

# Load Balancing AGFA HealthCare Enterprise Imaging

Version 1.0.0



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# 1. About this Brief

This brief outlines the steps required to configure a load balanced AGFA HealthCare Enterprise Imaging environment utilizing Loadbalancer.org appliances. It covers the configuration of the load balancers and also any AGFA HealthCare Enterprise Imaging 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 with AGFA HealthCare Enterprise Imaging. For full specifications of available models please refer to <https://www.loadbalancer.org/products>.

Some features may not be available or fully supported in all cloud platforms due to platform specific limitations. For more details, please refer to the "Main Differences to our Standard (Non-Cloud) Product" section in the appropriate cloud platform [Quick Start Guide](#) or check with Loadbalancer.org support.

## 3. Software Versions Supported

### 3.1. Loadbalancer.org Appliance

- V8.9.1 and later

#### Note

The screenshots used throughout this document aim to track the latest Loadbalancer.org software version. If you're using an older version, or the very latest, the screenshots presented here may not match your WebUI exactly.

### 3.2. AGFA HealthCare Enterprise Imaging

- All versions

## 4. AGFA HealthCare Enterprise Imaging

AGFA HealthCare Enterprise Imaging is designed to build a connected, collaborative, and scalable community of care. Its one-of-a-kind, seamless and secure platform makes this a reality through the creation of an Imaging Health Network™ (IHN). There, images are available 24/7 to all members of the care team – no matter where they are, or what kind of device they are working from.

## 5. Load Balancing AGFA HealthCare Enterprise Imaging

#### Note

It's highly recommended that you have a working AGFA HealthCare Enterprise Imaging environment first before implementing the load balancer.

### 5.1. Virtual Service (VIP) Requirements



To provide load balancing and HA for AGFA HealthCare Enterprise Imaging, the following VIPs are required:

Ref.	VIP Name	Mode	Port(s)	Persistence Mode	Health Check
VIP 1	CoreServerClient-80	L7 SNAT (HTTP)	80	HTTP Cookie	HTTP (GET)
VIP 2	CoreServerDICOM-104	L7 SNAT (TCP)	104	none	HTTP (GET)
VIP 3	CoreServerDICOM-110	L7 SNAT (TCP)	110	none	HTTP (GET)
VIP 4	CoreServer-443	L7 SNAT (HTTP)	81	HTTP Cookie	HTTPS (GET)
VIP 5	CoreServerHL7-2310	L7 SNAT (TCP)	2310	none	Connect to Port
VIP 6	CoreServerHL7-2311	L7 SNAT (TCP)	2311	none	Connect to Port
VIP 7	CoreServerDICOM-2762	L7 SNAT (TCP)	2762	none	HTTP (GET)
VIP 8	CoreServerClient-4447	L7 SNAT (TCP)	4447	none	HTTP (GET)
VIP 9	CoreServerClient-5222	L7 SNAT (TCP)	5222	none	Connect to Port
VIP 10	CoreServerClient-5223	L7 SNAT (TCP)	5223	none	Connect to Port
VIP 11	CoreServerClient-7443	L7 SNAT (TCP)	7443	none	Connect to Port
VIP 12	CoreServerARR-6514	L7 SNAT (TCP)	6514	none	Connect to Port
VIP 13	CoreServerClient-8080	L7 SNAT (HTTP)	8080	HTTP Cookie	HTTP (GET)
VIP 14	CoreServerClient-8443	L7 SNAT (HTTP)	8443	Source IP	HTTPS (GET)
VIP 15	CoreServerClient-9080	L7 SNAT (HTTP)	9080	Source IP	HTTP (GET)
VIP 16	CoreServerClient-9081	L7 SNAT (HTTP)	9081	Source IP	HTTP (GET)
VIP 17	CoreServerClient-10080	L7 SNAT (HTTP)	10080	Source IP	HTTP (GET)
VIP 18	CoreServerClient-10123	L7 SNAT (TCP)	10123	Source IP	Connect to Port
VIP 19	CoreServerClient-10124	L7 SNAT (TCP)	10124	Source IP	Connect to Port
VIP 20	WebServer-withXero	L7 SNAT (TCP)	443	none	HTTPS (GET)
VIP 21	WebServer-withoutXero	L7 SNAT (HTTP)	80	HTTP Cookie	HTTPS (GET)

## 5.2. TLS/SSL Termination

SSL Termination is configured on the load balancer for the following VIPs:

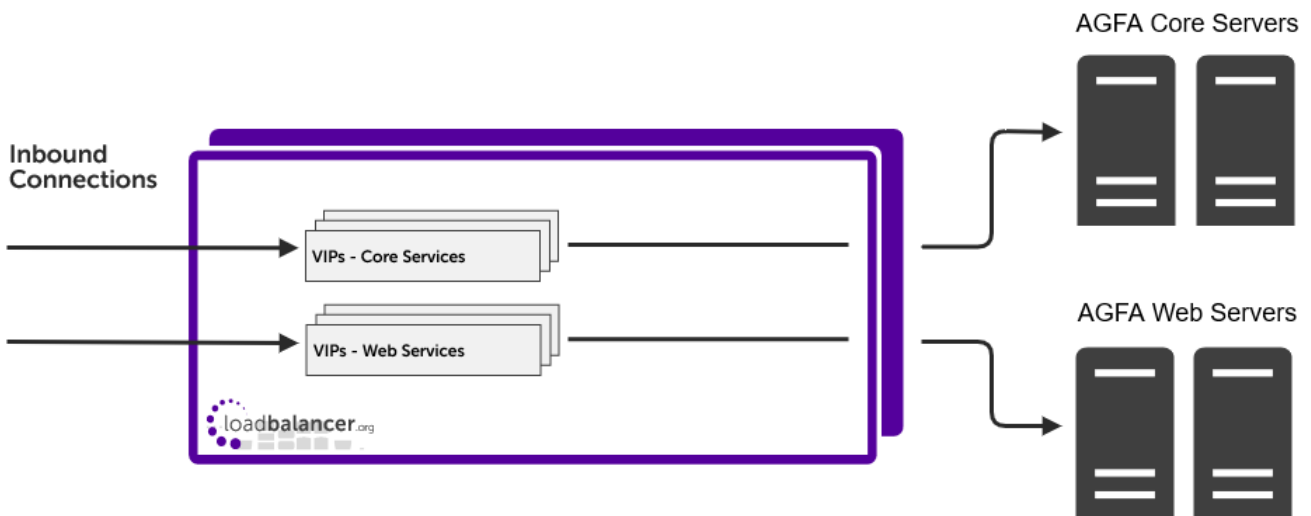
- VIP 4 - **CoreServer-443**
- VIP 14 - **CoreServerClient-8443**
- VIP 21 - **WebServer-withoutXero**

This provides an HTTPS Virtual Service for these VIPs. Certificates in PEM or PFX format can be uploaded to the load balancer.

