LOADBALANCER

DEPLOYMENT BRIEF

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/enterprise.

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

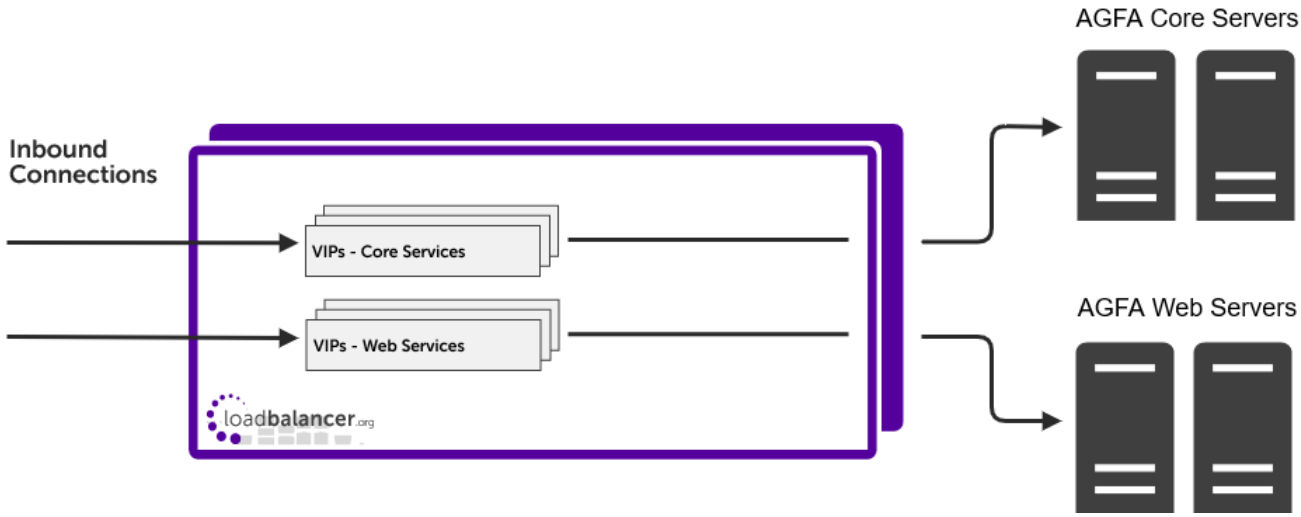
SSL Termination is configured on the load balancer for the following VIPs:

- 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 **IP** 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.

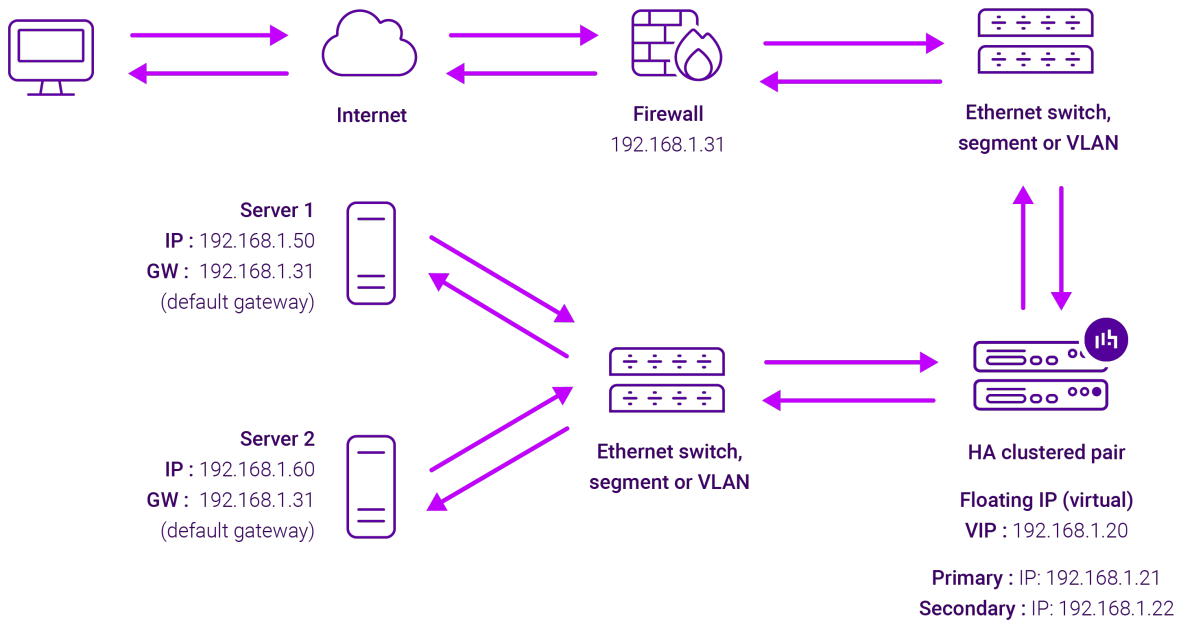
7. Load Balancer Deployment Methods

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. The image below shows an example network diagram for this mode.



- Because layer 7 SNAT mode is a full proxy, Real Servers in the cluster can be on any accessible network 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, **eth1** is typically used for client side connections and **eth0** is used for Real Server connections, although this is not mandatory since any interface can be used for any purpose.
- 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.

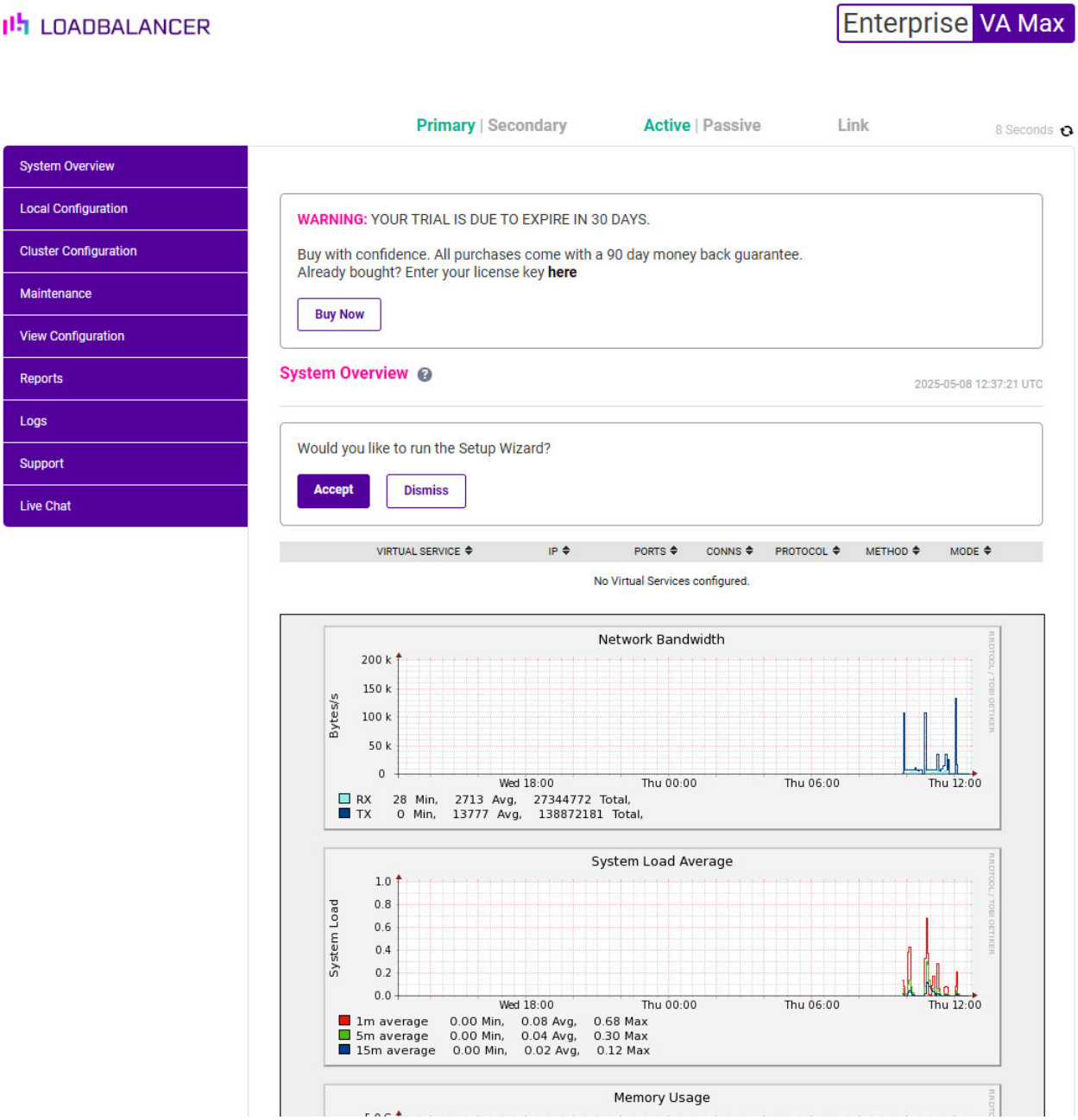
   > **Note** If you need to change the port, IP address or protocol that the WebUI listens on, please refer to Service Socket Addresses.

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:



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

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

8.3.1. 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 creating 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

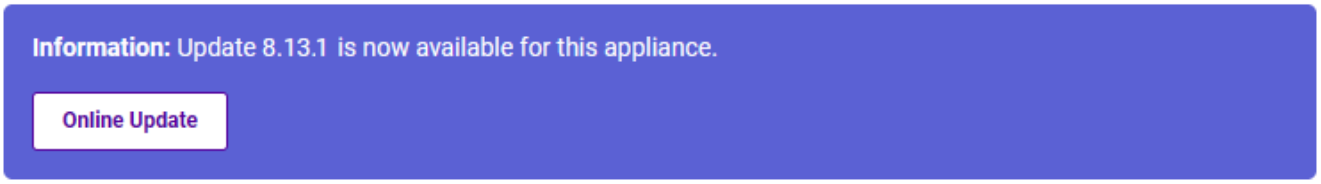
We recommend that the appliance is kept up to date to ensure that you benefit from the latest bug fixes, security updates and feature improvements. Both online and offline update are supported.

> **Note** For full details, please refer to Appliance Software Update in the Administration Manual.

> **Note** Services may need to be restarted/reloaded after the update process completes or in some cases a full appliance restart may be required. We therefore recommend performing the update during a maintenance window.

8.4.1. Online Update

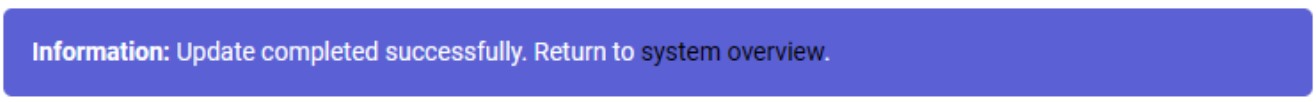
The appliance periodically contacts the Loadbalancer.org update server (**update.loadbalancer.org**) and checks for updates. This is the default behavior and can be disabled if preferred. If an update is found, a notification similar to the example below will be displayed at the top of the WebUI:



Click **Online Update**. A summary of all new features, improvements, bug fixes and security updates included in the update will be displayed. Click **Update** at the bottom of the page to start the update process.

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

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



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

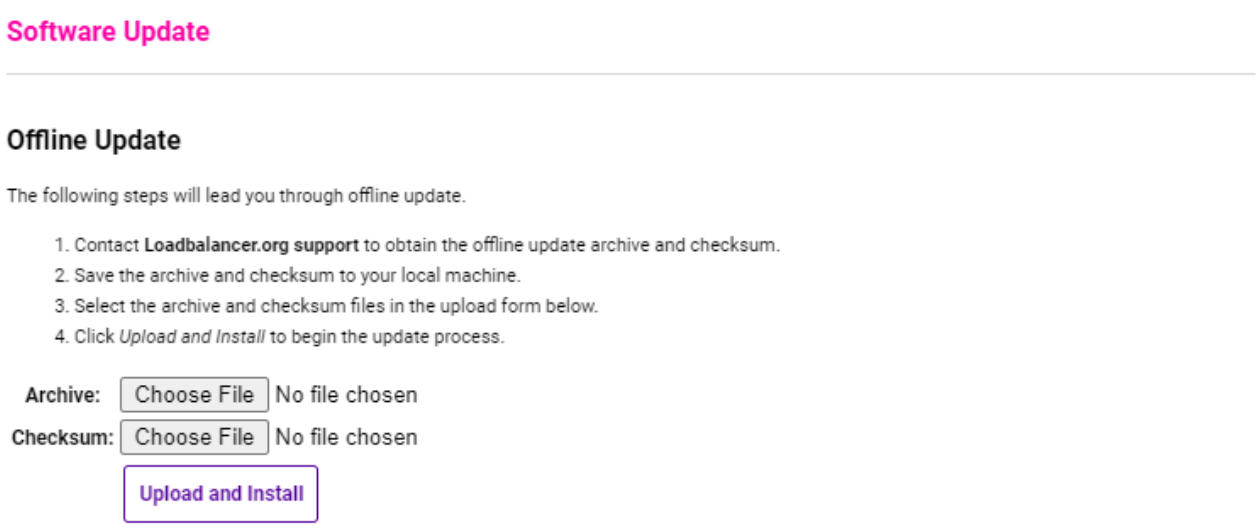
8.4.2. Offline Update

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

To check for the latest version, please refer to our product roadmap page available here. To obtain the latest offline update files contact support@loadbalancer.org.

