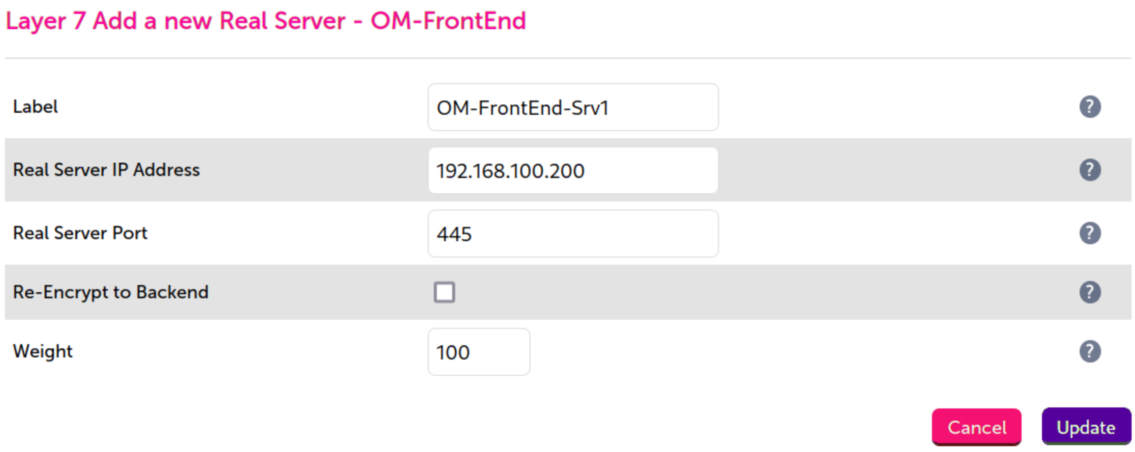


Layer 7 - Modify Virtual Service

Manual Configuration		□
Label		OM-FrontEnd
Virtual Service	IP Address	192.168.85.50
	Ports	445
Layer 7 Protocol		TCP Mode
TCP Keep-alive		□
Balance Mode		Weighted Round Robin
Persistence Mode		None
Feedback Method		None
Fallback Server	IP Address	127.0.0.1
	Port	9081
	Fallback Persistence	□
Health Checks		Connect to port
	Check Port	445

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. **OM-FrontEnd-Srv1**.
3. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.100.200**.
4. Set the *Real Server Port* field to **445**.
5. Click **Update**.
6. Repeat these steps to add additional real servers as required.



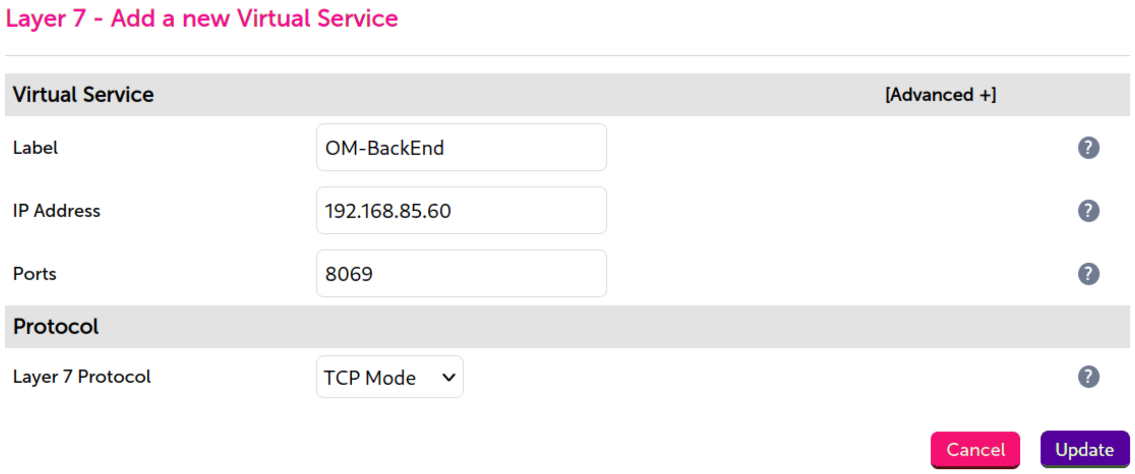
Layer 7 Add a new Real Server - OM-FrontEnd

Label	OM-FrontEnd-Srv1
Real Server IP Address	192.168.100.200
Real Server Port	445
Re-Encrypt to Backend	□
Weight	100

22.2. Configuring VIP 2 – Output Manager Back End

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. **OM-BackEnd**.
3. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.85.60**.
4. Set the *Ports* field as required, based on your setup:
   - If only HTTP traffic will be passed to the back end, set the *Ports* field to **8068**
   - If only HTTPS traffic will be passed to the back end, set the *Ports* field to **8069**
5. Set the *Layer 7 Protocol* to **TCP Mode**.
6. Click **Update** to create the virtual service.