## 6. Deployment Concept



Once the load balancer is deployed, clients connect to the Virtual Services (VIPs) rather than connecting directly to the AGFA HealthCare Enterprise Imaging servers. These connections are then load balanced across the AGFA HealthCare Enterprise Imaging servers to distribute the load according to the load balancing algorithm selected.



VIP = **V**irtual **I**P Address

#### 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 the section [Configuring HA - Adding a Secondary Appliance](#) in the appendix for more details on configuring a clustered pair.

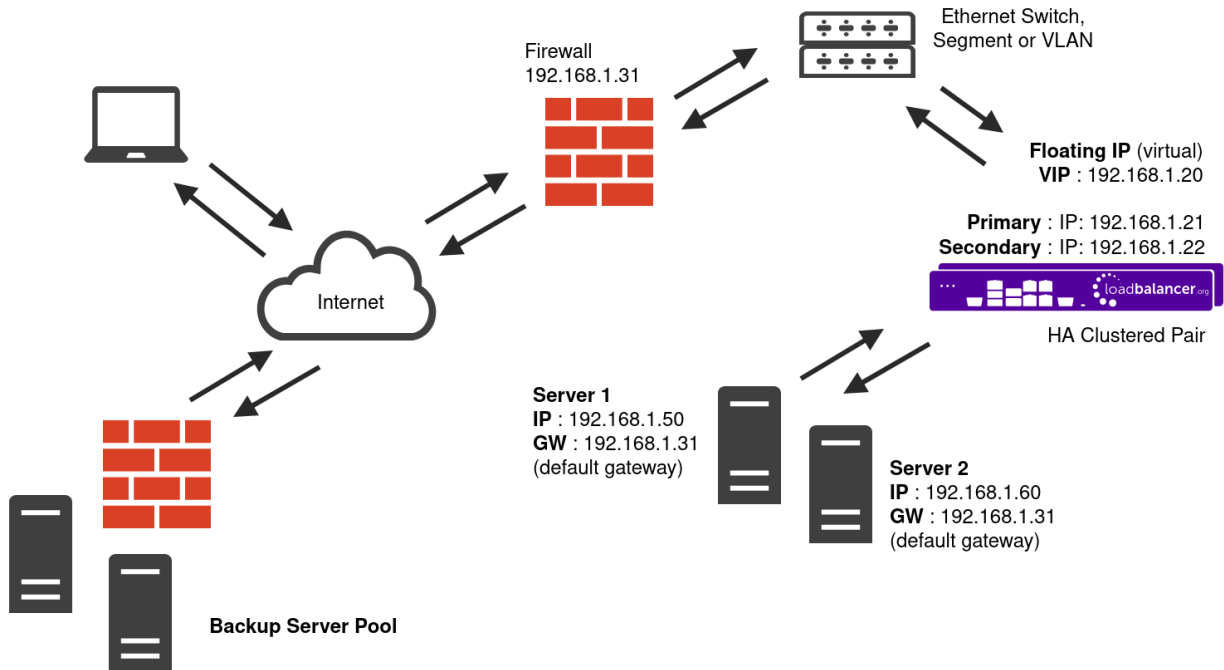
## 7. Load Balancer Deployment Methods

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*.

For AGFA HealthCare Enterprise Imaging, layer 7 SNAT mode is recommended. This mode is described below and is used for the configuration presented in this guide.

### 7.1. 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.

## 8. Loadbalancer.org Appliance – the Basics

### 8.1. Virtual Appliance

A fully featured, fully supported 30 day trial is available if you are conducting a PoC (Proof of Concept) deployment. The VA is currently available for VMware, Virtual Box, Hyper-V, KVM, XEN and Nutanix AHV and has been optimized for each Hypervisor. By default, the VA is allocated 2 vCPUs, 4GB of RAM and has a 20GB virtual disk. The Virtual Appliance can be downloaded [here](#).

#### Note

The same download is used for the licensed product, the only difference is that a license key file





(supplied by our sales team when the product is purchased) must be applied using the appliance's WebUI.

 **Note**

Please refer to [Virtual Appliance Installation](#) and the ReadMe.txt text file included in the VA download for additional information on deploying the VA using the various Hypervisors.

 **Note**

The VA has 4 network adapters. For VMware only the first adapter (**eth0**) is connected by default. For HyperV, KVM, XEN and Nutanix AHV all adapters are disconnected by default. Use the network configuration screen within the Hypervisor to connect the required adapters.

## 8.2. Initial Network Configuration

After boot up, follow the instructions on the appliance console to configure the management IP address, subnet mask, default gateway, DNS servers and other network and administrative settings.

 **Important**

Be sure to set a secure password for the load balancer, when prompted during the setup routine.

## 8.3. Accessing the Appliance WebUI

The WebUI is accessed using a web browser. By default, users are authenticated using Apache authentication. Users can also be authenticated against LDAP, LDAPS, Active Directory or Radius - for more information, please refer to [External Authentication](#).

 **Note**

There are certain differences when accessing the WebUI for the cloud appliances. For details, please refer to the relevant [Quick Start / Configuration Guide](#).

1. Using a browser, navigate to the following URL:

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

 **Note**

You'll receive a warning about the WebUI's SSL certificate. This is due to the default self signed certificate that is used. If preferred, you can upload your own certificate - for more information, please refer to [Appliance Security Features](#).

 **Note**

If you need to change the port, IP address or protocol that the WebUI listens on, please refer to [Service Socket Addresses](#).

2. Log in to the WebUI using the following credentials:

**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:

The screenshot displays the Loadbalancer web interface. At the top, there are status indicators: 'Primary | Secondary', 'Active | Passive', 'Link', and a refresh timer '15 Seconds'. On the left is a navigation menu with options: System Overview, Local Configuration, Cluster Configuration, Maintenance, View Configuration, Reports, Logs, Support, and Live Chat. The main content area features a warning box: 'WARNING: YOUR TRIAL IS DUE TO EXPIRE IN 30 DAYS. Buy with confidence. All purchases come with a 90 day money back guarantee. Already bought? Enter your license key here' with a 'Buy Now' button. Below this is a 'System Overview' section with a question 'Would you like to run the Setup Wizard?' and 'Accept'/'Dismiss' buttons. A filter bar shows 'No Virtual Services configured.' Below are two graphs: 'Network Bandwidth' showing RX (3k Min, 4k Avg, 32675k Total) and TX (6k Min, 7k Avg, 56693k Total) data, and 'System Load Average' showing 1m, 5m, and 15m averages. A 'Memory Usage' graph is partially visible at the bottom.

- You'll be asked if you want to run the Setup Wizard which can be used to configure layer 7 services. Click **Dismiss** if you're following a guide or want to configure the appliance manually or click **Accept** to start the wizard.