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:



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)
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

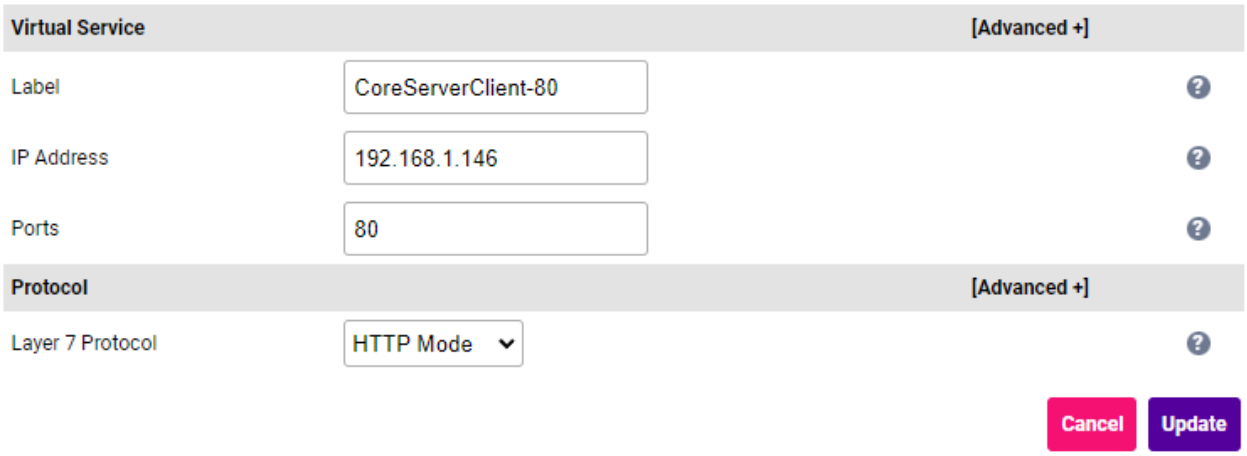
Loadbalancer.org recommend that load balancer appliances are deployed in pairs for high availability. In this guide a single unit is deployed first, adding a secondary unit is covered in the section Configuring HA - Adding a Secondary Appliance of the appendix.

9. Appliance Configuration for AGFA HealthCare Enterprise Imaging

9.1. VIP 1 - CoreServerClient-80

9.1.1. 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:



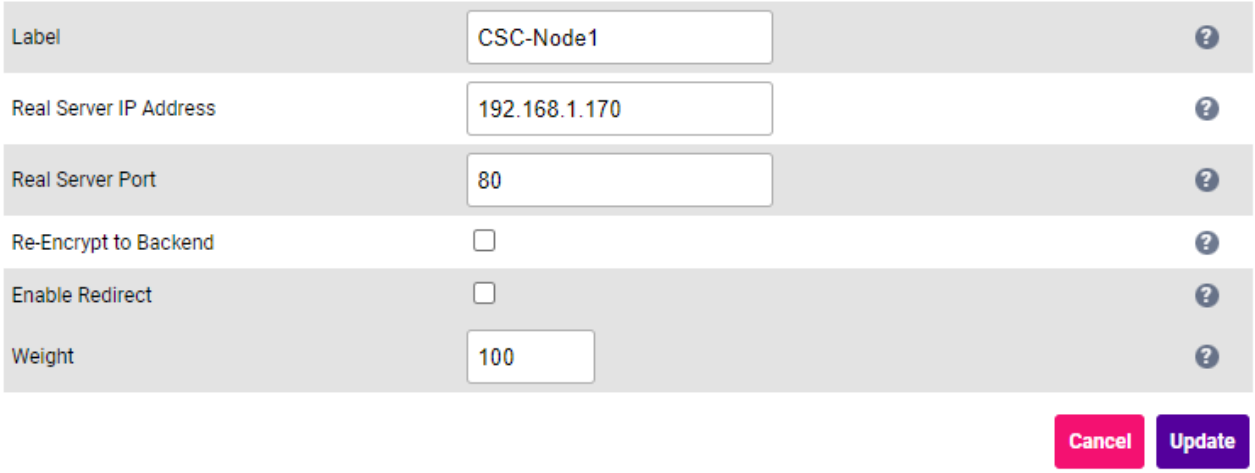
3. Define the *Label* for the virtual service as required, e.g. **CoreServerClient-80**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **80**.
6. Set the *Layer 7 Protocol* to **HTTP Mode**.
7. Click **Update** to create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

9.1.2. 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:

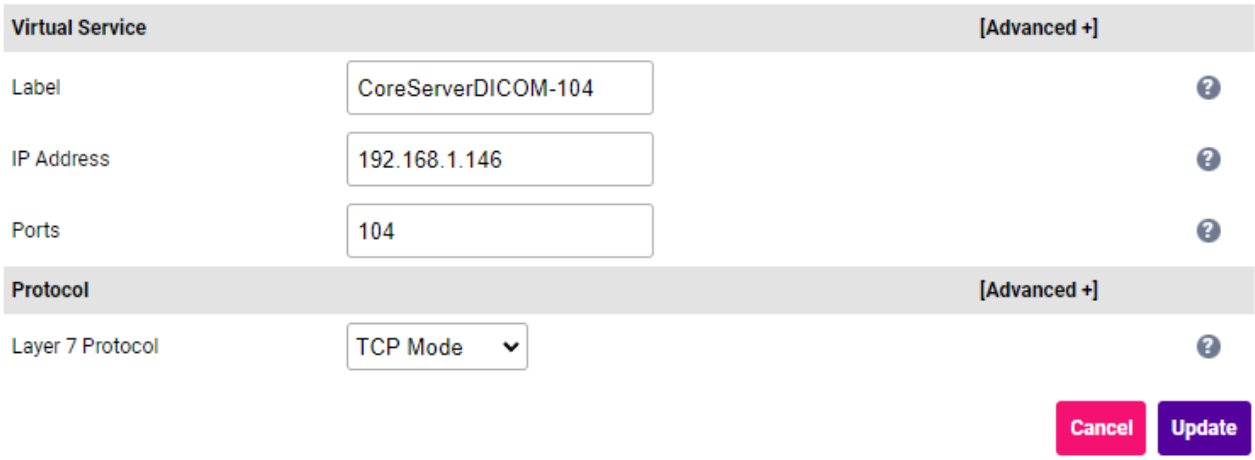


3. Define the *Label* for the Real Server as required, e.g. **CSC-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **80**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these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

9.2. VIP 2 - CoreServerDICOM-104

9.2.1. Virtual Service (VIP) Configuration

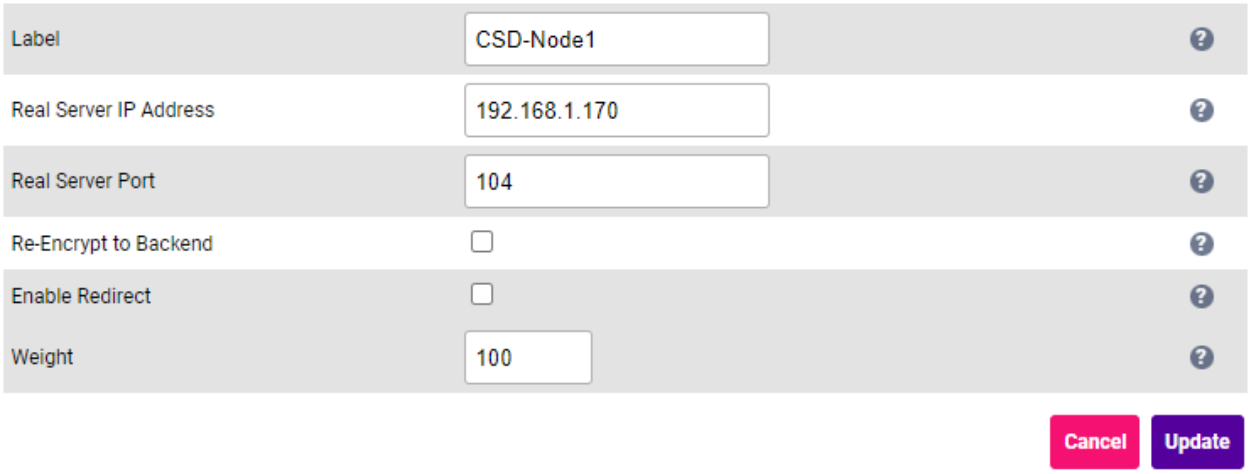
1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:



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**.

9.2.2. 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:

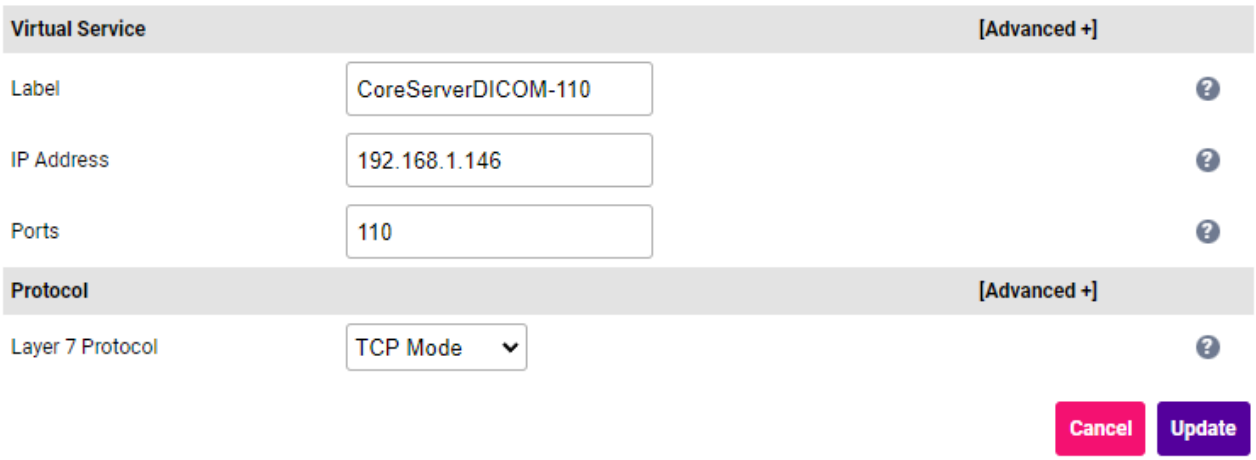


3. Define the *Label* for the Real Server as required, e.g. **CSD-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **104**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these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

9.3. VIP 3 - CoreServerDICOM-110

9.3.1. 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:

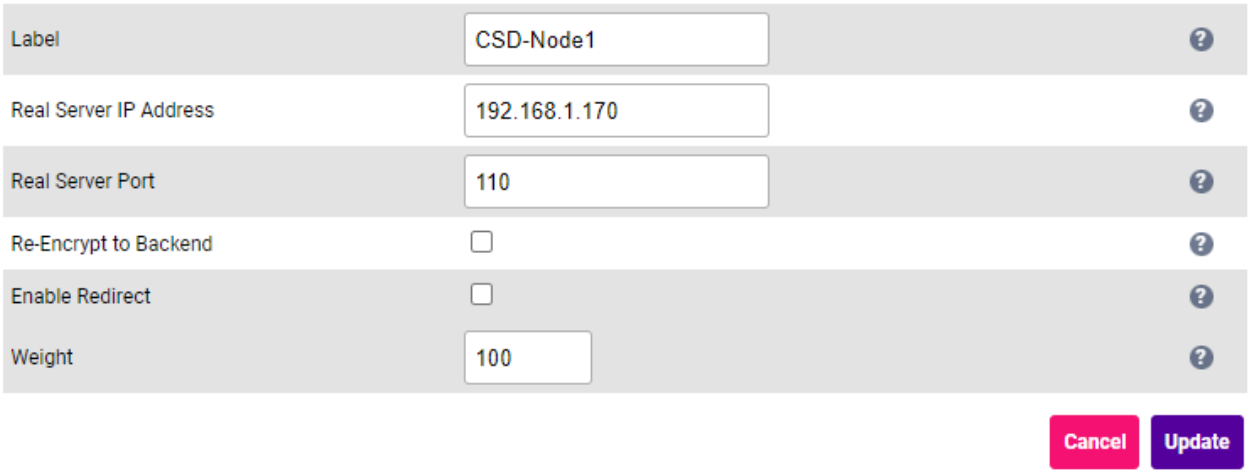


3. Define the *Label* for the virtual service as required, e.g. **CoreServerDICOM-110**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **110**.

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**.

9.3.2. 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:

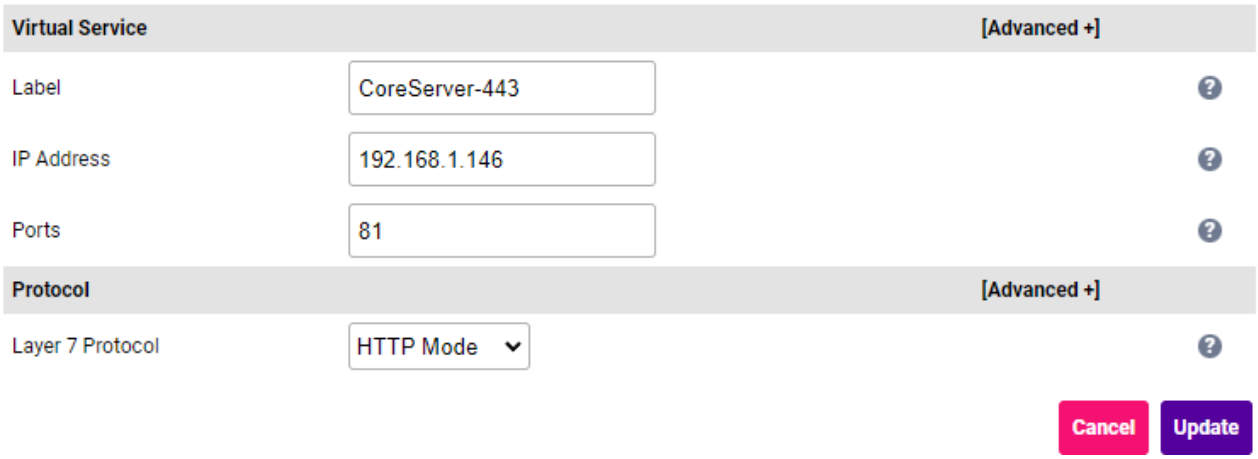


3. Define the *Label* for the Real Server as required, e.g. **CSD-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **110**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these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

9.4. VIP 4 - CoreServer-443

9.4.1. Virtual Service (VIP) Configuration

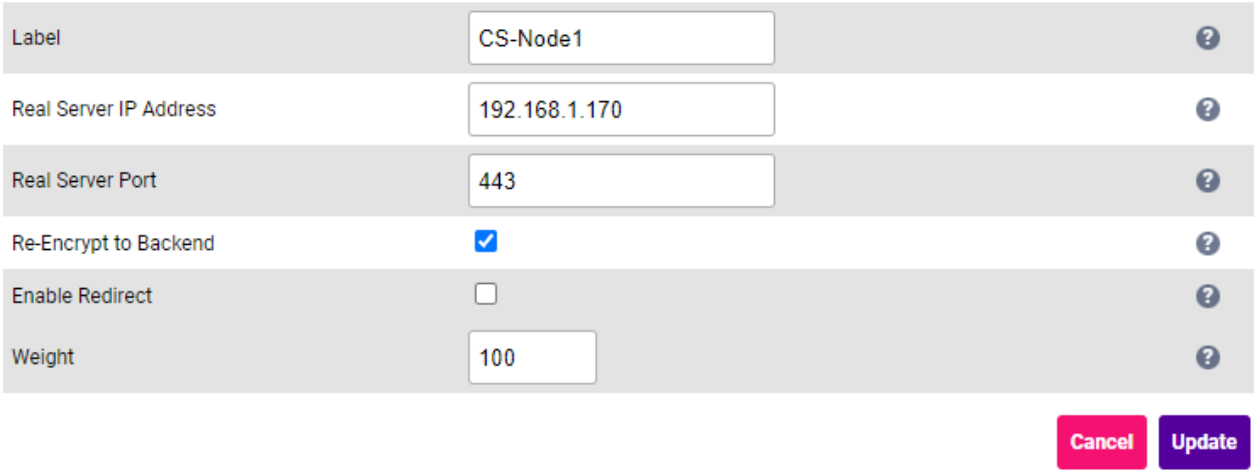
1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:



3. Define the *Label* for the virtual service as required, e.g. **CoreServer-443**.
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 **81**.
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 HTTPS (GET)**.
    - Set the *Request to send* to **/status**.
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**.