Layer 7 - Add a new Virtual Service

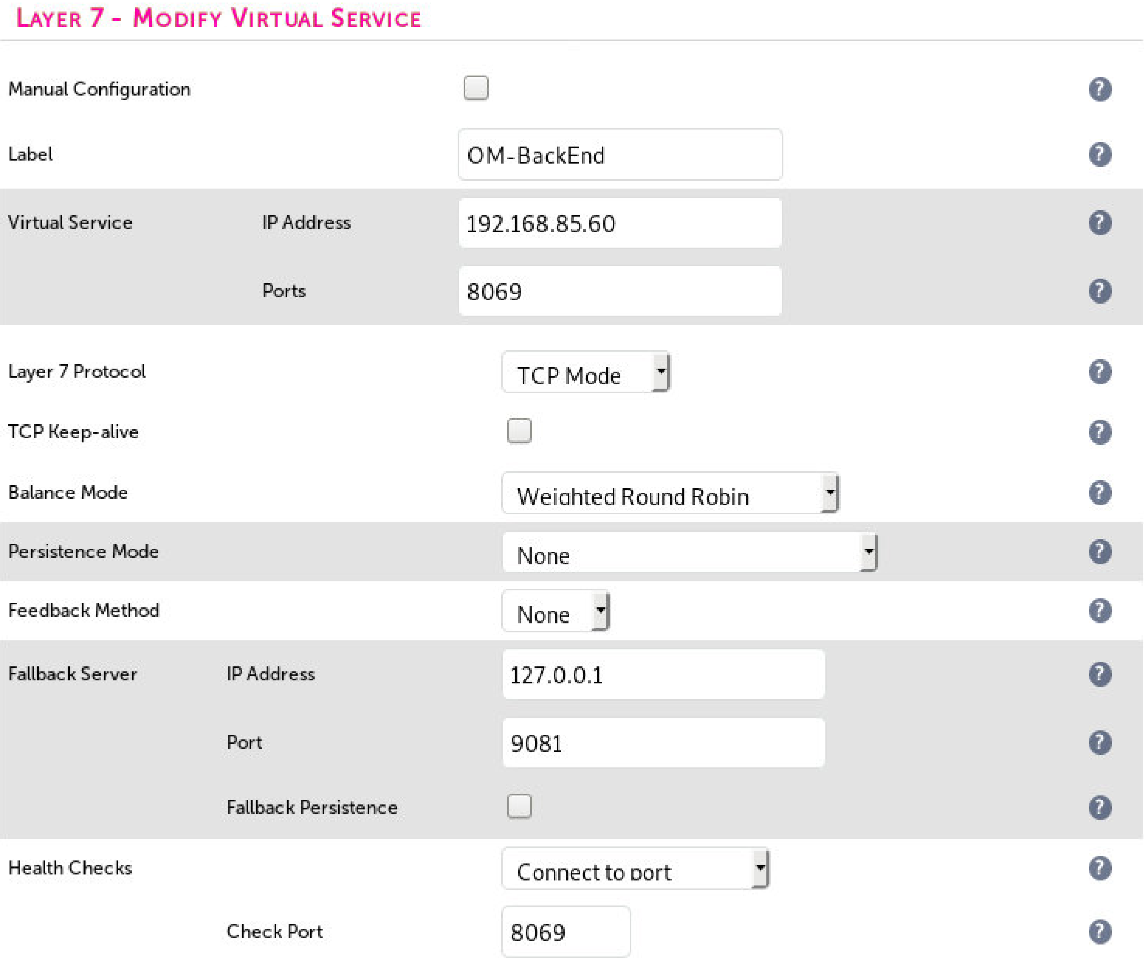
Virtual Service	[Advanced +]
Label	OM-BackEnd
IP Address	192.168.85.60
Ports	8069
Protocol	
Layer 7 Protocol	TCP Mode

7. Click **Modify** next to the newly created VIP.
8. Set *Balance Mode* to **Weighted Round Robin**.
9. Set *Persistence Mode* to **None**.

10. Set *Health Checks* to **Connect to port**.

11. Set the *Check Port* to the same port defined under *Virtual Service Ports*, i.e. either **8068** or **8069**.

12. Click **Update**.



Layer 7 - Modify Virtual Service

Manual Configuration		☐
Label		OM-BackEnd
Virtual Service	IP Address	192.168.85.60
	Ports	8069
Layer 7 Protocol		TCP Mode
TCP Keep-alive		☐
Balance Mode		Weighted Round Robin
Persistence Mode		None
Feedback Method		None
Fallback Server	IP Address	127.0.0.1
	Port	9081
	Fallback Persistence	☐
Health Checks		Connect to port
	Check Port	8069

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.

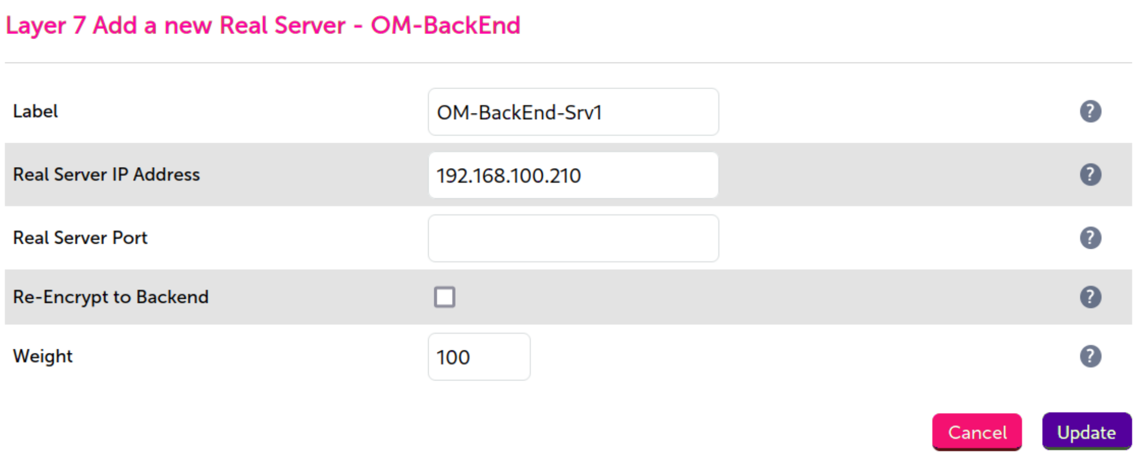
2. Define the *Label* for the real server as required, e.g. **OM-BackEnd-Srv1**.

3. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.85.210**.

4. Leave the *Real Server Port* field empty.

5. Click **Update**.

6. Repeat these steps to add additional real servers as required.



Layer 7 Add a new Real Server - OM-BackEnd

Label	OM-BackEnd-Srv1
Real Server IP Address	192.168.100.210
Real Server Port	
Re-Encrypt to Backend	□
Weight	100

22.3. Finalizing the Configuration

To apply the new settings, HAProxy must be reloaded. This can be done using the button in the "Commit changes" box at the top of the screen or by using the *Restart Services* menu option:

1. Using the WebUI, navigate to: *Maintenance > Restart Services*.
2. Click **Reload HAProxy**.

23. Testing & Verification

Note

For additional guidance on diagnosing and resolving any issues you may have, please also refer to Diagnostics & Troubleshooting.

23.1. 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, so for example

```
\\192.168.85.190
```

or

```
\\XeroxPrintService
```

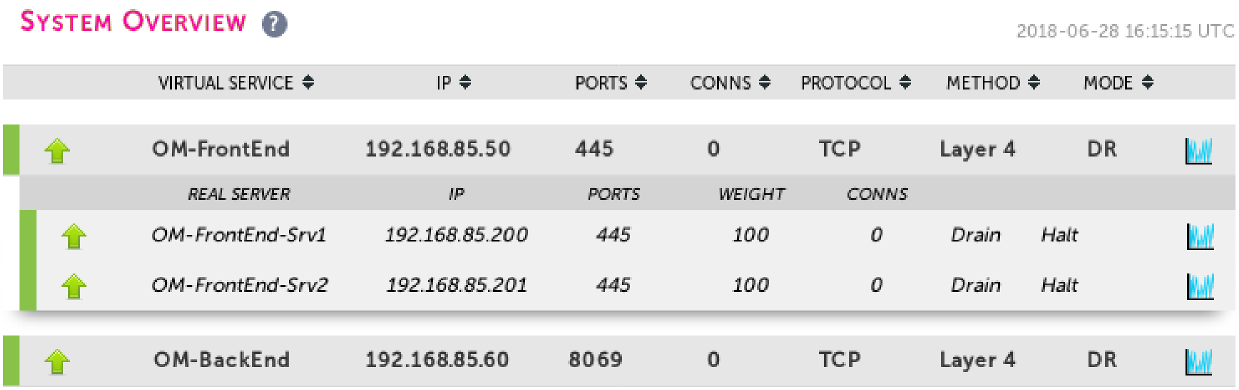
Any shared printers and shared folders that have been configured on the real print servers should be visible.

It is also possible to test by using an Active Directory user and computers to set up a Group Policy Object (GPO) pointing to the Output Manager front end VIP. For more details on how to do this, refer to Deploying Printers via Group Policy for more information.

23.2. Using the System Overview

The System Overview can be viewed in the WebUI. It shows a graphical view of all VIPs & RIPs (i.e. the Output

Manager servers) and shows the state/health of each server as well as the state of the each cluster as a whole. The example below shows that all real servers are healthy and available to accept connections.



SYSTEM OVERVIEW ?

2018-06-28 16:15:15 UTC

	VIRTUAL SERVICE ⬍	IP ⬍	PORTS ⬍	CONNS ⬍	PROTOCOL ⬍	METHOD ⬍	MODE ⬍
⬆	OM-FrontEnd	192.168.85.50	445	0	TCP	Layer 4	DR
⬆	OM-BackEnd	192.168.85.60	8069	0	TCP	Layer 4	DR

	REAL SERVER	IP	PORTS	WEIGHT	CONNS		
⬆	OM-FrontEnd-Srv1	192.168.85.200	445	100	0	Drain	Halt
⬆	OM-FrontEnd-Srv2	192.168.85.201	445	100	0	Drain	Halt

24. 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.

25. Further Documentation

For additional information, please refer to the Administration Manual.