## 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

## 8.4. Appliance Software Update

To ensure that the appliance(s) are running the latest software version, we recommend a software update check is performed.

### Determining the Current Software Version

The software version is displayed at the bottom of the WebUI as shown in the example below:

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ENTERPRISE VA Max - v8.11.4

English ▼

### Checking for Updates using Online Update

#### Note

By default, the appliance periodically contacts the Loadbalancer.org update server and checks for updates. An update check can also be manually triggered as detailed below.

1. Using the WebUI, navigate to: **Maintenance > Software Update**.
2. Select **Online Update**.
3. If the latest version is already installed, a message similar to the following will be displayed:

**Information:** Version v8.11.4 is the current release. No updates are available

4. If an update is available, you'll be presented with a list of new features, improvements, bug fixes and security related updates.
5. Click **Online Update** to start the update process.

#### Note

Do not navigate away whilst the update is ongoing, this may cause the update to fail.

6. Once complete (the update can take several minutes depending on download speed and upgrade version) the following message will be displayed:

**Information:** Update completed successfully.

7. If services need to be reloaded/restarted or the appliance needs a full restart, you'll be prompted accordingly.

### Using Offline Update



If the load balancer does not have access to the Internet, offline update can be used.

 **Note**

Please contact [support@loadbalancer.org](mailto:support@loadbalancer.org) to check if an update is available and obtain the latest offline update files.

To perform an offline update:

1. Using the WebUI, navigate to: **Maintenance > Software Update**.
2. Select **Offline Update**.
3. The following screen will be displayed:

### Software Update

#### Offline Update

The following steps will lead you through offline update.

1. Contact **Loadbalancer.org support** to obtain the offline update archive and checksum.
2. Save the archive and checksum to your local machine.
3. Select the archive and checksum files in the upload form below.
4. Click *Upload and Install* to begin the update process.

**Archive:**  No file chosen  
**Checksum:**  No file chosen

4. Select the *Archive* and *Checksum* files.
5. Click **Upload and Install**.
6. If services need to be reloaded/restarted or the appliance needs a full restart, you'll be prompted accordingly.

## 8.5. Ports Used by the Appliance

By default, the appliance uses the following TCP & UDP ports:

Protocol	Port	Purpose
TCP	22 *	SSH
TCP & UDP	53 *	DNS / GSLB
TCP & UDP	123	NTP
TCP & UDP	161 *	SNMP
UDP	6694	Heartbeat between Primary & Secondary appliances in HA mode
TCP	7778	HAProxy persistence table replication
TCP	9000 *	Gateway service (Centralized/Portal Management)
TCP	9080 *	WebUI - HTTP (disabled by default)



Protocol	Port	Purpose
TCP	9081 *	Nginx fallback page
TCP	9443 *	WebUI - HTTPS
TCP	25565 *	Shuttle service (Centralized/Portal Management)

### Note

The ports used for SSH, GSLB, SNMP, the WebUI, the fallback page, the gateway service and the shuttle service can be changed if required. For more information, please refer to [Service Socket Addresses](#).

## 8.6. HA Clustered Pair Configuration

Loadbalancer.org recommend that load balancer appliances are deployed in pairs for high availability. In this guide a single unit is deployed first, adding a secondary unit is covered in the section [Configuring HA - Adding a Secondary Appliance](#) of the appendix.

# 9. Appliance Configuration for AGFA HealthCare Enterprise Imaging

## 9.1. VIP 1 - CoreServerClient-80

### Virtual Service (VIP) Configuration

- Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
- Enter the following details:

Virtual Service		[Advanced +]
Label	<input type="text" value="CoreServerClient-80"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="80"/>	?
Protocol		[Advanced +]
Layer 7 Protocol	<input type="text" value="HTTP Mode"/>	?

- Define the *Label* for the virtual service as required, e.g. **CoreServerClient-80**.
- Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
- Set the *Ports* field to **80**.
- Set the *Layer 7 Protocol* to **HTTP Mode**.



7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section and click **[Advanced]**.
  - Ensure that the *Persistence Mode* is set to **HTTP Cookie**.
  - Set the *HTTP Cookie Name* to **JSESSIONID**.
  - Set the *Cookie Max Idle Duration* to **1h**, i.e. 1 hour.
  - Set the *Cookie Max Life Duration* to **12h**, i.e 12 hours.
10. Scroll to the *Health Checks* section.
  - Set the *Health Checks* to **Negotiate HTTP (GET)**.
  - Set the *Request to send* to **/status**.
11. Leave all other settings at their default value.
12. Click **Update**.

## Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

Label	<input type="text" value="CSC-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="80"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Enable Redirect	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

3. Define the *Label* for the Real Server as required, e.g. **CSC-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **80**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.2. VIP 2 - CoreServerDICOM-104

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:

Virtual Service		[Advanced +]
Label	<input type="text" value="CoreServerDICOM-104"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="104"/>	?
Protocol		[Advanced +]
Layer 7 Protocol	<input type="text" value="TCP Mode"/>	?

3. Define the *Label* for the virtual service as required, e.g. **CoreServerDICOM-104**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **104**.
6. Set the *Layer 7 Protocol* to **TCP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section.
  - Set the *Persistence Mode* to **None**.
10. Scroll to the *Health Checks* section.
  - Set the *Health Checks* to **Negotiate HTTP (GET)**.
  - Set the *Request to send* to **/status?type=dicom&port=104**.
11. Leave all other settings at their default value.
12. Click **Update**.

### Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:



Label	<input type="text" value="CSD-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="104"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Enable Redirect	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

Cancel
Update

3. Define the *Label* for the Real Server as required, e.g. **CSD-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **104**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

### 9.3. VIP 3 - CoreServerDICOM-110

#### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:

<b>Virtual Service</b>		[Advanced +]
Label	<input type="text" value="CoreServerDICOM-110"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="110"/>	?
<b>Protocol</b>		[Advanced +]
Layer 7 Protocol	<input type="text" value="TCP Mode"/>	?

Cancel
Update

3. Define the *Label* for the virtual service as required, e.g. **CoreServerDICOM-110**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **110**.



6. Set the *Layer 7 Protocol* to **TCP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section.
  - Set the *Persistence Mode* to **None**.
10. Scroll to the *Health Checks* section.
  - Set the *Health Checks* to **Negotiate HTTP (GET)**.
  - Set the *Request to send* to **/status?type=dicom&port=110**.
11. Leave all other settings at their default value.
12. Click **Update**.

## Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

Label	<input type="text" value="CSD-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="110"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Enable Redirect	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

3. Define the *Label* for the Real Server as required, e.g. **CSD-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **110**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.4. VIP 4 - CoreServer-443

### Virtual Service (VIP) Configuration



- Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
- Enter the following details:

Virtual Service		[Advanced +]
Label	<input type="text" value="CoreServer-443"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="81"/>	?
Protocol		[Advanced +]
Layer 7 Protocol	<input type="text" value="HTTP Mode"/>	?