9.4.2. 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:

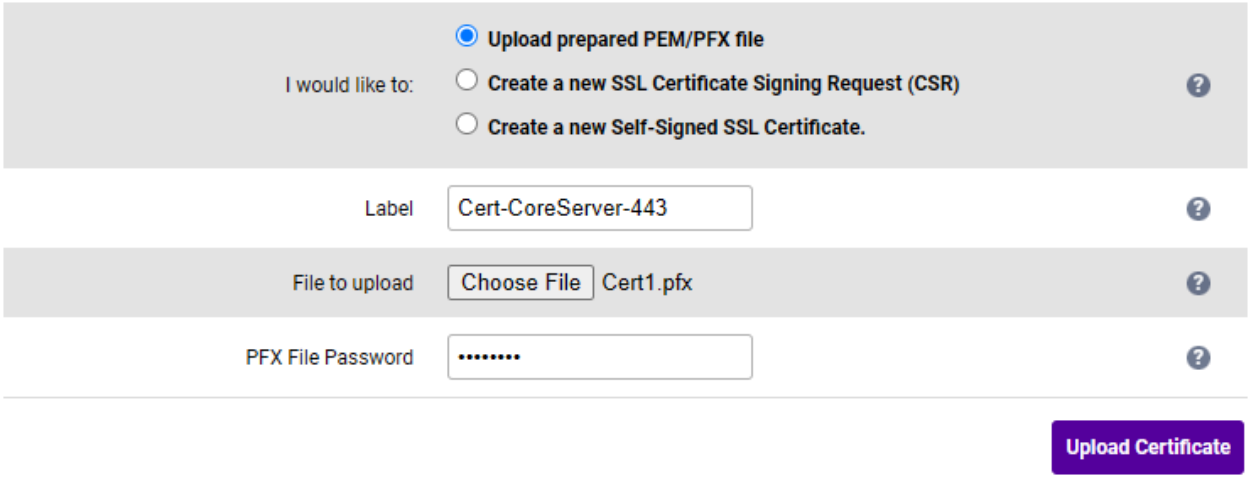


3. Define the *Label* for the Real Server as required, e.g. **CS-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **443**.
6. Ensure that *Re-Encrypt to Backend* is enabled (checked).
7. Leave all other settings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

9.4.3. Upload the SSL Certificate

Certificates in either PEM or PFX format can be uploaded.

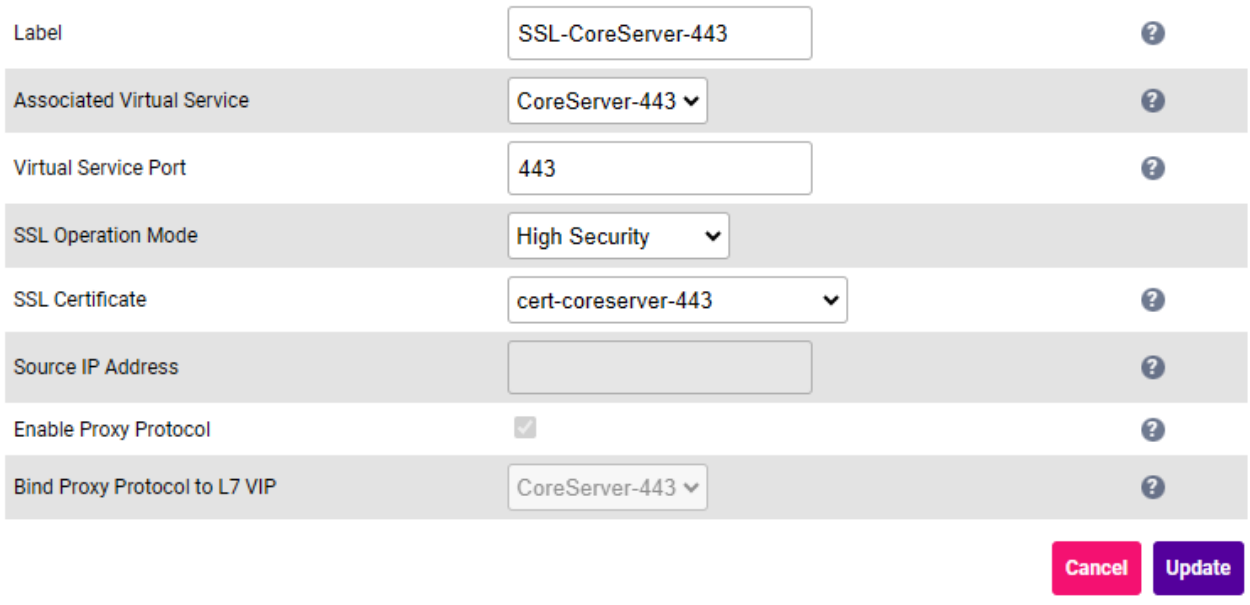
1. Using the WebUI, navigate to *Cluster Configuration > SSL Certificate* and click **Add a new SSL Certificate**.
2. Select the option **Upload prepared PEM/PFX file**.
3. Enter the following details:



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**.

9.4.4. 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:



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

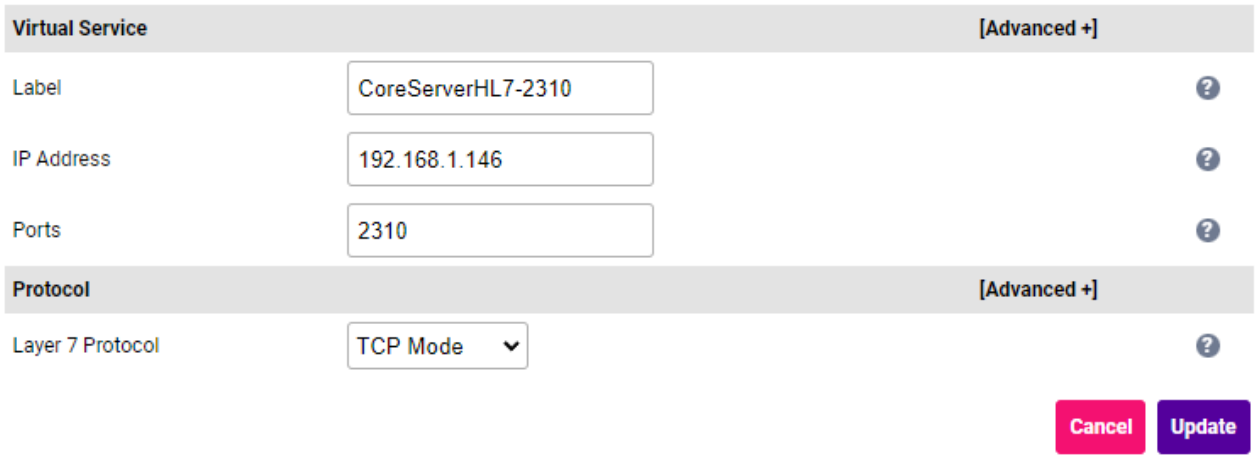
> **Note** Once the VIP is selected, the *Label* field will be auto-populated with **SSL-CoreServer-443**. This can be changed if preferred.

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

9.5.1. 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:

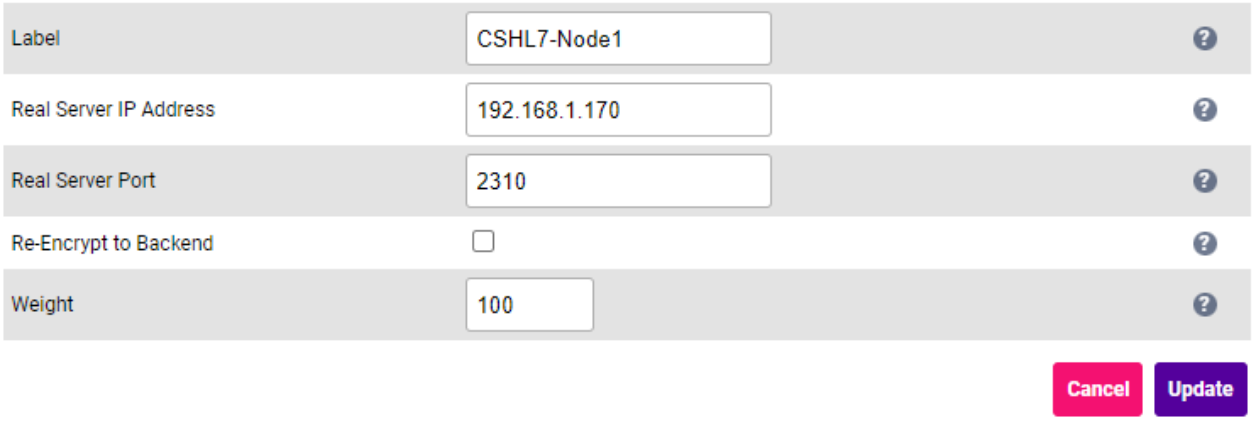


3. Define the *Label* for the virtual service as required, e.g. **CoreServerHL7-2310**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **2310**.
6. Set the *Layer 7 Protocol* to **TCP Mode**.
7. Click **Update** to create 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**.

9.5.2. 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:

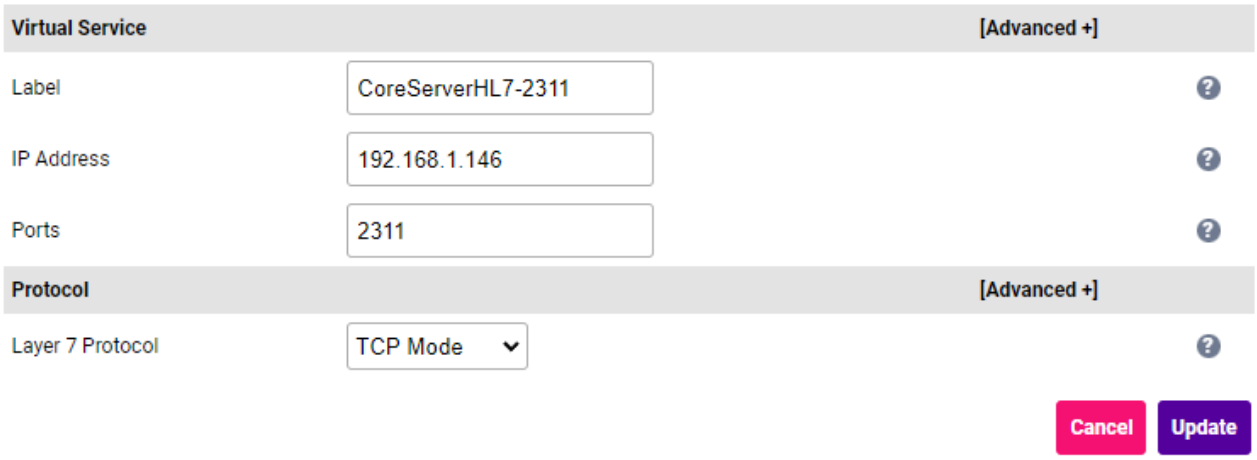


3. Define the *Label* for the Real Server as required, e.g. **CSHL7-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **2310**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat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

9.6. VIP 6 - CoreServerHL7-2311

9.6.1. 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:

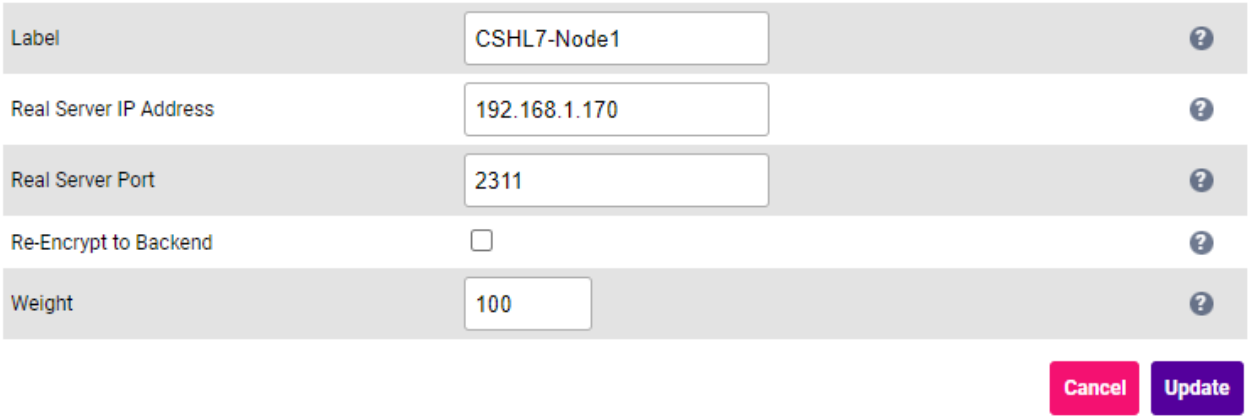


3. Define the *Label* for the virtual service as required, e.g. **CoreServerHL7-2311**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **2311**.