26. Appendix

26.1. Solving the ARP Problem

Windows Server 2012 & Later

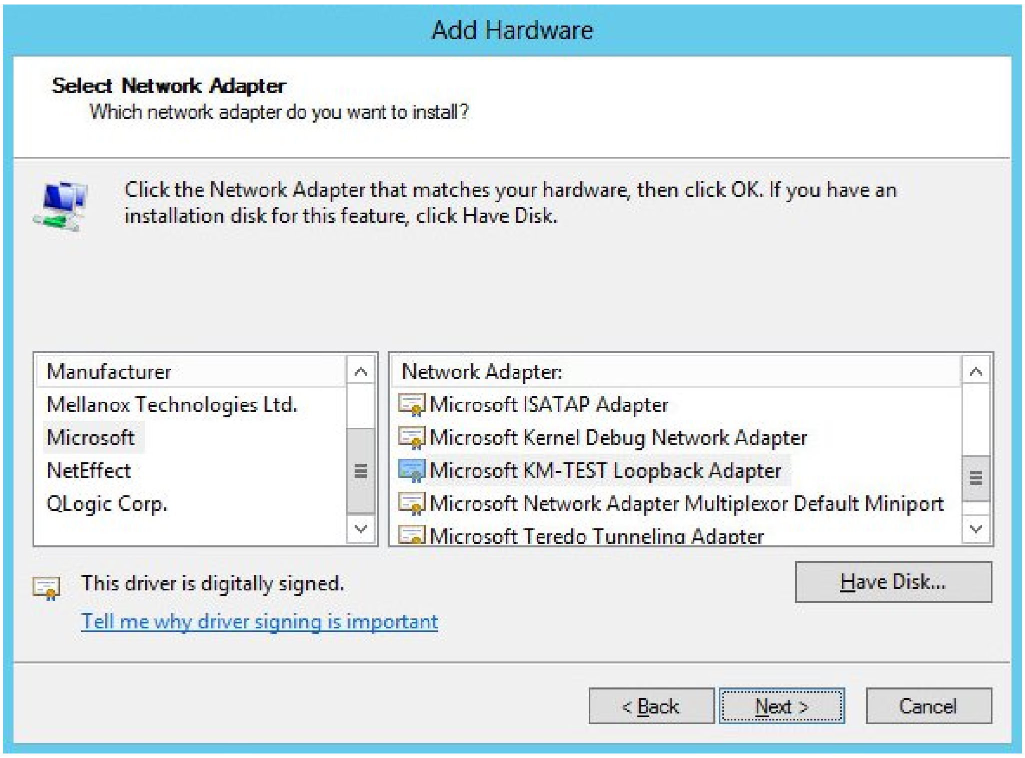
Windows Server 2012 and later support Direct Routing (DR) mode through the use of the Microsoft Loopback Adapter that must be installed and configured on each load balanced (Real) Server. The IP address configured on the Loopback Adapter must be the same as the Virtual Service (VIP) address. This enables the server to receive packets that have their destination set as the VIP address. If a Real Server is included in multiple DR mode VIPs, an IP address for each VIP must be added to the Loopback Adapter.

In addition, steps must be taken to set the strong/weak host behavior on each Real Server. This is used to either prevent or allow interfaces to receive packets destined for a different interface on the same server.

> (!) Important The following 3 steps must be completed on ***all*** Real Servers associated with the VIP.

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**.



Add Hardware

Select Network Adapter
Which network adapter do you want to install?

Click the Network Adapter that matches your hardware, then click OK. If you have an installation disk for this feature, click Have Disk.

Manufacturer	Network Adapter:
Mellanox Technologies Ltd.	Microsoft ISATAP Adapter
Microsoft	Microsoft Kernel Debug Network Adapter
NetEffect	Microsoft KM-TEST Loopback Adapter
QLogic Corp.	Microsoft Network Adapter Multiplexor Default Miniport
	Microsoft Teredo Tunneling Adapter

This driver is digitally signed.
Tell me why driver signing is important

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

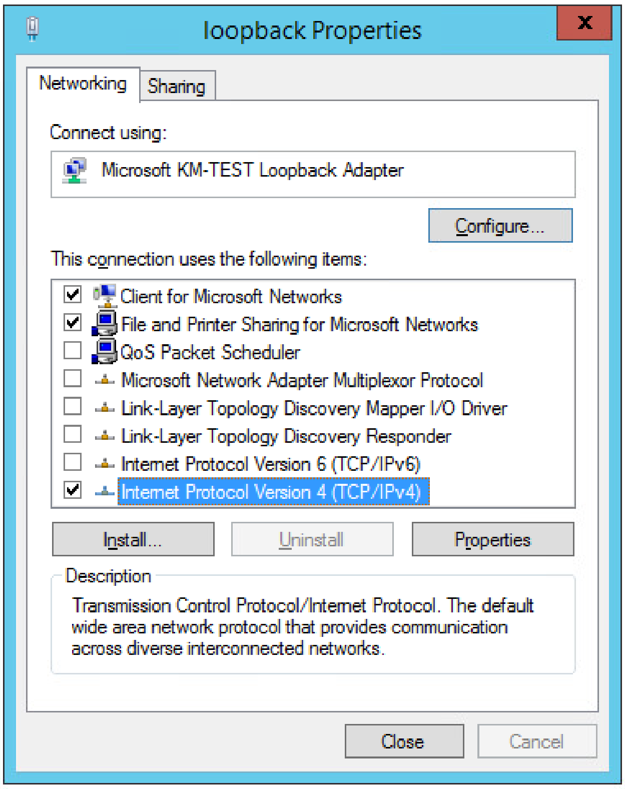
1. Open Control Panel and click **Network and Sharing Center**.
2. Click **Change adapter settings**.
3. Right-click the new Loopback Adapter and select **Properties**.

> **Note** You can configure IPv4 or IPv6 addresses or both depending on your requirements.