- Define the *Label* for the virtual service as required, e.g. **CoreServer-443**.
- Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
- Set the *Ports* field to **81**.
- Set the *Layer 7 Protocol* to **HTTP Mode**.
- Click **Update** to create the Virtual Service.
- Now click **Modify** next to the newly created VIP.
- Scroll to the *Persistence* section and click **[Advanced]**.
  - Ensure that the *Persistence Mode* is set to **HTTP Cookie**.
  - Set the *HTTP Cookie Name* to **JSESSIONID**.
  - Set the *Cookie Max Idle Duration* to **1h**, i.e. 1 hour.
  - Set the *Cookie Max Life Duration* to **12h**, i.e 12 hours.
- Scroll to the *Health Checks* section.
  - Set the *Health Checks* to **Negotiate HTTPS (GET)**.
  - Set the *Request to send* to **/status**.
- Scroll to the *SSL* section.
  - Enable (check) *Backend Encryption*.
- Scroll to the *Other* section and click **[Advanced]**.
  - Set *Force to HTTP* to **Yes**.
- Leave all other settings at their default value.
- Click **Update**.

## Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

Label	<input type="text" value="CS-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="443"/>	?
Re-Encrypt to Backend	<input checked="" type="checkbox"/>	?
Enable Redirect	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

**Cancel** **Update**

3. Define the *Label* for the Real Server as required, e.g. **CS-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **443**.
6. Ensure that *Re-Encrypt to Backend* is enabled (checked).
7. Leave all other settings at their default value.
8. Click **Update**.
9. Repeat these steps to add the remaining Real Server(s).

## Upload the SSL Certificate

Certificates in either PEM or PFX format can be uploaded.

1. Using the WebUI, navigate to *Cluster Configuration > SSL Certificate* and click **Add a new SSL Certificate**.
2. Select the option **Upload prepared PEM/PFX file**.
3. Enter the following details:

I would like to:

- Upload prepared PEM/PFX file
- Create a new SSL Certificate Signing Request (CSR)
- Create a new Self-Signed SSL Certificate.

Label:

File to upload:  Cert1.pfx

PFX File Password:

4. Specify an appropriate *Label*, e.g. **Cert-CoreServer-443**.
5. Click **Choose File**.
6. Browse to and select the relevant PEM or PFX file.
7. For PFX files specify the password if required.
8. Click **Upload Certificate**.

### Configure SSL Termination

1. Using the WebUI, navigate to *Cluster Configuration > SSL Termination* and click **Add a new Virtual Service**.
2. Enter the following details:

Label:

Associated Virtual Service:

Virtual Service Port:

SSL Operation Mode:

SSL Certificate:

Source IP Address:

Enable Proxy Protocol:

Bind Proxy Protocol to L7 VIP:

3. Using the *Associated Virtual Service* drop-down, select the Virtual Service created above, e.g. **CoreServer-443**.

 **Note** Once the VIP is selected, the *Label* field will be auto-populated with **SSL-CoreServer-443**. This can be changed if preferred.

4. Ensure that the *Virtual Service Port* is set to **443**.
5. Leave *SSL Operation Mode* set to **High Security**.
6. Select the *SSL Certificate* uploaded previously.
7. Leave all other settings at their default value.
8. Click **Update**.

## 9.5. VIP 5 - CoreServerHL7-2310

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:

Virtual Service		[Advanced +]
Label	<input type="text" value="CoreServerHL7-2310"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="2310"/>	?
Protocol		[Advanced +]
Layer 7 Protocol	<input type="text" value="TCP Mode"/>	?

3. Define the *Label* for the virtual service as required, e.g. **CoreServerHL7-2310**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **2310**.
6. Set the *Layer 7 Protocol* to **TCP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section.
  - Set the *Persistence Mode* to **None**.
10. Leave all other settings at their default value.
11. Click **Update**.

### Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.

2. Enter the following details:

Label	<input type="text" value="CSHL7-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="2310"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

3. Define the *Label* for the Real Server as required, e.g. **CSHL7-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **2310**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.6. VIP 6 - CoreServerHL7-2311

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:

<b>Virtual Service</b>		[Advanced +]
Label	<input type="text" value="CoreServerHL7-2311"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="2311"/>	?
<b>Protocol</b>		[Advanced +]
Layer 7 Protocol	<input type="text" value="TCP Mode"/>	?

3. Define the *Label* for the virtual service as required, e.g. **CoreServerHL7-2311**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **2311**.

6. Set the *Layer 7 Protocol* to **TCP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section.
  - Set the *Persistence Mode* to **None**.
10. Leave all other settings at their default value.
11. Click **Update**.

## Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

Label	<input type="text" value="CSHL7-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="2311"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

3. Define the *Label* for the Real Server as required, e.g. **CSHL7-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **2311**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.7. VIP 7 - CoreServerDICOM-2762

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:

Virtual Service		[Advanced +]
Label	<input type="text" value="CoreServerDICOM-2762"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="2762"/>	?
Protocol		[Advanced +]
Layer 7 Protocol	<input type="text" value="TCP Mode"/>	?

3. Define the *Label* for the virtual service as required, e.g. **CoreServerHL7-2762**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **2762**.
6. Set the *Layer 7 Protocol* to **TCP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section.
  - Set the *Persistence Mode* to **None**.
10. Scroll to the *Health Checks* section.
  - Set the *Health Checks* to **Negotiate HTTP (GET)**.
  - Set the *Request to send* to **/status?type=dicom&port=104**.
11. Leave all other settings at their default value.
12. Click **Update**.

## Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:



Label	<input type="text" value="CSD2-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="2762"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

3. Define the *Label* for the Real Server as required, e.g. **CSD2-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **2762**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.8. VIP 8 - CoreServerClient-4447

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:

<b>Virtual Service</b>		[Advanced +]
Label	<input type="text" value="CoreServerClient-4447"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="4447"/>	?
<b>Protocol</b>		[Advanced +]
Layer 7 Protocol	<input type="text" value="TCP Mode"/>	?

3. Define the *Label* for the virtual service as required, e.g. **CoreServerClient-4447**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **4447**.
6. Set the *Layer 7 Protocol* to **TCP Mode**.

7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section.
  - Set the *Persistence Mode* to **None**.
10. Scroll to the *Health Checks* section.
  - Set the *Health Checks* to **Negotiate HTTP (GET)**.
  - Set the *Request to send* to **/status**.
11. Leave all other settings at their default value.
12. Click **Update**.

## Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

Label	<input type="text" value="CSC2-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="4447"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

3. Define the *Label* for the Real Server as required, e.g. **CSC2-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **4447**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.9. VIP 9 - CoreServerClient-5222

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:

Virtual Service		[Advanced +]
Label	<input type="text" value="CoreServerClient-5222"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="5222"/>	?
Protocol		[Advanced +]
Layer 7 Protocol	<input type="text" value="TCP Mode"/>	?

3. Define the *Label* for the virtual service as required, e.g. **CoreServerClient-5222**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **5222**.
6. Set the *Layer 7 Protocol* to **TCP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section.
  - Set the *Persistence Mode* to **None**.
10. Scroll to the *Health Checks* section.
11. Leave all other settings at their default value.
12. Click **Update**.

### Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

Label	<input type="text" value="CSC3-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="5222"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?



3. Define the *Label* for the Real Server as required, e.g. **CSC3-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **5222**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.10. VIP 10 - CoreServerClient-5223

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:

Virtual Service		[Advanced +]
Label	<input type="text" value="CoreServerClient-5223"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="5223"/>	?
Protocol		[Advanced +]
Layer 7 Protocol	<input type="text" value="TCP Mode"/>	?

3. Define the *Label* for the virtual service as required, e.g. **CoreServerClient-5223**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **5223**.
6. Set the *Layer 7 Protocol* to **TCP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section.
  - Set the *Persistence Mode* to **None**.
10. Scroll to the *Health Checks* section.
11. Leave all other settings at their default value.
12. Click **Update**.

### Define the Associated Real Servers (RIPs)



- Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
- Enter the following details:

Label	<input type="text" value="CSC4-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="5223"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

Cancel
Update

- Define the *Label* for the Real Server as required, e.g. **CSC4-Node1**.
- Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
- Set the *Real Server Port* field to **5223**.
- Leave all other settings at their default value.
- Click **Update**.
- Repeat these steps to add the remaining Real Server(s).

## 9.11. VIP 11 - CoreServerClient-7443

### Virtual Service (VIP) Configuration

- Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
- Enter the following details:

<b>Virtual Service</b>		[Advanced +]
Label	<input type="text" value="CoreServerClient-7443"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="7443"/>	?
<b>Protocol</b>		[Advanced +]
Layer 7 Protocol	<input type="text" value="TCP Mode"/>	?

Cancel
Update

- Define the *Label* for the virtual service as required, e.g. **CoreServerClient-7443**.

4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **7443**.
6. Set the *Layer 7 Protocol* to **TCP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section.
  - Set the *Persistence Mode* to **None**.
10. Scroll to the *Health Checks* section.
11. Leave all other settings at their default value.
12. Click **Update**.

### Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

Label	<input type="text" value="CSC5-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="7443"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

3. Define the *Label* for the Real Server as required, e.g. **CSC5-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **7443**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.12. VIP 12 - CoreServerARR-6514

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.

2. Enter the following details:

Virtual Service		[Advanced +]
Label	<input type="text" value="CoreServerARR-6514"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="6514"/>	?
Protocol		[Advanced +]
Layer 7 Protocol	<input type="text" value="TCP Mode"/>	?

3. Define the *Label* for the virtual service as required, e.g. **CoreServerARR-6514**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **6514**.
6. Set the *Layer 7 Protocol* to **TCP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section.
  - Set the *Persistence Mode* to **None**.
10. Leave all other settings at their default value.
11. Click **Update**.

## Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

Label	<input type="text" value="CSC6-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="6514"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

3. Define the *Label* for the Real Server as required, e.g. **CSC6-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **6514**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.13. VIP 13 - CoreServerClient-8080

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:

Virtual Service		[Advanced +]
Label	<input type="text" value="CoreServerClient-8080"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="8080"/>	?
Protocol		[Advanced +]
Layer 7 Protocol	<input type="text" value="HTTP Mode"/>	?

3. Define the *Label* for the virtual service as required, e.g. **CoreServerClient-8080**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **8080**.
6. Set the *Layer 7 Protocol* to **HTTP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section and click **[Advanced]**.
  - Ensure that the *Persistence Mode* is set to **HTTP Cookie**.
  - Set the *HTTP Cookie Name* to **JSESSIONID**.
  - Set the *Cookie Max Idle Duration* to **1h**, i.e. 1 hour.
  - Set the *Cookie Max Life Duration* to **12h**, i.e 12 hours.
10. Scroll to the *Health Checks* section.



- Set the *Health Checks* to **Negotiate HTTP (GET)**.
- Set the *Request to send* to **/status**.

11. Leave all other settings at their default value.
12. Click **Update**.

## Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

Label	<input type="text" value="CSC7-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="8080"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Enable Redirect	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

3. Define the *Label* for the Real Server as required, e.g. **CSC7-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **8080**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.14. VIP 14 - CoreServerClient-8443

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:

Virtual Service		[Advanced +]
Label	<input type="text" value="CoreServerClient-8443"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="880"/>	?
Protocol		[Advanced +]
Layer 7 Protocol	<input type="text" value="HTTP Mode"/>	?

3. Define the *Label* for the virtual service as required, e.g. **CoreServerClient-8443**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **880**.
6. Set the *Layer 7 Protocol* to **HTTP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section and click **[Advanced]**.
  - Set the *Persistence Mode* to **Source IP**.
  - Set the *Persistence Timeout* to **6h**, i.e. 6 hours.
10. Scroll to the *Health Checks* section.
  - Set the *Health Checks* to **Negotiate HTTPS (GET)**.
  - Set the *Request to send* to **/status**.
11. Scroll to the *SSL* section.
  - Enable (check) *Backend Encryption*.
12. Leave all other settings at their default value.
13. Click **Update**.

## Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

Label	<input type="text" value="CSC8-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="8443"/>	?
Re-Encrypt to Backend	<input checked="" type="checkbox"/>	?
Enable Redirect	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

Cancel
Update

3. Define the *Label* for the Real Server as required, e.g. **CSC8-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **8443**.
6. Ensure that *Re-Encrypt to Backend* is enabled (checked).
7. Leave all other settings at their default value.
8. Click **Update**.
9. Repeat these steps to add the remaining Real Server(s).

## Upload the SSL Certificate

Certificates in either PEM or PFX format can be uploaded.

1. Using the WebUI, navigate to *Cluster Configuration > SSL Certificate* and click **Add a new SSL Certificate**.
2. Select the option **Upload prepared PEM/PFX file**.
3. Enter the following details:

**Upload prepared PEM/PFX file**

I would like to:

Create a new SSL Certificate Signing Request (CSR)

Create a new Self-Signed SSL Certificate.

Label

File to upload  Cert1.pfx

PFX File Password

Upload Certificate

4. Specify an appropriate *Label*, e.g. **Cert-CoreServerClient-8443**.

5. Click **Choose File**.
6. Browse to and select the relevant PEM or PFX file.
7. For PFX files specify the password if required.
8. Click **Upload Certificate**.