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**.

9.6.2. 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:

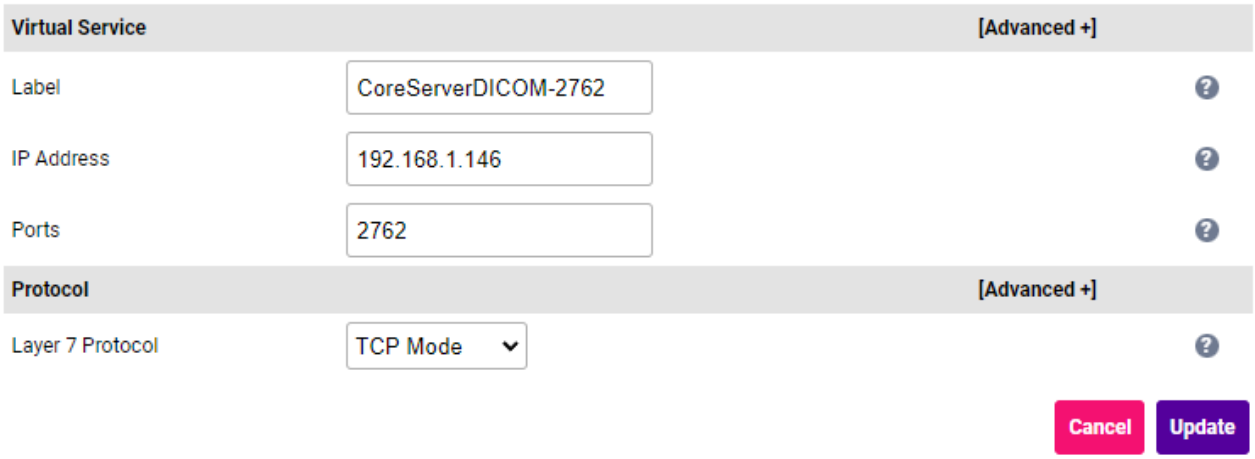


3. Define the *Label* for the Real Server as required, e.g. **CSHL7-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **2311**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat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

9.7. VIP 7 - CoreServerDICOM-2762

9.7.1. Virtual Service (VIP) Configuration

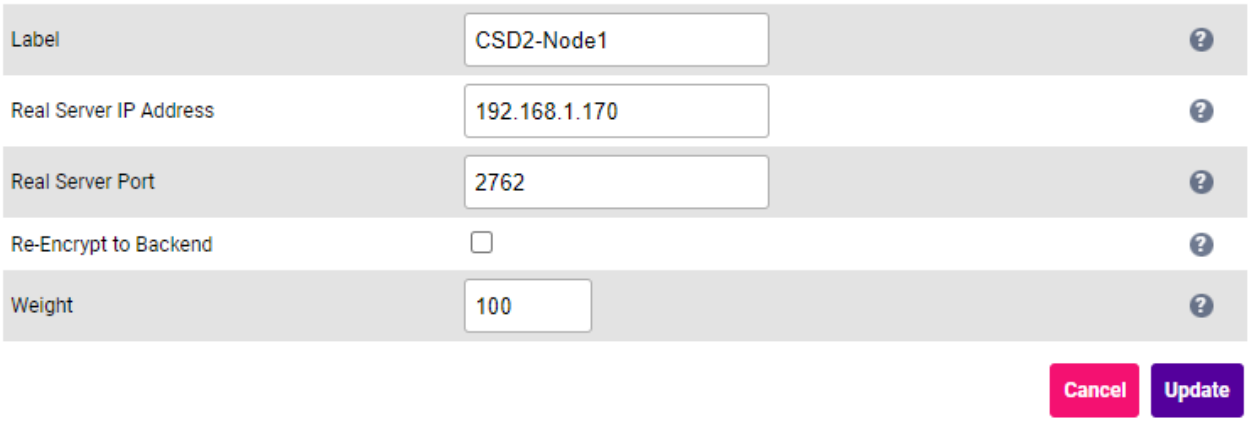
1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:



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**.

9.7.2. 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:

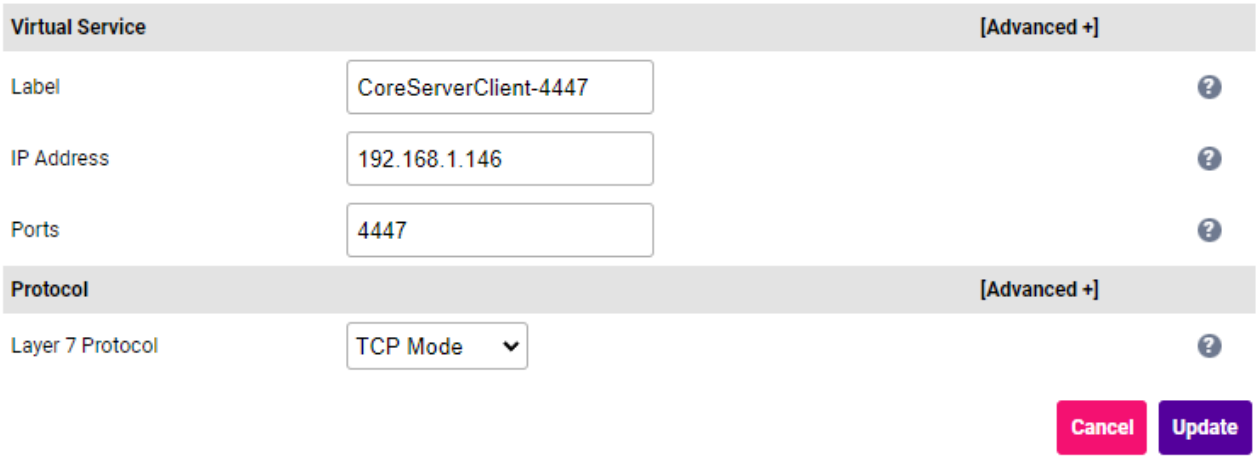


3. Define the *Label* for the Real Server as required, e.g. **CSD2-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **2762**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat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

9.8. VIP 8 - CoreServerClient-4447

9.8.1. 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:

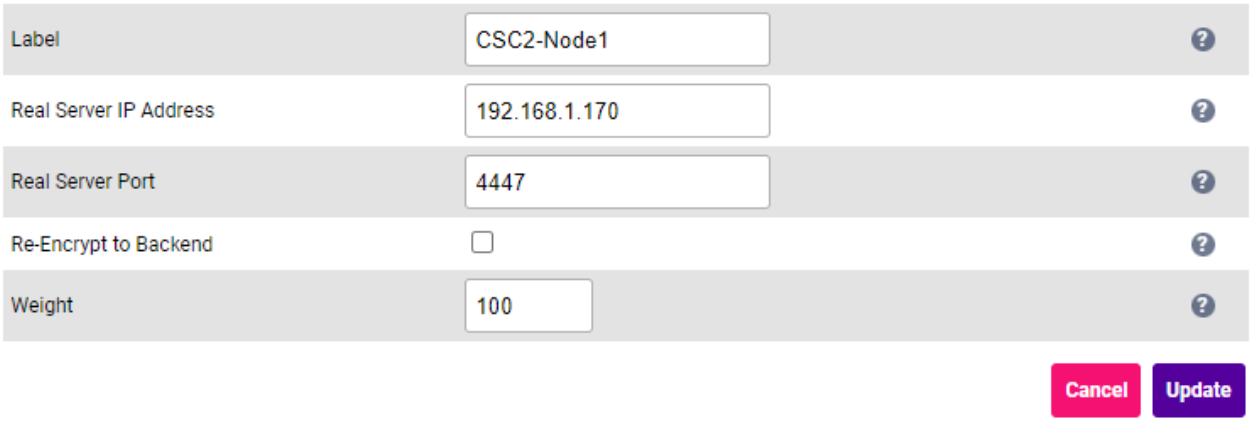


3. Define the *Label* for the virtual service as required, e.g. **CoreServerClient-4447**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **4447**.
6. Set the *Layer 7 Protocol* to **TCP Mode**.

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**.

9.8.2. 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:

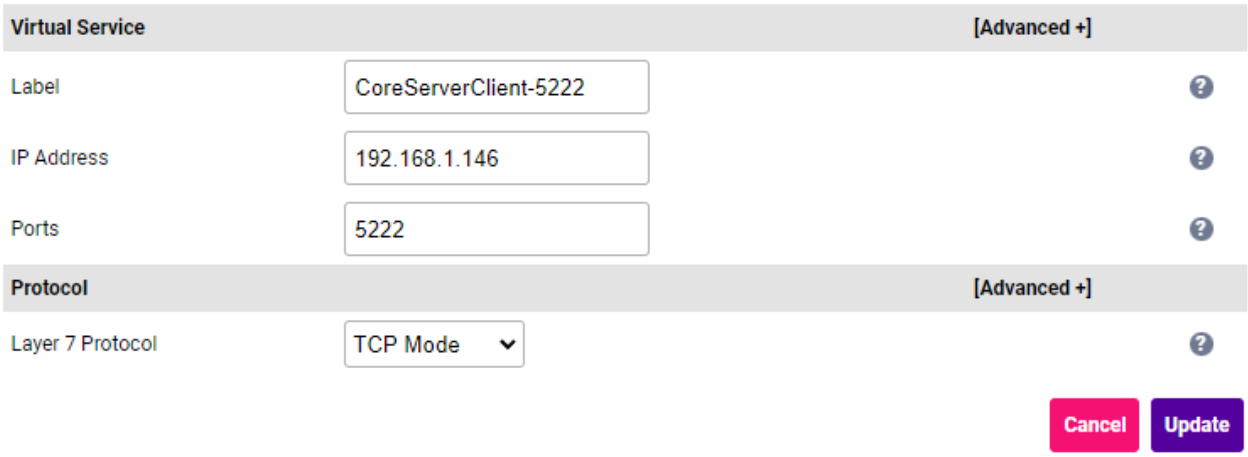


3. Define the *Label* for the Real Server as required, e.g. **CSC2-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **4447**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat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

9.9. VIP 9 - CoreServerClient-5222

9.9.1. Virtual Service (VIP) Configuration

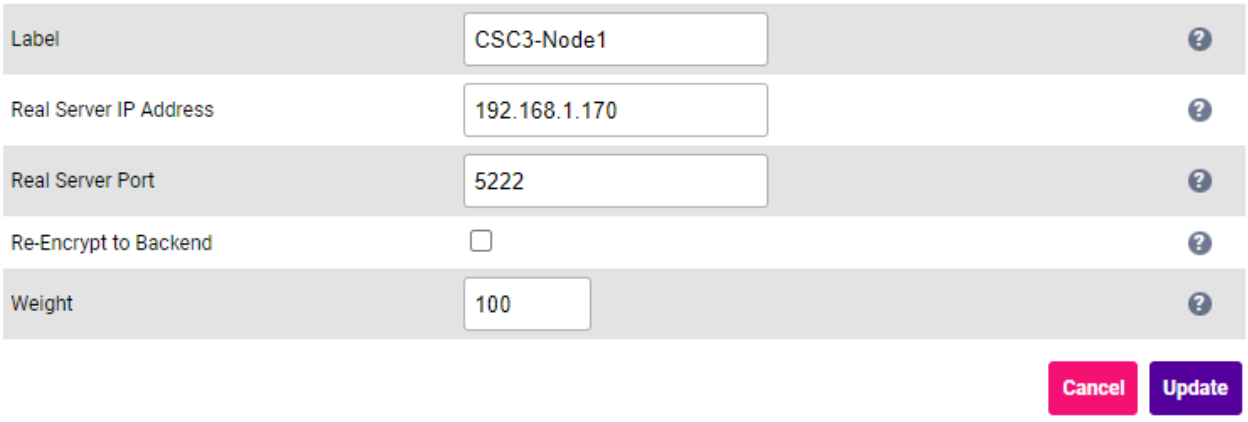
1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:



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**.