> **Important** when configuring the loopback adapter properties, make sure that **Client for Microsoft Networks** and **File & Printer Sharing for Microsoft Networks** is also checked as shown below.

IPv4 Addresses

1. Uncheck all items except **Client for Microsoft Networks**, **File & Printer Sharing for Microsoft Networks** and **Internet Protocol Version 4 (TCP/IPv4)** as shown below:



loopback Properties

Networking | Sharing

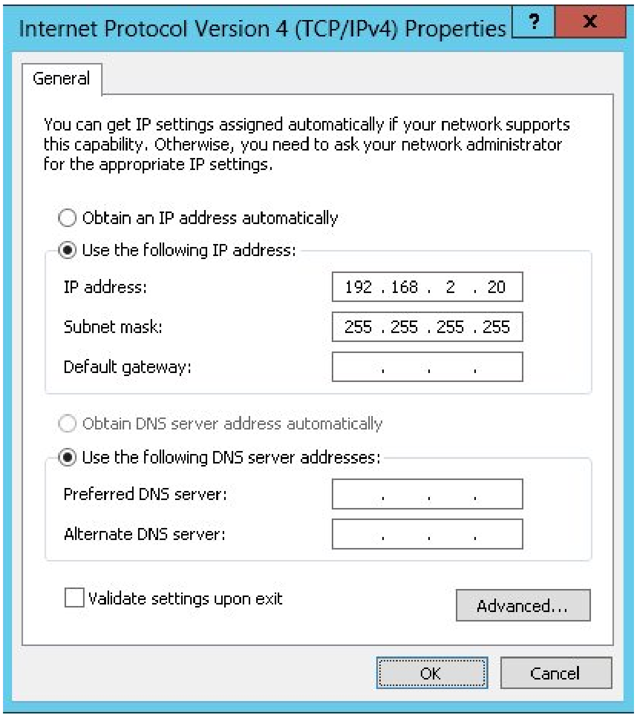
Connect using: Microsoft KM-TEST Loopback Adapter

This connection uses the following items:

☑ Client for Microsoft Networks
☑ File and Printer Sharing for Microsoft Networks
☐ QoS Packet Scheduler
☐ Microsoft Network Adapter Multiplexor Protocol
☐ Link-Layer Topology Discovery Mapper I/O Driver
☐ Link-Layer Topology Discovery Responder
☐ Internet Protocol Version 6 (TCP/IPv6)
☑ Internet Protocol Version 4 (TCP/IPv4)

Description: Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

2. Ensure that **Internet Protocol Version (TCP/IPv4)** is selected, click **Properties** and configure the IP address to be the same as the Virtual Service address (VIP) with a subnet mask of **255.255.255.255**, e.g. **192.168.2.20/255.255.255.255** as shown below:



Internet Protocol Version 4 (TCP/IPv4) Properties

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically

● Use the following IP address:

IP address: 192 . 168 . 2 . 20

Subnet mask: 255 . 255 . 255 . 255

Default gateway: . . .

○ Obtain DNS server address automatically

● Use the following DNS server addresses:

Preferred DNS server: . . .

Alternate DNS server: . . .

□ Validate settings upon exit

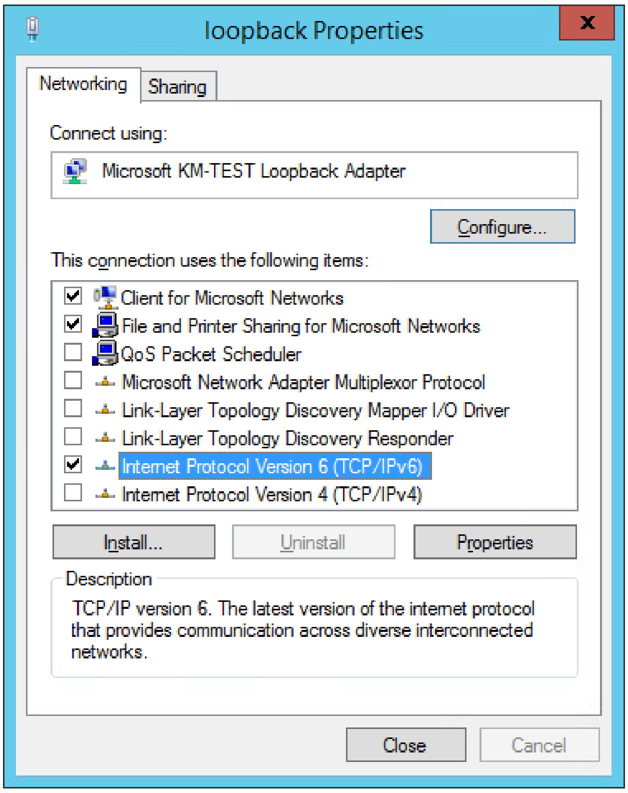
Note	**192.168.2.20** is an example, make sure you specify the correct VIP address.

Note	If a Real Server is included in multiple DR mode VIPs, an IP address for each VIP must be added to the Loopback Adapter.

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

IPv6 Addresses

1. Uncheck all items except **Client for Microsoft Networks**, **File & Printer Sharing for Microsoft Networks** and **Internet Protocol Version 6 (TCP/IPv6)** as shown below:



loopback Properties

Networking | Sharing

Connect using:

Microsoft KM-TEST Loopback Adapter

Configure...