## Configure SSL Termination

1. Using the WebUI, navigate to *Cluster Configuration > SSL Termination* and click **Add a new Virtual Service**.
2. Enter the following details:

Label	SSL-CoreServerClient-8443	?
Associated Virtual Service	CoreServerClient-8443 ▼	?
Virtual Service Port	8443	?
SSL Operation Mode	High Security ▼	
SSL Certificate	Default Self Signed Certificate ▼	?
Source IP Address		?
Enable Proxy Protocol	<input checked="" type="checkbox"/>	?
Bind Proxy Protocol to L7 VIP	CoreServerClient-8443 ▼	?

Cancel
Update

3. Using the *Associated Virtual Service* drop-down, select the Virtual Service created above, e.g. **CoreServerClient-8443**.

### Note

Once the VIP is selected, the *Label* field will be auto-populated with **SSL-CoreServerClient-8443**. This can be changed if preferred.

4. Set the *Virtual Service Port* to **8443**.
5. Leave *SSL Operation Mode* set to **High Security**.
6. Select the *SSL Certificate* uploaded previously.
7. Leave all other settings at their default value.
8. Click **Update**.

## 9.15. VIP 15 - CoreServerClient-9080

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.

2. Enter the following details:

Virtual Service		[Advanced +]
Label	<input type="text" value="CoreServerClient-9080"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="9080"/>	?
Protocol		[Advanced +]
Layer 7 Protocol	<input type="text" value="HTTP Mode"/>	?

3. Define the *Label* for the virtual service as required, e.g. **CoreServerClient-9080**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **9080**.
6. Set the *Layer 7 Protocol* to **HTTP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section and click **[Advanced]**.
  - Set the *Persistence Mode* to **Source IP**.
  - Set the *Persistence Timeout* to **6h**, i.e. 6 hours.
10. Scroll to the *Health Checks* section.
  - Set the *Health Checks* to **Negotiate HTTP (GET)**.
  - Set the *Request to send* to **/status**.
11. Leave all other settings at their default value.
12. Click **Update**.

## Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

Label	<input type="text" value="CSC9-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="9080"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Enable Redirect	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

3. Define the **Label** for the Real Server as required, e.g. **CS-Node1**.
4. Set the **Real Server IP Address** field to the required IP address, e.g. **192.168.1.170**.
5. Set the **Real Server Port** field to **9080**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.16. VIP 16 - CoreServerClient-9081

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to **Cluster Configuration > Layer 7 – Virtual Services** and click on **Add a new Virtual Service**.
2. Enter the following details:

<b>Virtual Service</b>		[Advanced +]
Label	<input type="text" value="CoreServerClient-9081"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="9081"/>	?
<b>Protocol</b>		[Advanced +]
Layer 7 Protocol	<input type="text" value="HTTP Mode"/>	?

3. Define the **Label** for the virtual service as required, e.g. **CoreServerClient-9081**.
4. Set the **Virtual Service IP Address** field to the required IP address, e.g. **192.168.1.146**.
5. Set the **Ports** field to **9081**.

6. Set the *Layer 7 Protocol* to **HTTP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section and click **[Advanced]**.
  - Set the *Persistence Mode* to **Source IP**.
  - Set the *Persistence Timeout* to **6h**, i.e. 6 hours.
10. Scroll to the *Health Checks* section.
  - Set the *Health Checks* to **Negotiate HTTP (GET)**.
  - Set the *Request to send* to **/status**.
11. Leave all other settings at their default value.
12. Click **Update**.

### Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

Label	<input type="text" value="CSC9-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="9081"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Enable Redirect	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

3. Define the *Label* for the Real Server as required, e.g. **CSC9-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **9081**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.17. VIP 17 - CoreServerClient-10080

## Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:

Virtual Service		[Advanced +]
Label	<input type="text" value="CoreServerClient-10080"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="10080"/>	?
Protocol		[Advanced +]
Layer 7 Protocol	<input type="text" value="HTTP Mode"/>	?

3. Define the *Label* for the virtual service as required, e.g. **CoreServerClient-10080**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **10080**.
6. Set the *Layer 7 Protocol* to **HTTP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section and click **[Advanced]**.
  - Set the *Persistence Mode* to **Source IP**.
  - Set the *Persistence Timeout* to **6h**, i.e. 6 hours.
10. Scroll to the *Health Checks* section.
  - Set the *Health Checks* to **Negotiate HTTP (GET)**.
  - Set the *Request to send* to **/status**.
11. Leave all other settings at their default value.
12. Click **Update**.

## Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:



Label	<input type="text" value="CSC10-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="10080"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Enable Redirect	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

Cancel
Update

3. Define the *Label* for the Real Server as required, e.g. **CSC10-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **10080**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.18. VIP 18 - CoreServerClient-10123

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:

<b>Virtual Service</b>		[Advanced +]
Label	<input type="text" value="CoreServerClient-10123"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="10123"/>	?
<b>Protocol</b>		[Advanced +]
Layer 7 Protocol	<input type="text" value="TCP Mode"/>	?

Cancel
Update

3. Define the *Label* for the virtual service as required, e.g. **CoreServerClient-10123**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **10123**.

6. Set the *Layer 7 Protocol* to **TCP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section and click **[Advanced]**.
  - Set the *Persistence Mode* to **Source IP**.
  - Set the *Persistence Timeout* to **6h**, i.e. 6 hours.
10. Leave all other settings at their default value.
11. Click **Update**.

## Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

Label	<input type="text" value="CSC11-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="10123"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

3. Define the *Label* for the Real Server as required, e.g. **CSC11-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **10123**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.19. VIP 19 - CoreServerClient-10124

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:

Virtual Service		[Advanced +]
Label	<input type="text" value="CoreServerClient-10124"/>	?
IP Address	<input type="text" value="192.168.1.146"/>	?
Ports	<input type="text" value="10124"/>	?
Protocol		[Advanced +]
Layer 7 Protocol	<input type="text" value="TCP Mode"/>	?

- Define the *Label* for the virtual service as required, e.g. **CoreServerClient-10124**.
- Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
- Set the *Ports* field to **10124**.
- Set the *Layer 7 Protocol* to **TCP Mode**.
- Click **Update** to create the Virtual Service.
- Now click **Modify** next to the newly created VIP.
- Scroll to the *Persistence* section and click **[Advanced]**.
  - Set the *Persistence Mode* to **Source IP**.
  - Set the *Persistence Timeout* to **6h**, i.e. 6 hours.
- Leave all other settings at their default value.
- Click **Update**.

### Define the Associated Real Servers (RIPs)

- Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
- Enter the following details:

Label	<input type="text" value="CSC12-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.170"/>	?
Real Server Port	<input type="text" value="10124"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

3. Define the *Label* for the Real Server as required, e.g. **CSC12-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **10124**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.20. VIP 20 - WebServer-withXero

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:

Virtual Service		[Advanced +]
Label	<input type="text" value="WebServer-withXero"/>	?
IP Address	<input type="text" value="192.168.1.144"/>	?
Ports	<input type="text" value="443"/>	?
Protocol		[Advanced +]
Layer 7 Protocol	<input type="text" value="TCP Mode"/>	?