9.9.2. 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:

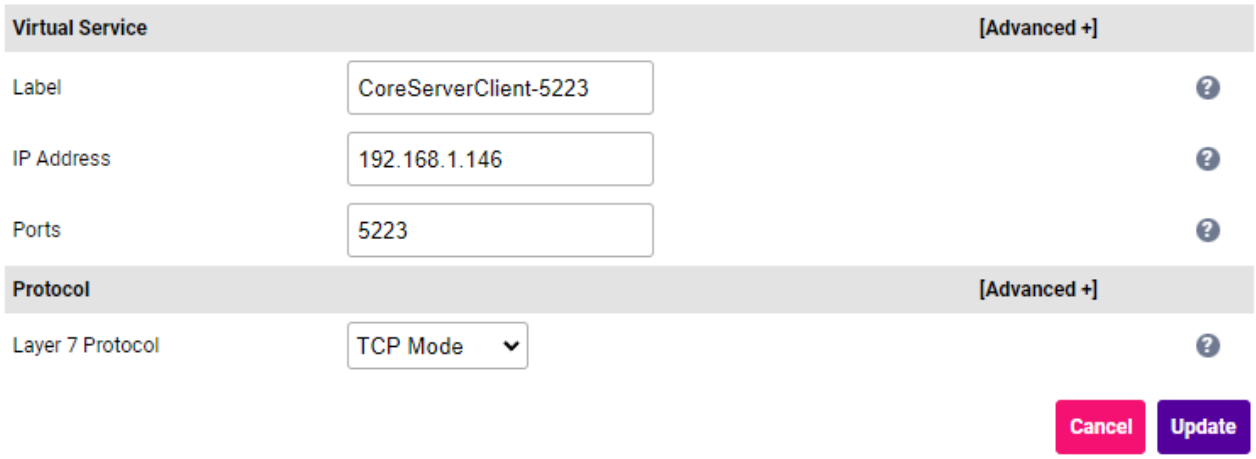


3. Define the *Label* for the Real Server as required, e.g. **CSC3-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **5222**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat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

9.10. VIP 10 - CoreServerClient-5223

9.10.1. Virtual Service (VIP) Configuration

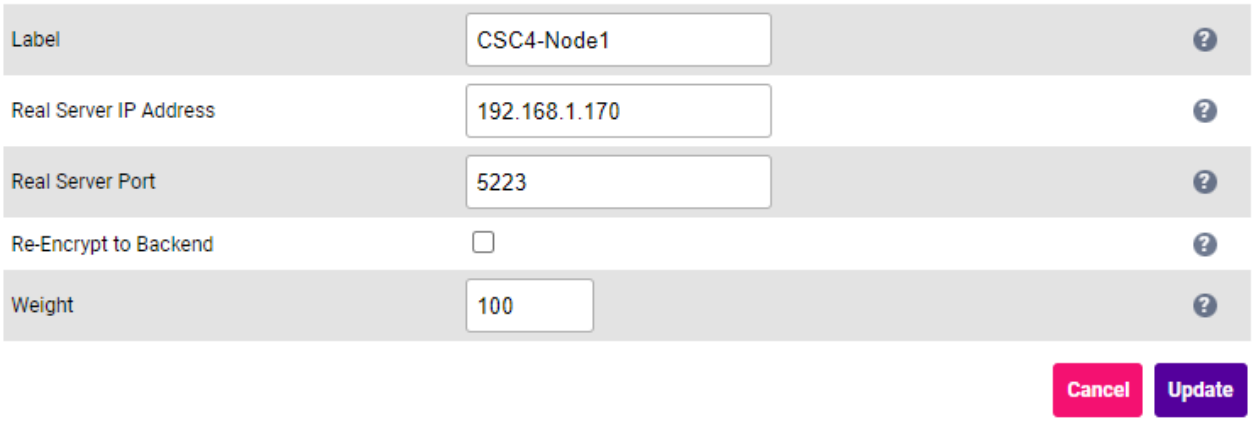
1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:



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**.

9.10.2. 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:

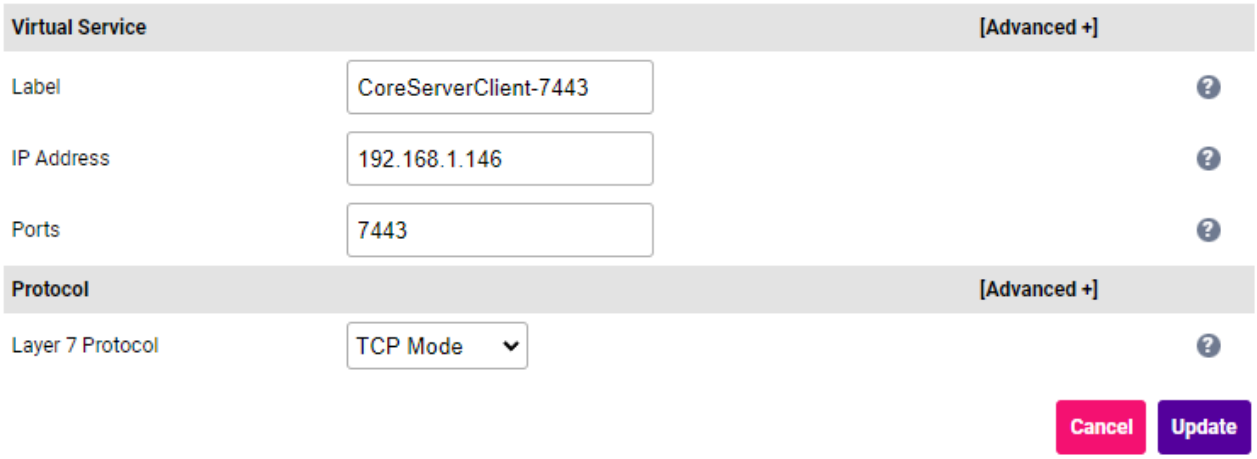


3. Define the *Label* for the Real Server as required, e.g. **CSC4-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **5223**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat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

9.11. VIP 11 - CoreServerClient-7443

9.11.1. 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:

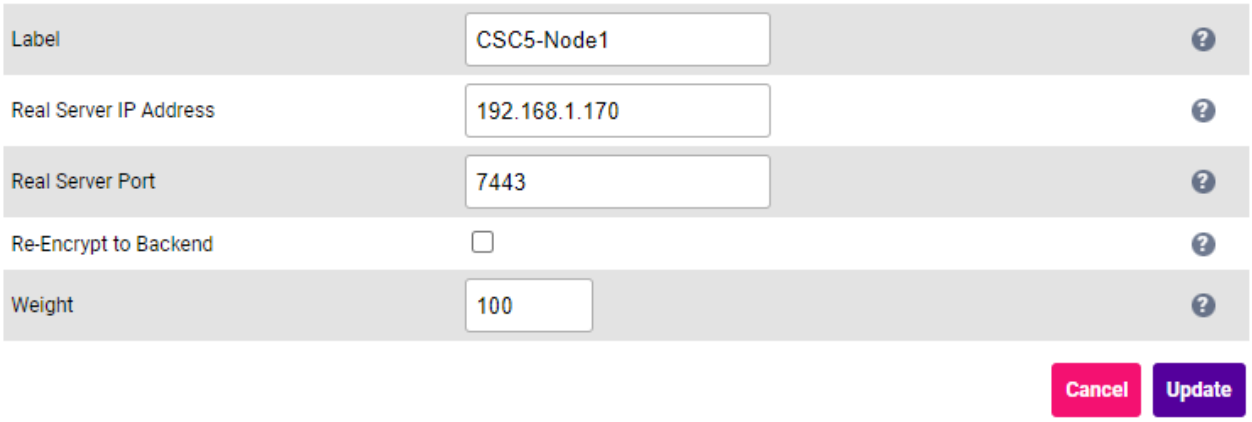


3. Define the *Label* for the virtual service as required, e.g. **CoreServerClient-7443**.

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**.

9.11.2. 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:



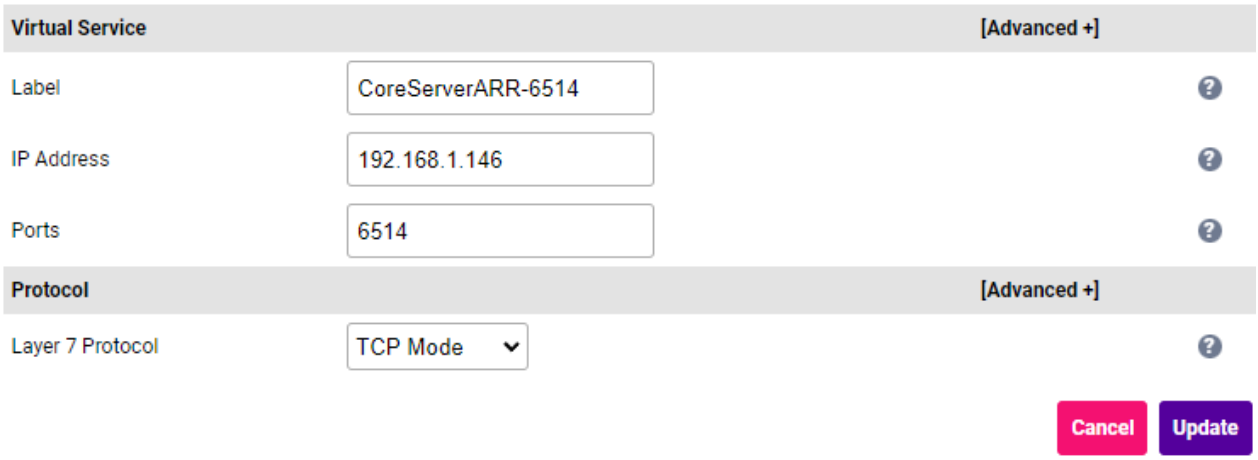
3. Define the *Label* for the Real Server as required, e.g. **CSC5-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **7443**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat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

9.12. VIP 12 - CoreServerARR-6514

9.12.1. Virtual Service (VIP) Configuration

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

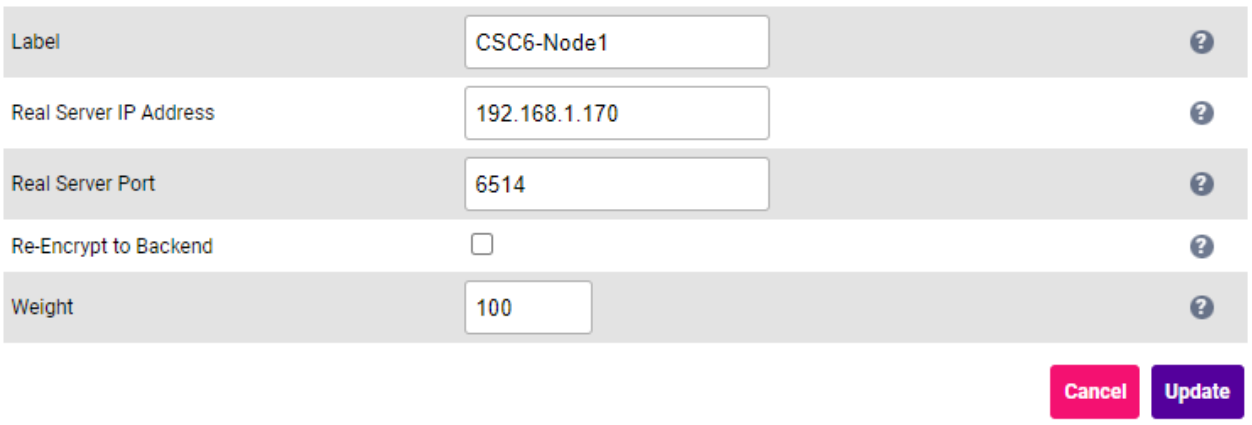
2. Enter the following details:



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**.

9.12.2. 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:

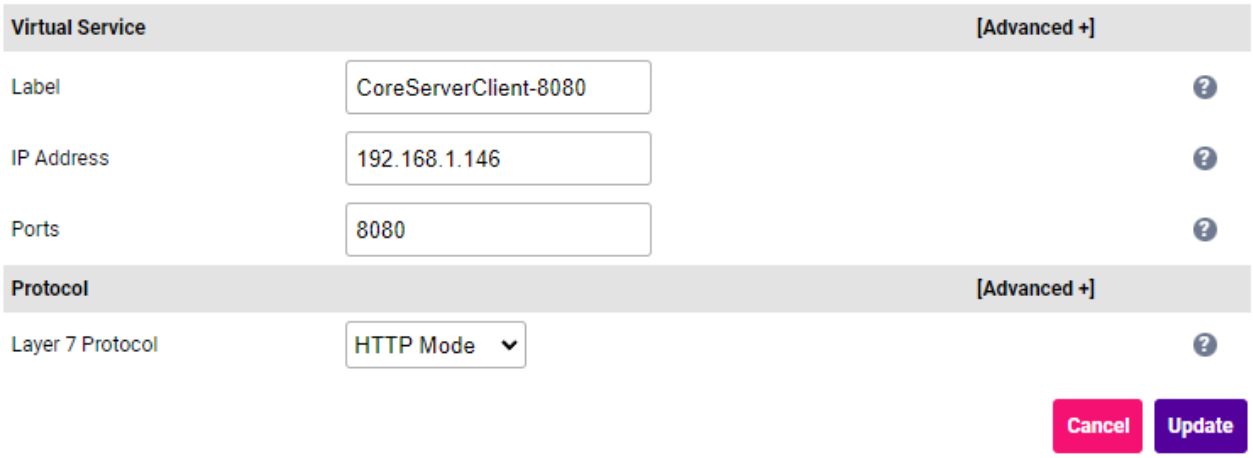


3. Define the *Label* for the Real Server as required, e.g. **CSC6-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **6514**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat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

9.13. VIP 13 - CoreServerClient-8080

9.13.1. 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:



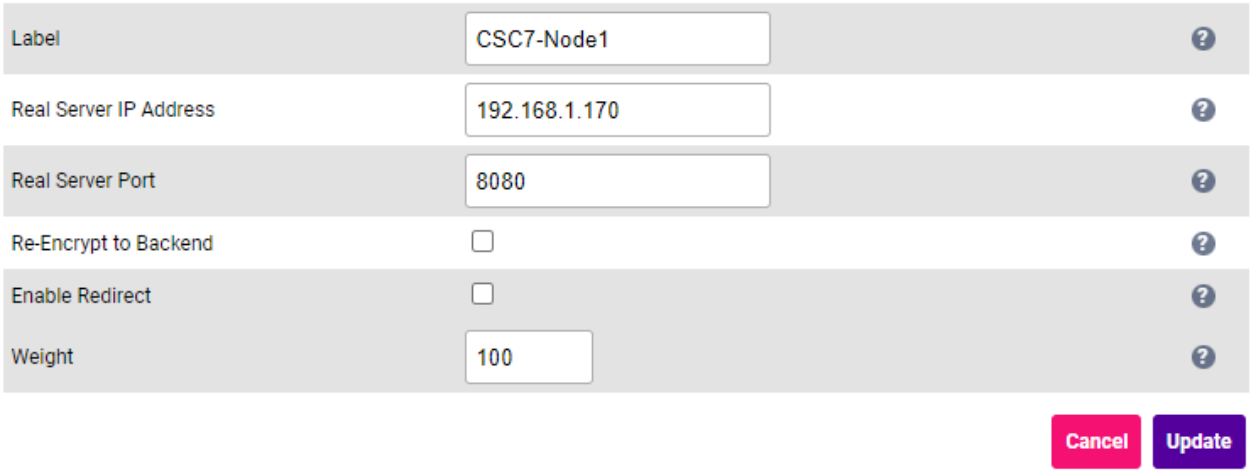
3. Define the *Label* for the virtual service as required, e.g. **CoreServerClient-8080**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **8080**.
6. Set the *Layer 7 Protocol* to **HTTP Mode**.
7. Click **Update** to create 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**.