This connection uses the following items:

- ☑ Client for Microsoft Networks
- ☑ File and Printer Sharing for Microsoft Networks
- □ QoS Packet Scheduler
- □ Microsoft Network Adapter Multiplexor Protocol
- □ Link-Layer Topology Discovery Mapper I/O Driver
- □ Link-Layer Topology Discovery Responder
- ☑ Internet Protocol Version 6 (TCP/IPv6)
- □ Internet Protocol Version 4 (TCP/IPv4)

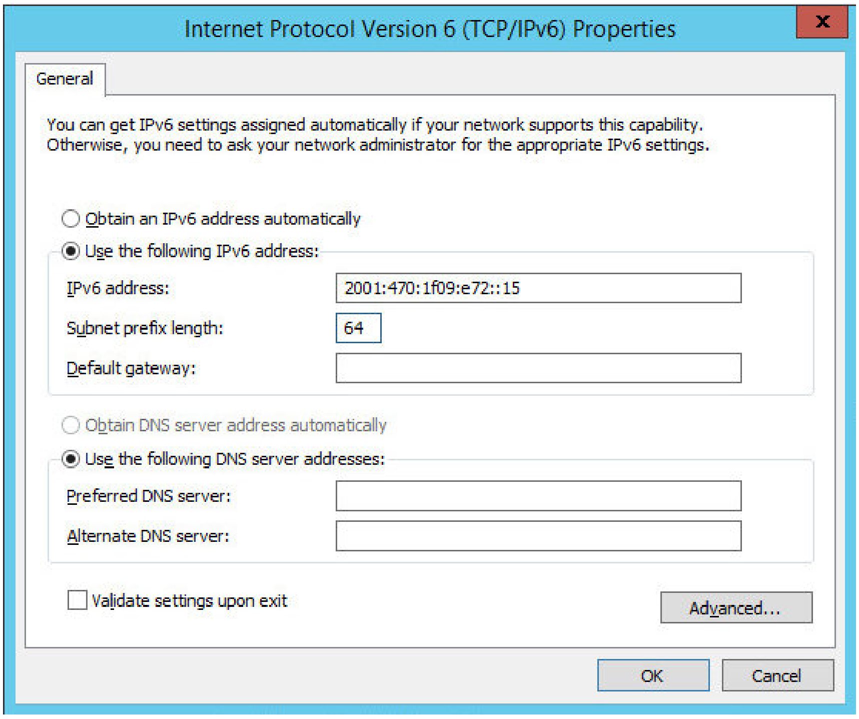
Install... | Uninstall | Properties

Description

TCP/IP version 6. The latest version of the internet protocol that provides communication across diverse interconnected networks.

Close | Cancel

2. Ensure that **Internet Protocol Version (TCP/IPv6)** is selected, 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:



Internet Protocol Version 6 (TCP/IPv6) Properties

General

You can get IPv6 settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IPv6 settings.

○ Obtain an IPv6 address automatically

● Use the following IPv6 address:

IPv6 address: 2001:470:1f09:e72::15

Subnet prefix length: 64

Default gateway:

○ Obtain DNS server address automatically

● Use the following DNS server addresses:

Preferred DNS server:

Alternate DNS server:

□ Validate settings upon exit

Advanced...

OK | Cancel

Note **2001:470:1f09:e72::15/64** is an example, make sure you specify the correct VIP address.

Note If a Real Server is included in multiple DR mode VIPs, an IP address for each VIP must be added to the Loopback Adapter.

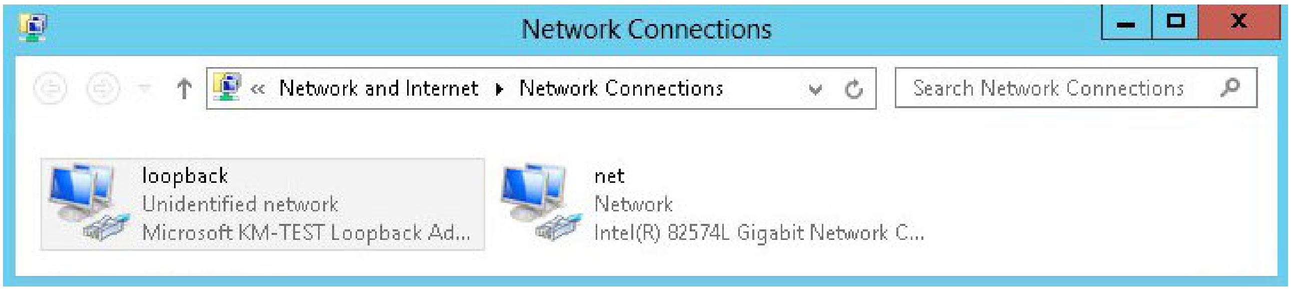
3. Click **OK** then click **Close** to save and apply the new settings.

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

The strong/weak host behavior can be configured using either of the following 2 methods:

- Option 1 - Using Network Shell (netsh) commands
- Option 2 - Using PowerShell cmdlets

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:


Network Connections
« Network and Internet ▸ Network Connections
Search Network Connections

loopback
Unidentified network
Microsoft KM-TEST Loopback Ad...

net
Network
Intel(R) 82574L Gigabit Network C...