3. Define the *Label* for the virtual service as required, e.g. **WebServer-withXero**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.144**.
5. Set the *Ports* field to **443**.
6. Set the *Layer 7 Protocol* to **TCP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section.
  - Set the *Persistence Mode* to **None**.
10. Scroll to the *Health Checks* section.
  - Set the *Health Checks* to **Negotiate HTTPS (GET)**.
  - Set the *Request to send* to **/wado/status/deployed**.
11. Leave all other settings at their default value.

12. Click **Update**.

## Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:

Label	<input type="text" value="Web1-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.180"/>	?
Real Server Port	<input type="text" value="443"/>	?
Re-Encrypt to Backend	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

3. Define the *Label* for the Real Server as required, e.g. **Web1-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.180**.
5. Set the *Real Server Port* field to **443**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these steps to add the remaining Real Server(s).

## 9.21. VIP 21 - WebServer-withoutXero

### Virtual Service (VIP) Configuration

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:

Virtual Service		[Advanced +]
Label	<input type="text" value="WebServer-withoutXero"/>	?
IP Address	<input type="text" value="192.168.1.145"/>	?
Ports	<input type="text" value="80"/>	?
Protocol		[Advanced -]
Layer 7 Protocol	<input type="text" value="HTTP Mode"/>	?

3. Define the *Label* for the virtual service as required, e.g. **WebServer-withoutXero**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.145**.
5. Set the *Ports* field to **80**.
6. Set the *Layer 7 Protocol* to **HTTP Mode**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Persistence* section and click **[Advanced]**.
  - Ensure that the *Persistence Mode* is set to **HTTP Cookie**.
  - Set the *HTTP Cookie Name* to **JSESSIONIDSSO**.
  - Set the *Cookie Max Idle Duration* to **1h**, i.e. 1 hour.
  - Set the *Cookie Max Life Duration* to **12h**, i.e 12 hours.
10. Scroll to the *Health Checks* section.
  - Set the *Health Checks* to **Negotiate HTTPS (GET)**.
  - Set the *Request to send* to **/wado/status/deployed**.
11. Scroll to the *SSL* section.
  - Enable (check) *Backend Encryption*.
12. Scroll to the *Other* section and click **[Advanced]**.
  - Set *Force to HTTP* to **Yes**.
13. Leave all other settings at their default value.
14. Click **Update**.

## Define the Associated Real Servers (RIPs)

1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Real Servers* and click on **Add a new Real Server** next to the newly created VIP.
2. Enter the following details:



Label	<input type="text" value="Web1-Node1"/>	?
Real Server IP Address	<input type="text" value="192.168.1.180"/>	?
Real Server Port	<input type="text" value="443"/>	?
Re-Encrypt to Backend	<input checked="" type="checkbox"/>	?
Enable Redirect	<input type="checkbox"/>	?
Weight	<input type="text" value="100"/>	?

3. Define the *Label* for the Real Server as required, e.g. **Web1-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.180**.
5. Set the *Real Server Port* field to **443**.
6. Ensure that *Re-Encrypt to Backend* is enabled (checked).
7. Leave all other settings at their default value.
8. Click **Update**.
9. Repeat these steps to add the remaining Real Server(s).

## Upload the SSL Certificate

Certificates in either PEM or PFX format can be uploaded.

1. Using the WebUI, navigate to *Cluster Configuration > SSL Certificate* and click **Add a new SSL Certificate**.
2. Select the option **Upload prepared PEM/PFX file**.
3. Enter the following details:

I would like to:	<input checked="" type="radio"/> <b>Upload prepared PEM/PFX file</b> <input type="radio"/> Create a new SSL Certificate Signing Request (CSR) <input type="radio"/> Create a new Self-Signed SSL Certificate.	?
Label	<input type="text" value="Cert-WebServer-withoutXerc"/>	?
File to upload	<input type="button" value="Choose File"/> Cert1.pfx	?
PFX File Password	<input type="password" value="....."/>	?

4. Specify an appropriate *Label*, e.g. **Cert-WebServer-withoutXero**.

5. Click **Choose File**.
6. Browse to and select the relevant PEM or PFX file.
7. For PFX files specify the password if required.
8. Click **Upload Certificate**.

## Configure SSL Termination

1. Using the WebUI, navigate to *Cluster Configuration > SSL Termination* and click **Add a new Virtual Service**.
2. Enter the following details:

Label	SSL-WebServer-withoutXerc	?
Associated Virtual Service	WebServer-withoutXero	?
Virtual Service Port	443	?
SSL Operation Mode	High Security	
SSL Certificate	cert-webserver-withoutxero	?
Source IP Address		?
Enable Proxy Protocol	<input checked="" type="checkbox"/>	?
Bind Proxy Protocol to L7 VIP	WebServer-withoutXero	?

Cancel
Update

3. Using the *Associated Virtual Service* drop-down, select the Virtual Service created above, e.g. **WebServer-withoutXero**.

### Note

Once the VIP is selected, the *Label* field will be auto-populated with **SSL-WebServer-withoutXero**. This can be changed if preferred.

4. Ensure that the *Virtual Service Port* is set to **443**.
5. Leave *SSL Operation Mode* set to **High Security**.
6. Select the *SSL Certificate* uploaded previously.
7. Leave all other settings at their default value.
8. Click **Update**.

## 9.22. Finalizing the Configuration

To apply the new settings, HAProxy and STunnel 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**.
3. Click **Reload STunnel**.

## 10. Testing & Verification

### Note

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

### 10.1. Accessing AGFA HealthCare Enterprise Imaging via the Load Balancer

Verify that you're able to successfully access all load balanced applications and services via the Virtual Services on the load balancer.

### Note

Make sure that DNS is updated so that any FQDNs used point to the VIPs rather than individual servers.