9.13.2. 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:

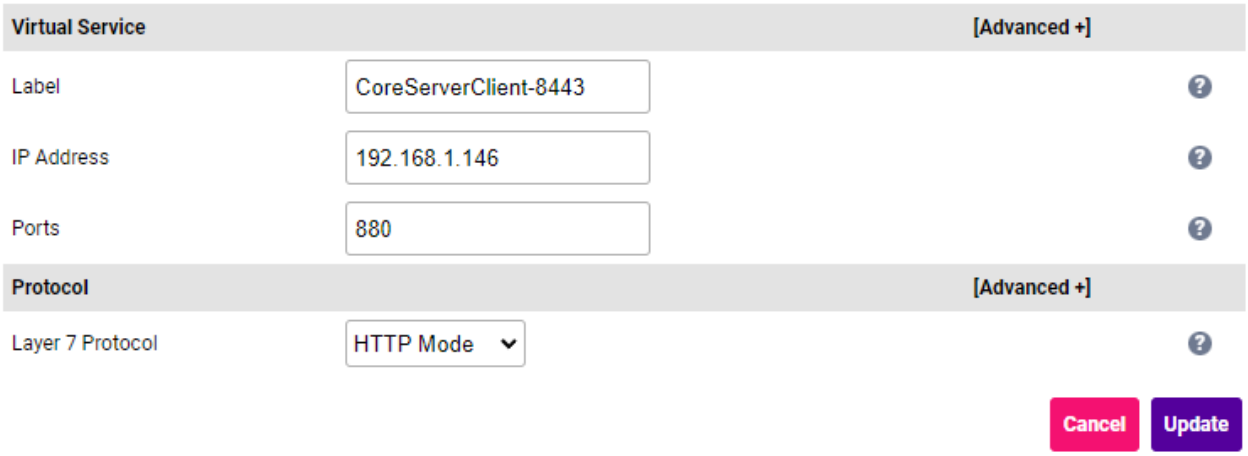


3. Define the *Label* for the Real Server as required, e.g. **CSC7-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **8080**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat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

9.14. VIP 14 - CoreServerClient-8443

9.14.1. Virtual Service (VIP) Configuration

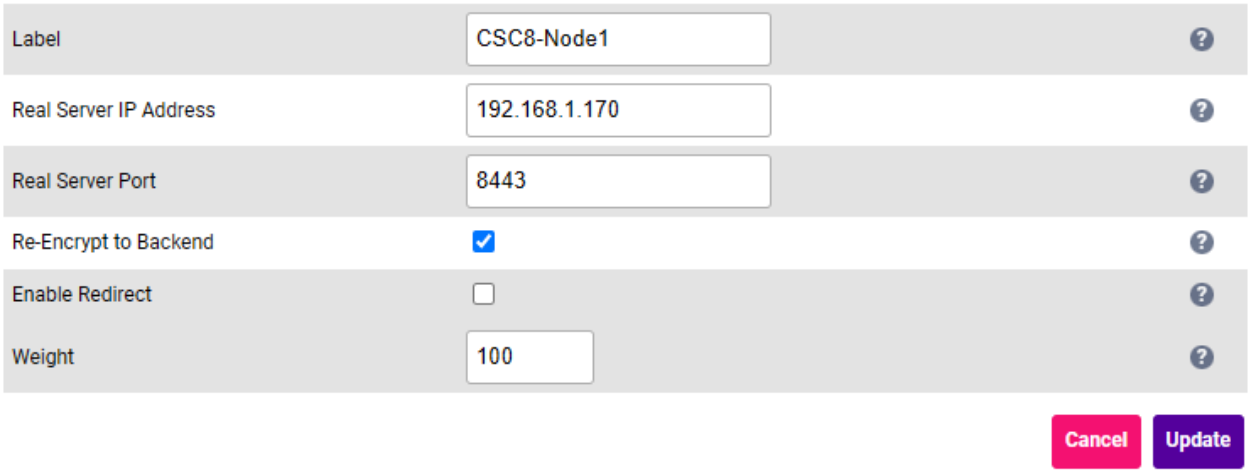
1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:



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**.

9.14.2. 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:

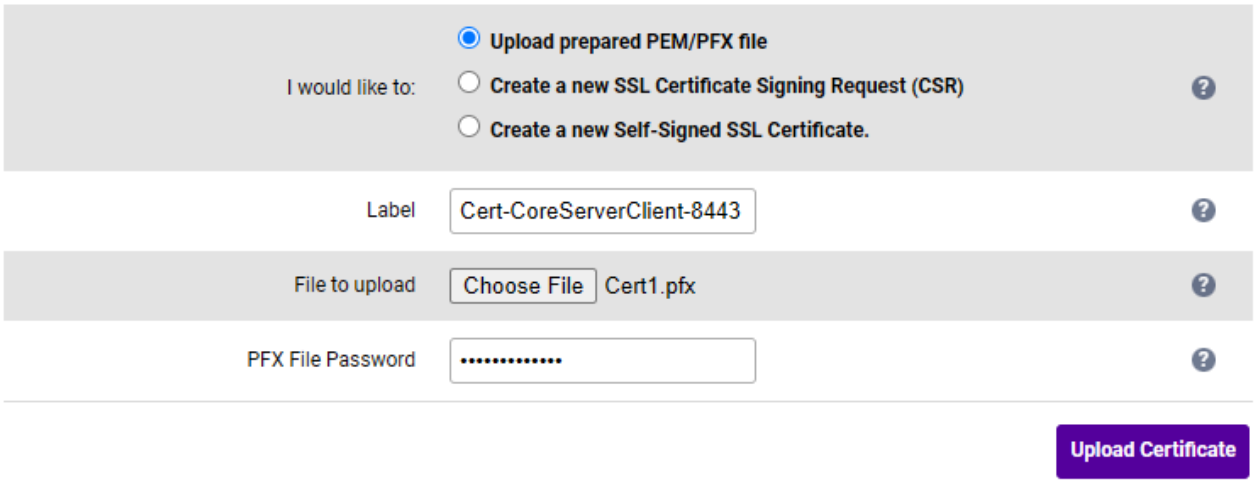


3. Define the *Label* for the Real Server as required, e.g. **CSC8-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **8443**.
6. Ensure that *Re-Encrypt to Backend* is enabled (checked).
7. Leave all other settings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

9.14.3. 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:

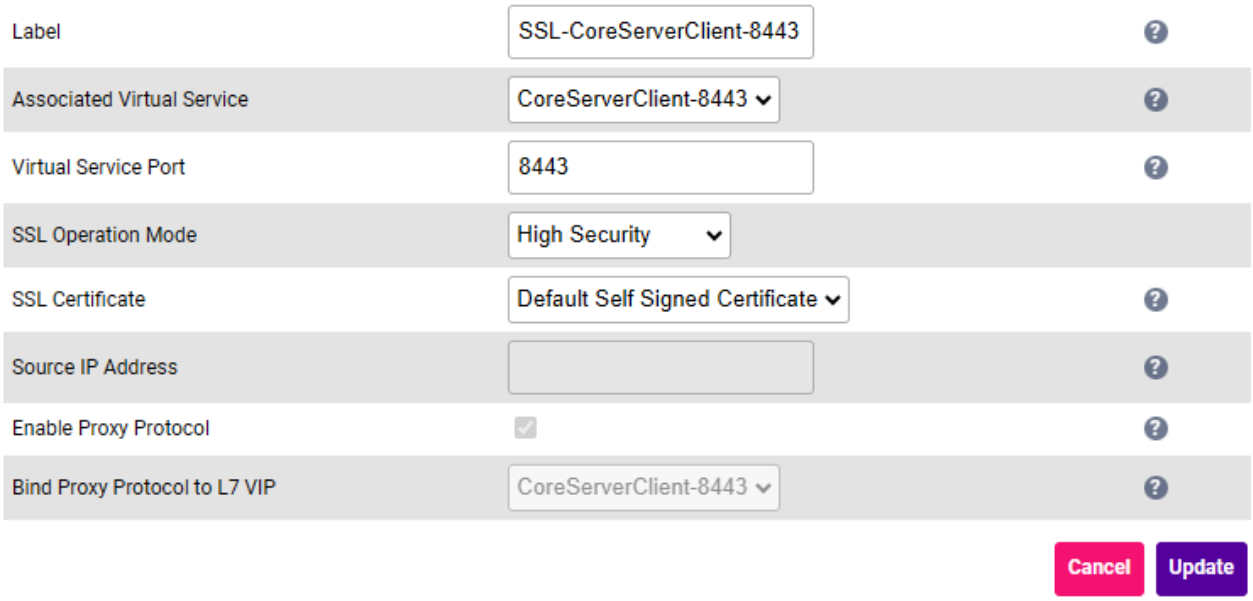


4. Specify an appropriate *Label*, e.g. **Cert-CoreServerClient-8443**.

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**.

9.14.4. 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:



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.

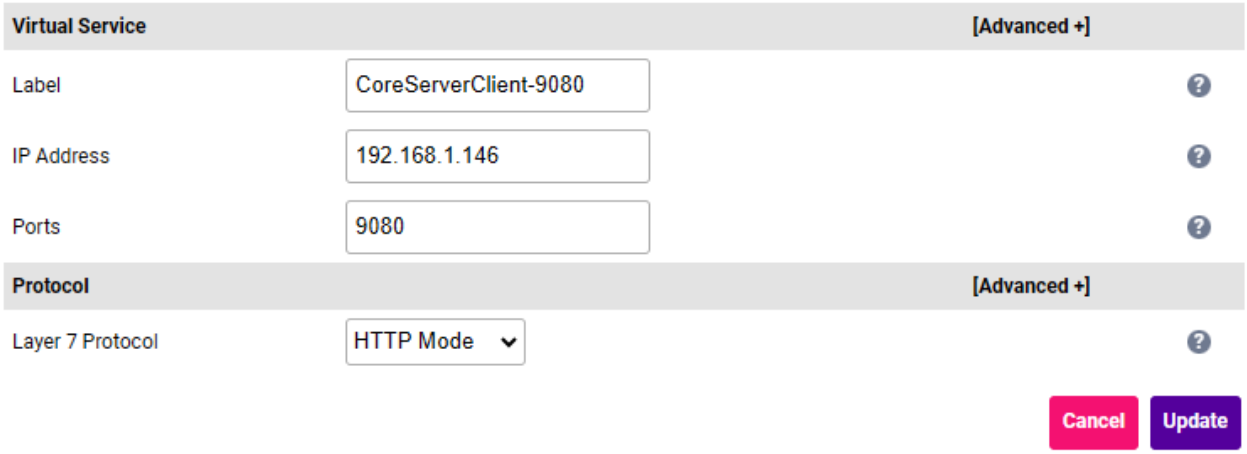
4. Set the *Virtual Service Port* to **8443**.
5. Leave *SSL Operation Mode* set to **High Security**.
6. Select the *SSL Certificate* uploaded previously.
7. Leave all other settings at their default value.
8. Click **Update**.

9.15. VIP 15 - CoreServerClient-9080

9.15.1. Virtual Service (VIP) Configuration

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

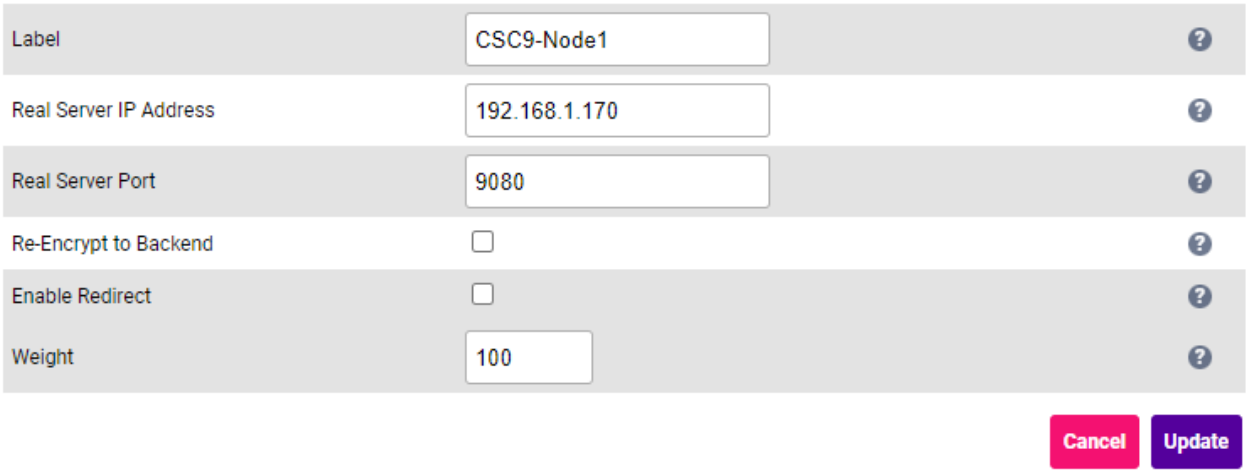
2. Enter the following details:



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**.