ⓘ 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 addresses:

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

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

For IPv6 Addresses:

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

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

26.2. Configuring HA - Adding a Secondary Appliance

Our recommended configuration is to use a clustered HA pair of load balancers to provide a highly available and resilient load balancing solution.

We recommend that the Primary appliance is configured first and then the Secondary should be added. Once the Primary and Secondary are paired, all load balanced services configured on the Primary are automatically replicated to the Secondary over the network using SSH/SCP.

> ℹ **Note**
>
> For Enterprise Azure, the HA pair should be configured first. In Azure, when creating a VIP using an HA pair, 2 private IPs must be specified – one for the VIP when it's active on the Primary and one for the VIP when it's active on the Secondary. Configuring the HA pair first, enables both IPs to be specified when the VIP is created.

The clustered HA pair uses Heartbeat to determine the state of the other appliance. Should the active device (normally the Primary) suffer a failure, the passive device (normally the Secondary) will take over.

Non-Replicated Settings

A number of settings are not replicated as part of the Primary/Secondary pairing process and therefore must be manually configured on the Secondary appliance. These are listed by WebUI menu option in the table below:

WebUI Main Menu Option	Sub Menu Option	Description
Local Configuration	Hostname & DNS	Hostname and DNS settings
Local Configuration	Network Interface Configuration	All network settings including IP address(es), bonding configuration and VLANs
Local Configuration	Routing	Routing configuration including default gateways and static routes
Local Configuration	System Date & time	All time and date related settings

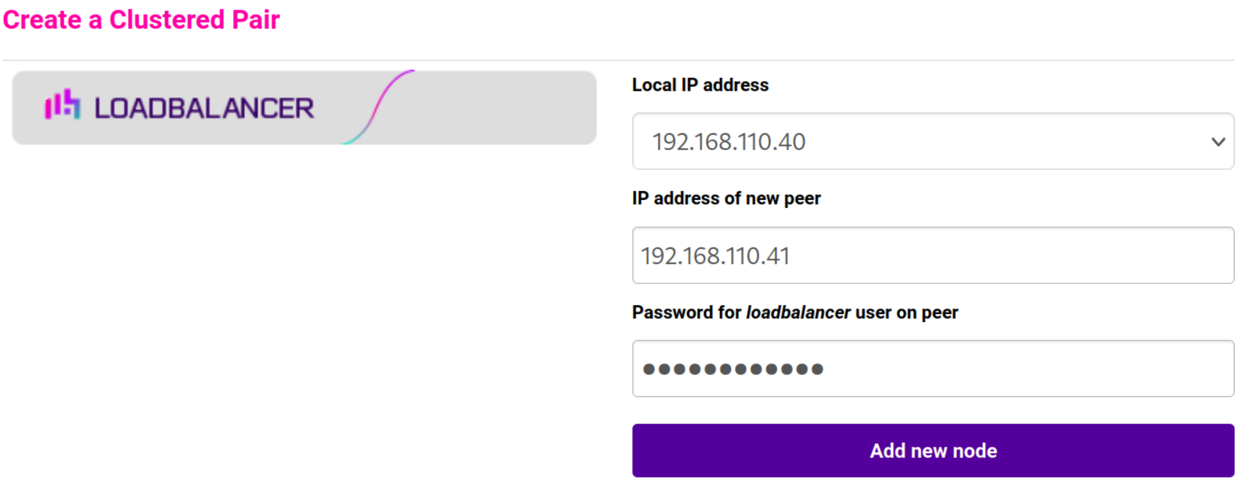
WebUI Main Menu Option	Sub Menu Option	Description
Local Configuration	Physical – Advanced Configuration	Various settings including Internet Proxy, Management Gateway, Firewall connection tracking table size, NIC offloading, SMTP relay, logging and Syslog Server
Local Configuration	Security	Appliance security settings
Local Configuration	SNMP Configuration	Appliance SNMP settings
Local Configuration	Graphing	Appliance graphing settings
Local Configuration	License Key	Appliance licensing
Maintenance	Software Updates	Appliance software update management
Maintenance	Firewall Script	Appliance firewall (iptables) configuration
Maintenance	Firewall Lockdown Wizard	Appliance management lockdown settings

> **Important** Make sure that if these settings/updates have been configured on the Primary appliance, they're also configured on the Secondary appliance.

Adding a Secondary Appliance - Create an HA Clustered Pair

> **Note** If you have already run the firewall lockdown wizard on either appliance, you'll need to ensure that it is temporarily disabled on both appliances whilst performing the pairing process.

1. Deploy a second appliance that will be the Secondary and configure initial network settings.
2. Using the WebUI on the Primary appliance, navigate to: *Cluster Configuration > High-Availability Configuration*.