### 10.2. Using System Overview

The System Overview can be viewed in the WebUI. It shows a graphical view of all Virtual Services & the associated Real Servers (i.e. the AGFA HealthCare Enterprise Imaging servers) and shows the state/health of each server as well as the overall state of each cluster. The example below shows that all servers are healthy (green) and available to accept connections:

#### System Overview ?

2024-08-07 08:57:18 UTC

VIRTUAL SERVICE	IP	PORTS	CONN	PROTOCOL	METHOD	MODE	
↑ CoreServerClient-80	192.168.1.146	80	0	HTTP	Layer 7	Proxy	
<i>REAL SERVER</i>							
	<i>IP</i>	<i>PORTS</i>	<i>WEIGHT</i>	<i>CONN</i>			
↑	CSC-Node1	192.168.1.170	80	100	0	Drain	Halt
↑	CSC-Node2	192.168.1.171	80	100	0	Drain	Halt
↑ CoreServerDICOM-104	192.168.1.146	104	0	TCP	Layer 7	Proxy	
↑ CoreServerDICOM-110	192.168.1.146	110	0	TCP	Layer 7	Proxy	
↑  CoreServer-443	192.168.1.146	81	0	HTTP	Layer 7	Proxy	
↑ CoreServerHL7-2310	192.168.1.146	2310	0	TCP	Layer 7	Proxy	
↑ CoreServerHL7-2311	192.168.1.146	2311	0	TCP	Layer 7	Proxy	
↑ CoreServerHL7-2762	192.168.1.146	2762	0	TCP	Layer 7	Proxy	
↑ CoreServerClient-4447	192.168.1.146	4447	0	TCP	Layer 7	Proxy	



## 11. 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](mailto:support@loadbalancer.org).

## 12. Further Documentation

For additional information, please refer to the [Administration Manual](#).



# 13. Appendix

## 13.1. 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 fully configured first, then the Secondary appliance can be added to create an HA pair. Once the HA pair is configured, load balanced services must be configured and modified on the Primary appliance. The Secondary appliance will be automatically kept in sync.

 **Note**

For Enterprise Azure, the HA pair should be configured first. For more information, please refer to the Azure Quick Start/Configuration Guide available in the [documentation library](#)

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	Interface IP addresses, bonding configuration and VLANs
Local Configuration	Routing	Default gateways and static routes
Local Configuration	System Date & time	Time and date related settings
Local Configuration	Physical – Advanced Configuration	Various appliance settings
Local Configuration	Portal Management	Portal management settings
Local Configuration	Security	Security settings
Local Configuration	SNMP Configuration	SNMP settings
Local Configuration	Graphing	Graphing settings
Local Configuration	License Key	Appliance licensing
Maintenance	Backup & Restore	Local XML backups
Maintenance	Software Updates	Appliance software updates
Maintenance	Fallback Page	Fallback page configuration
Maintenance	Firewall Script	Firewall (iptables) configuration
Maintenance	Firewall Lockdown Wizard	Appliance management lockdown settings



### ⚠ Important

Make sure that where any of the above have been configured on the Primary appliance, they're also configured on the Secondary.

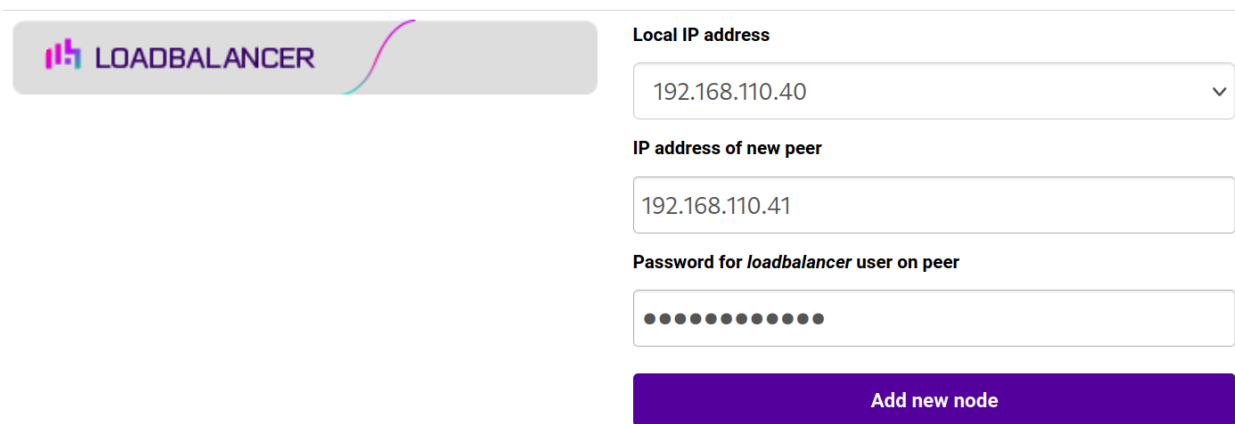
## Configuring the HA Clustered Pair

### 📌 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.

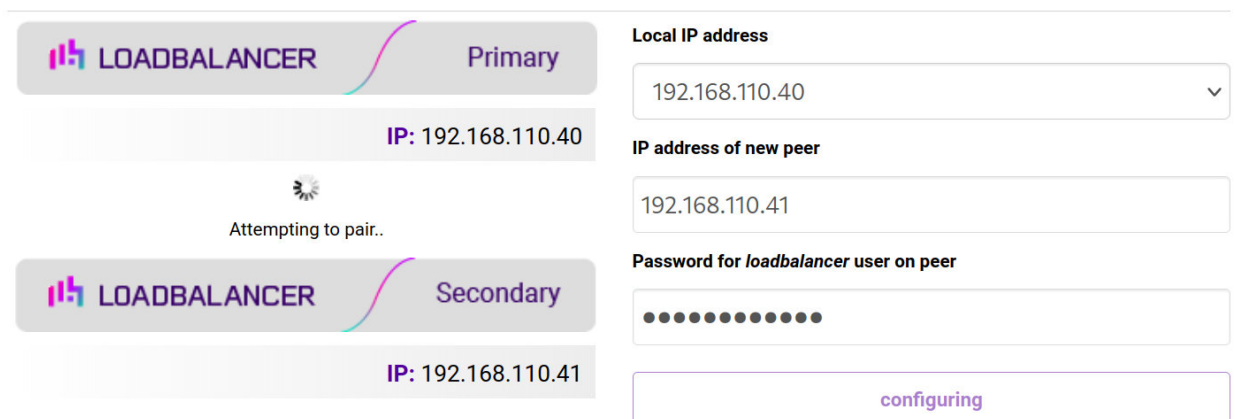
1. Deploy a second appliance that will be the Secondary and configure initial network settings.
2. Using the WebUI on the Primary appliance, navigate to: **Cluster Configuration > High-Availability Configuration**.

### Create a Clustered Pair



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



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

## High Availability Configuration - primary

The screenshot displays a configuration interface for a High Availability (HA) setup. It features two load balancer appliances, each represented by a grey rounded rectangle with a purple icon and a pink-to-purple gradient line. The top appliance is labeled 'LOADBALANCER Primary' and has the IP address 'IP: 192.168.110.40'. The bottom appliance is labeled 'LOADBALANCER Secondary' and has the IP address 'IP: 192.168.110.41'. To the right of these appliances is a prominent red button with the text 'Break Clustered Pair'.

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](#).

## 14. Document Revision History

Version	Date	Change	Reason for Change	Changed By
1.0.0	8 August 2024	Initial version		RJC





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