9.15.2. 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:

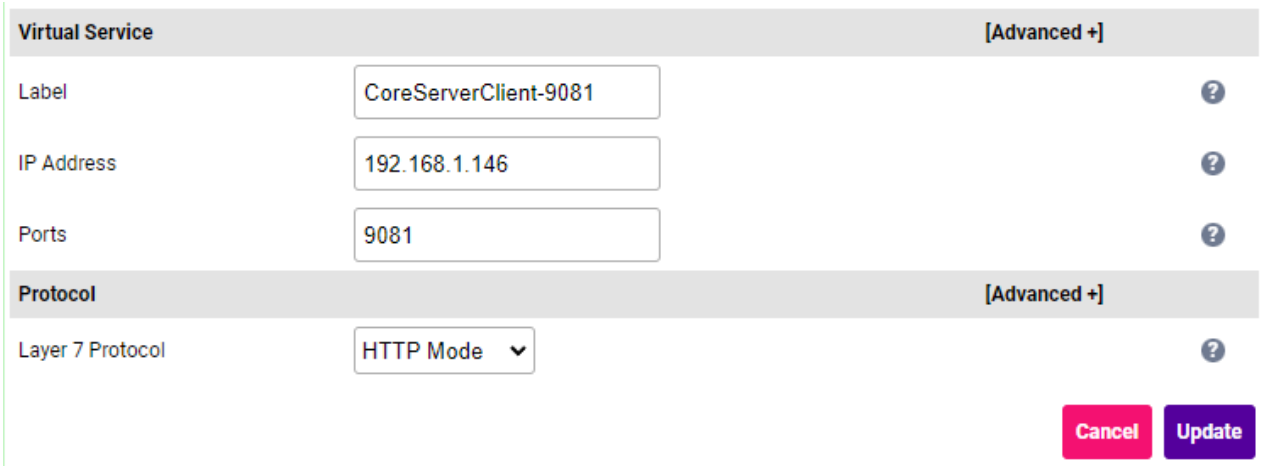


3. Define the *Label* for the Real Server as required, e.g. **CS-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **9080**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat these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

9.16. VIP 16 - CoreServerClient-9081

9.16.1. 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:

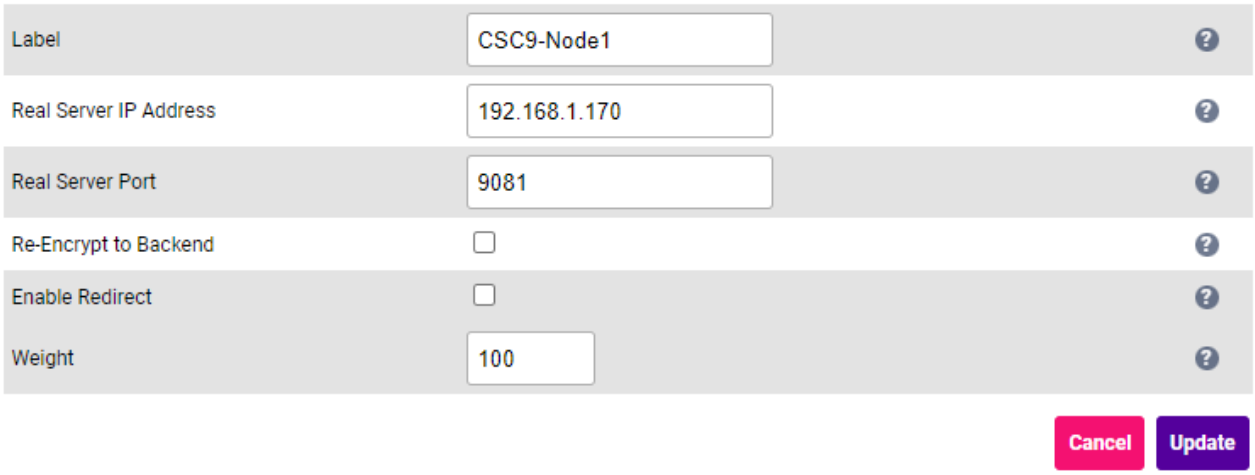


3. Define the *Label* for the virtual service as required, e.g. **CoreServerClient-9081**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **9081**.

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**.

9.16.2. 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:

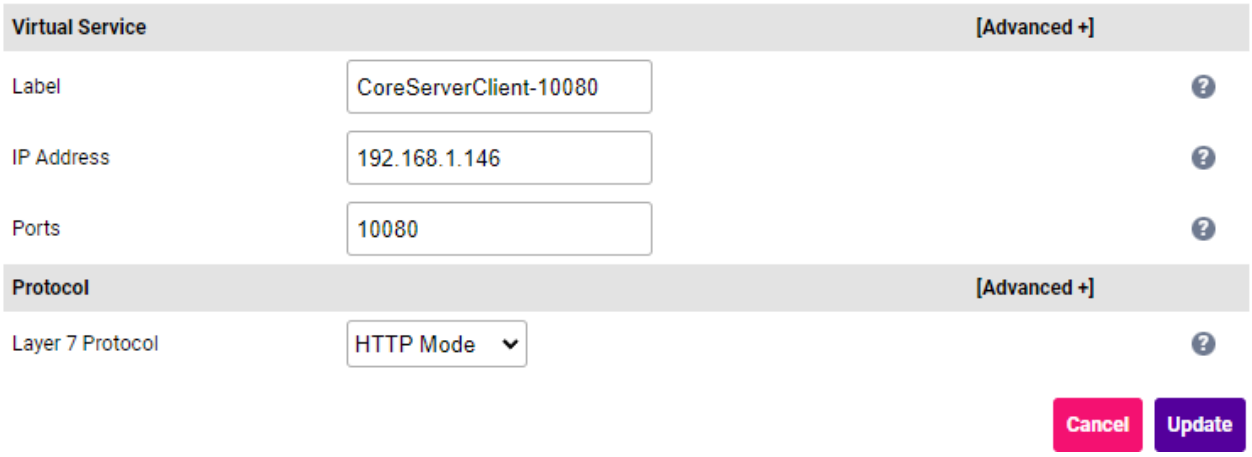


3. Define the *Label* for the Real Server as required, e.g. **CSC9-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **9081**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat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

9.17. VIP 17 - CoreServerClient-10080

9.17.1. Virtual Service (VIP) Configuration

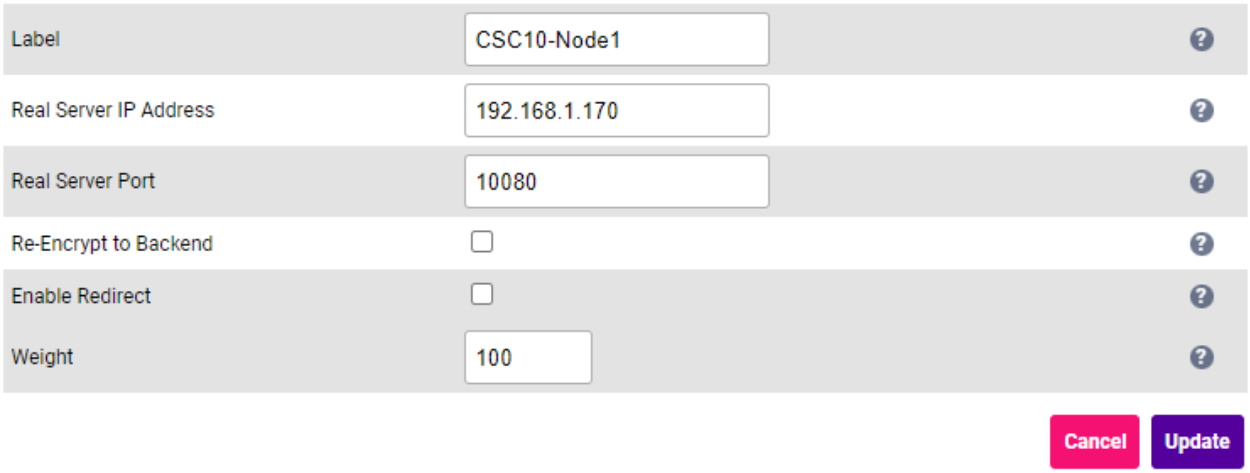
1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:



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**.

9.17.2. 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:

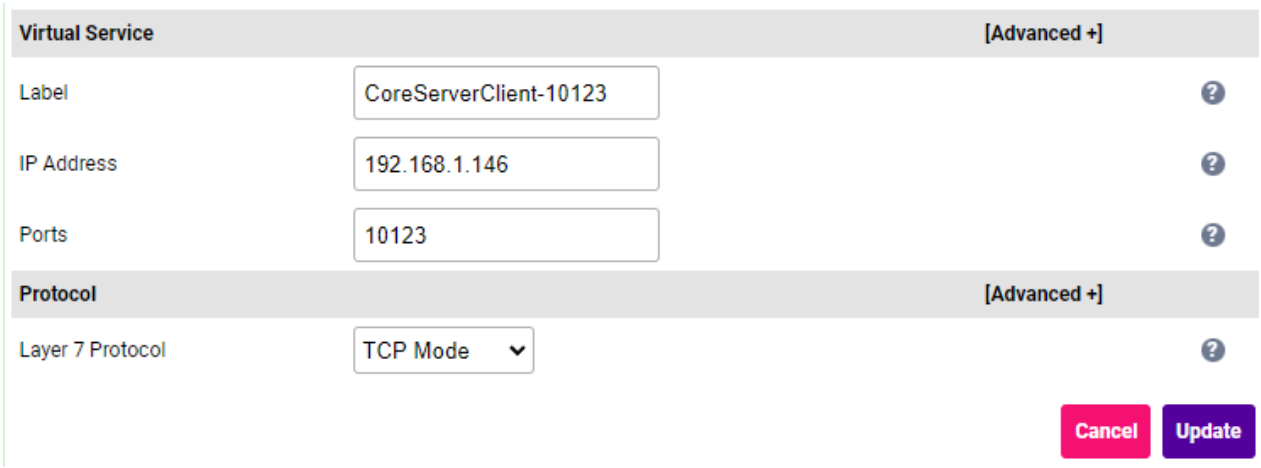


3. Define the *Label* for the Real Server as required, e.g. **CSC10-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **10080**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat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

9.18. VIP 18 - CoreServerClient-10123

9.18.1. 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:

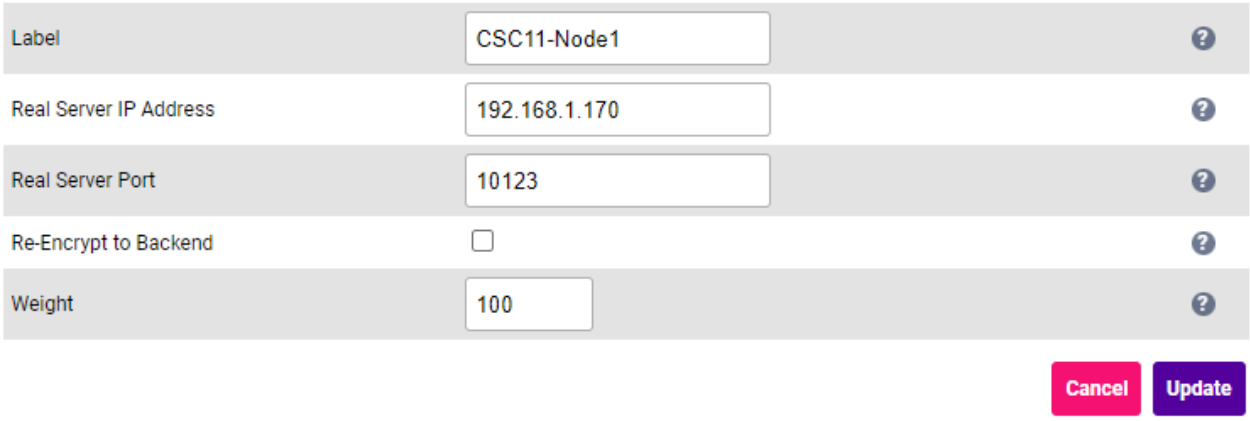


3. Define the *Label* for the virtual service as required, e.g. **CoreServerClient-10123**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.146**.
5. Set the *Ports* field to **10123**.

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**.

9.18.2. 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:

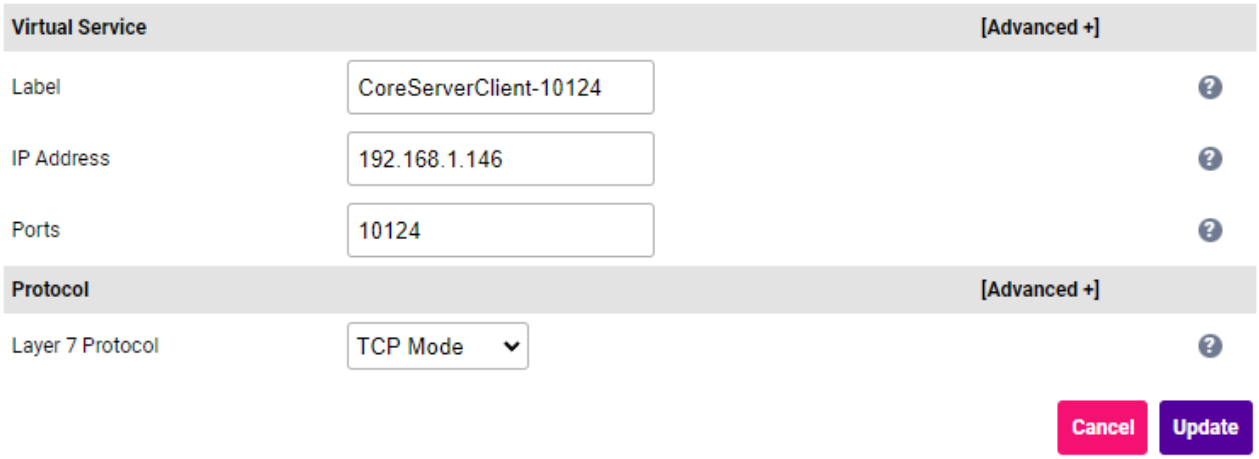


3. Define the *Label* for the Real Server as required, e.g. **CSC11-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **10123**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat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

9.19. VIP 19 - CoreServerClient-10124

9.19.1. Virtual Service (VIP) Configuration

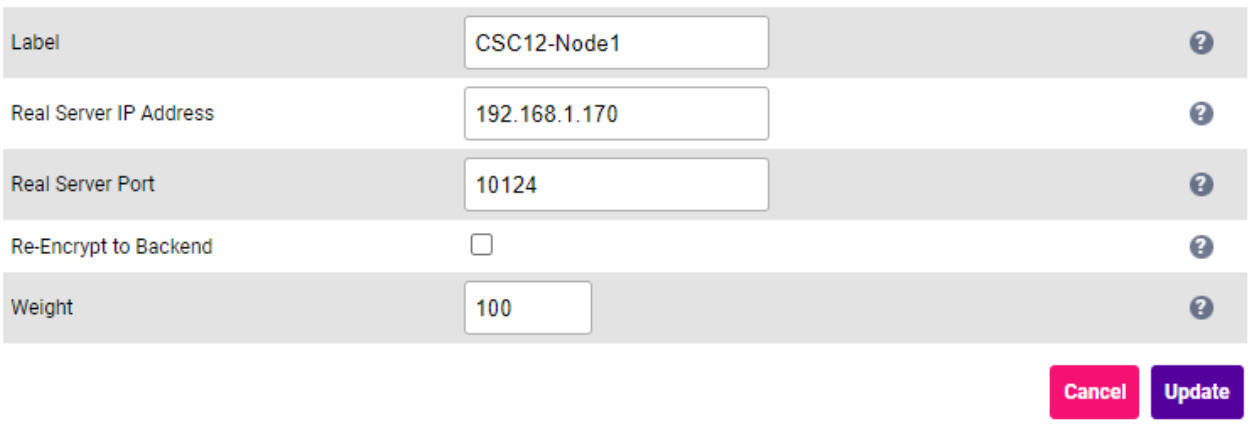
1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:



3. Define the *Label* for the virtual service as required, e.g. **CoreServerClient-10124**.
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 **10124**.
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**.