Create a Clustered Pair

Local IP address

192.168.110.40

IP address of new peer

192.168.110.41

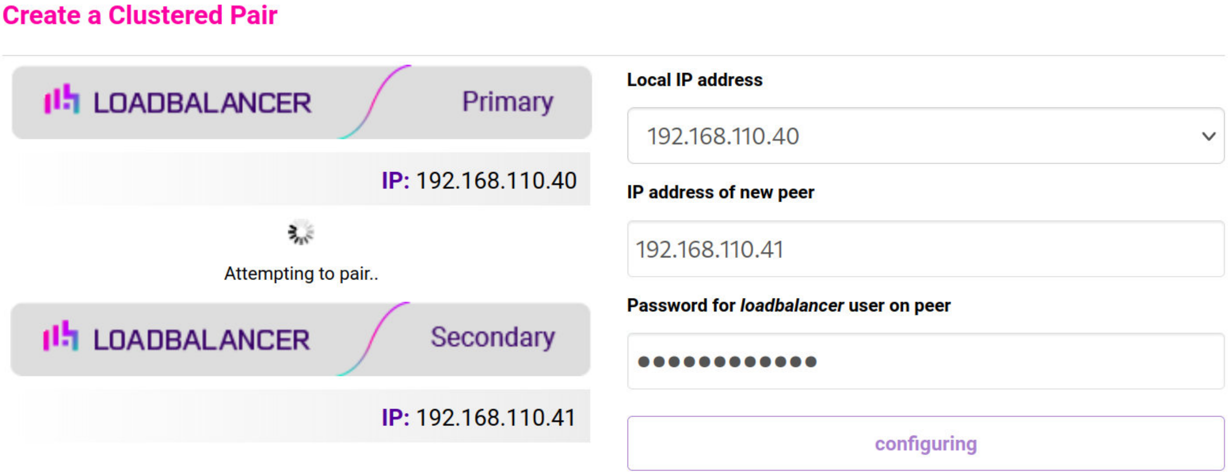
Password for *loadbalancer* user on peer

●●●●●●●●●●●●

3. Specify the IP address and the *loadbalancer* user's password for the Secondary (peer) appliance as shown in the example above.

4. Click **Add new node**.

5. The pairing process now commences as shown below:



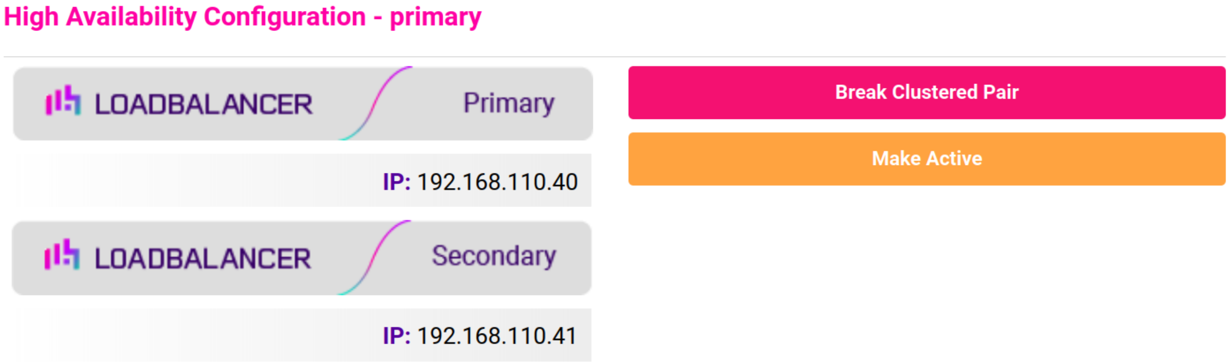
Create a Clustered Pair

Local IP address: 192.168.110.40

IP address of new peer: 192.168.110.41

Password for *loadbalancer* user on peer: ●●●●●●●●●●●●

6. Once complete, the following will be displayed on the Primary appliance:



High Availability Configuration - primary

7. To finalize the configuration, restart heartbeat and any other services as prompted in the "Commit changes" message box at the top of the screen.

Note	Clicking the **Restart Heartbeat** button on the Primary appliance will also automatically restart heartbeat on the Secondary appliance.

Note	For more details on configuring HA with 2 appliances, please refer to Appliance Clustering for HA.

Note	For details on testing and verifying HA, please refer to Clustered Pair Diagnostics.

26.3. Deploying Printers via Group Policy

It is possible to deploy a printer using a Group Policy, by following these steps:

1. Ensure that the load balanced print server name (e.g. XeroxPrintService) is resolvable by DNS or NetBIOS, as

explained in Configuring Name Resolution.

2. On your print server, open: ***Administrative Tools > Printer Management***.
3. Right-click Print Servers and enter the name for your load balanced print server (e.g. XeroxPrintService) and click **OK**.
4. Expand the Printers section.
5. Right click the printer you want to deploy, and click **Deploy with Group Policy**.
6. Select the relevant GPO and configure the remaining settings according to your requirements.

27. Document Revision History

Version	Date	Change	Reason for Change	Changed By
0.9.6	1 October 2019	Initial version		AW
1.0.0	6 November 2019	Styling and layout	General styling updates	AH
1.0.1	3 September 2020	New title page Updated Canadian contact details	Branding update Change to Canadian contact details	AH
1.1.0	1 November 2021	Converted the document to AsciiDoc	Move to new documentation system	AH, RJC, ZAC
1.1.1	28 September 2022	Updated layer 7 VIP and RIP creation screenshots	Reflect changes in the web user interface	AH
1.1.2	5 January 2023	Combined software version information into one section Added one level of section numbering Reworded 'Further Documentation' section Removed references to the colour of certain UI elements	Housekeeping across all documentation	AH
1.1.3	2 February 2023	Updated screenshots	Branding update	AH
1.1.4	7 March 2023	Removed conclusion section	Updates across all documentation	AH
1.2.0	24 March 2023	New document theme Modified diagram colours	Branding update	AH

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