9.19.2. 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:

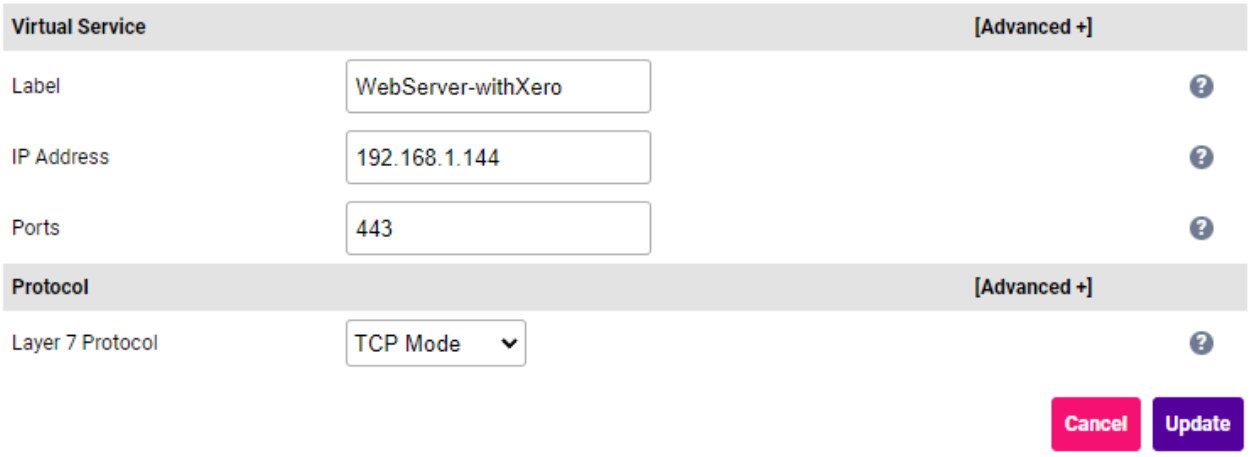


3. Define the *Label* for the Real Server as required, e.g. **CSC12-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.170**.
5. Set the *Real Server Port* field to **10124**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat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

9.20. VIP 20 - WebServer-withXero

9.20.1. 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:

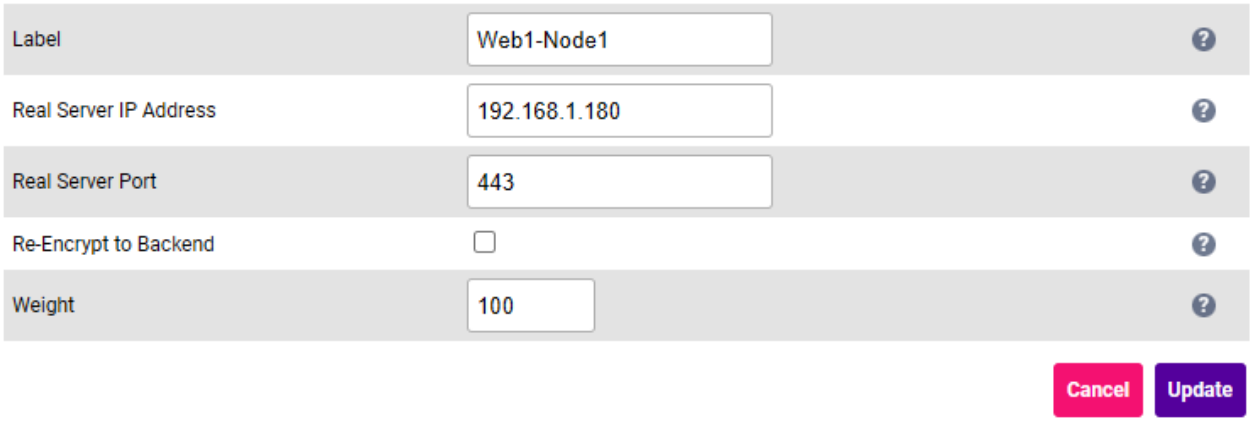


3. Define the *Label* for the virtual service as required, e.g. **WebServer-withXero**.
4. Set the *Virtual Service IP Address* field to the required IP address, e.g. **192.168.1.144**.
5. Set the *Ports* field to **443**.
6. Set the *Layer 7 Protocol* to **TCP Mode**.
7. Click **Update** to create the 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**.

9.20.2. 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:

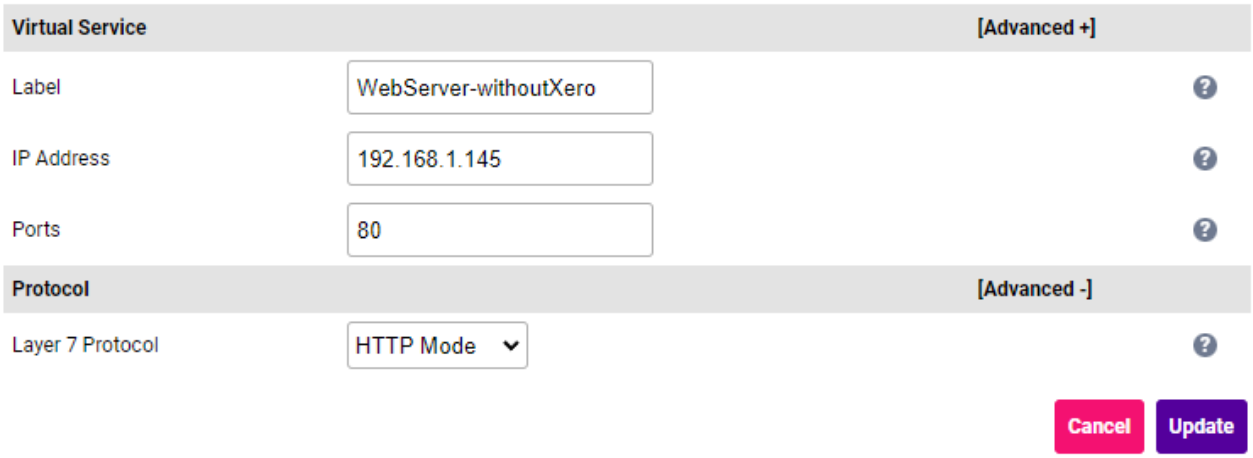


3. Define the *Label* for the Real Server as required, e.g. **Web1-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.180**.
5. Set the *Real Server Port* field to **443**.
6. Leave all other settings at their default value.
7. Click **Update**.
8. Repeat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

9.21. VIP 21 - WebServer-withoutXero

9.21.1. Virtual Service (VIP) Configuration

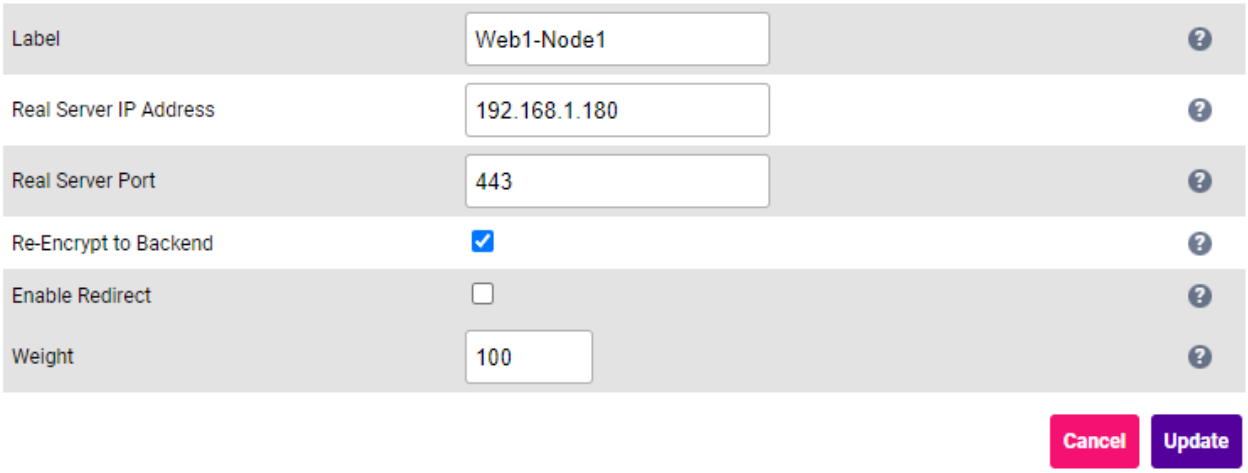
1. Using the WebUI, navigate to *Cluster Configuration > Layer 7 – Virtual Services* and click on **Add a new Virtual Service**.
2. Enter the following details:



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**.

9.21.2. 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:

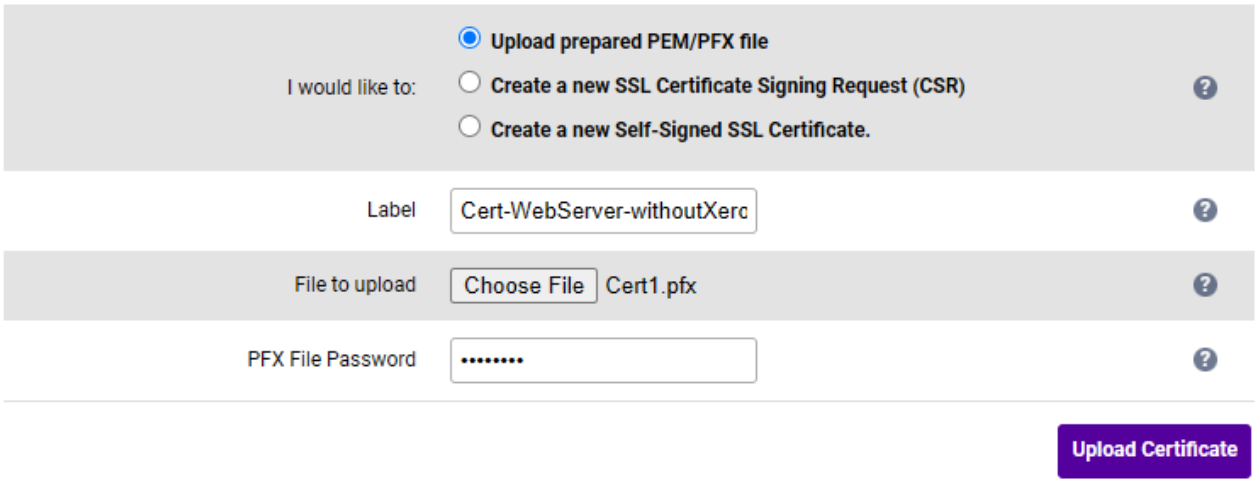


3. Define the *Label* for the Real Server as required, e.g. **Web1-Node1**.
4. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.1.180**.
5. Set the *Real Server Port* field to **443**.
6. Ensure that *Re-Encrypt to Backend* is enabled (checked).
7. Leave all other settings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

9.21.3. 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:

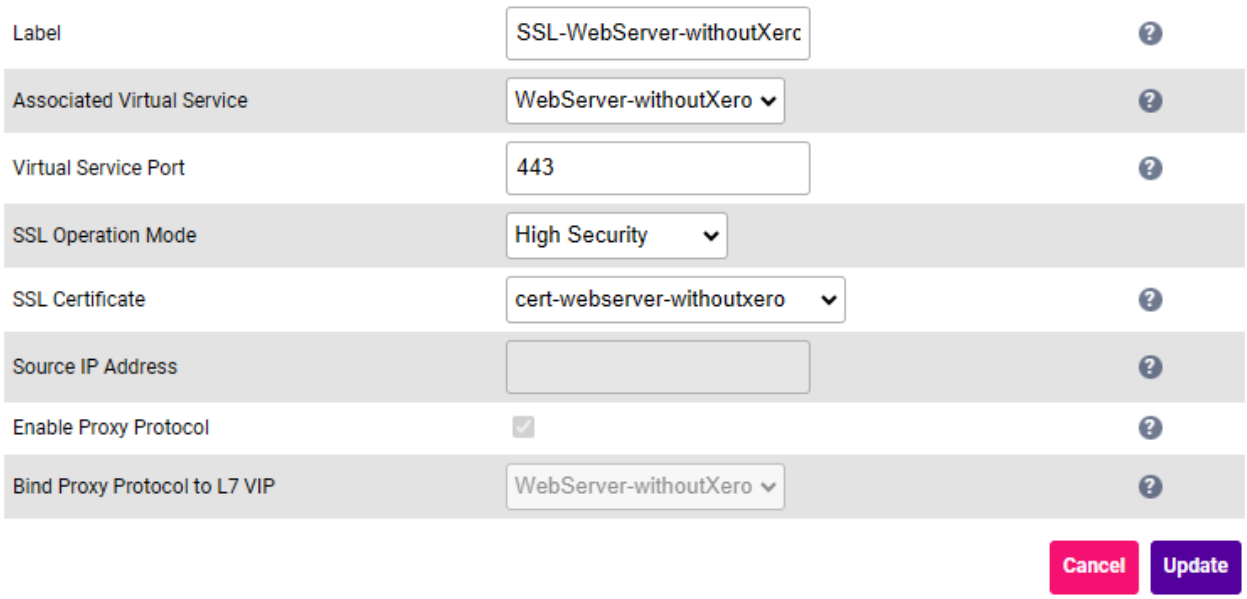


4. Specify an appropriate *Label*, e.g. **Cert-WebServer-withoutXero**.

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**.

9.21.4. 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:



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.

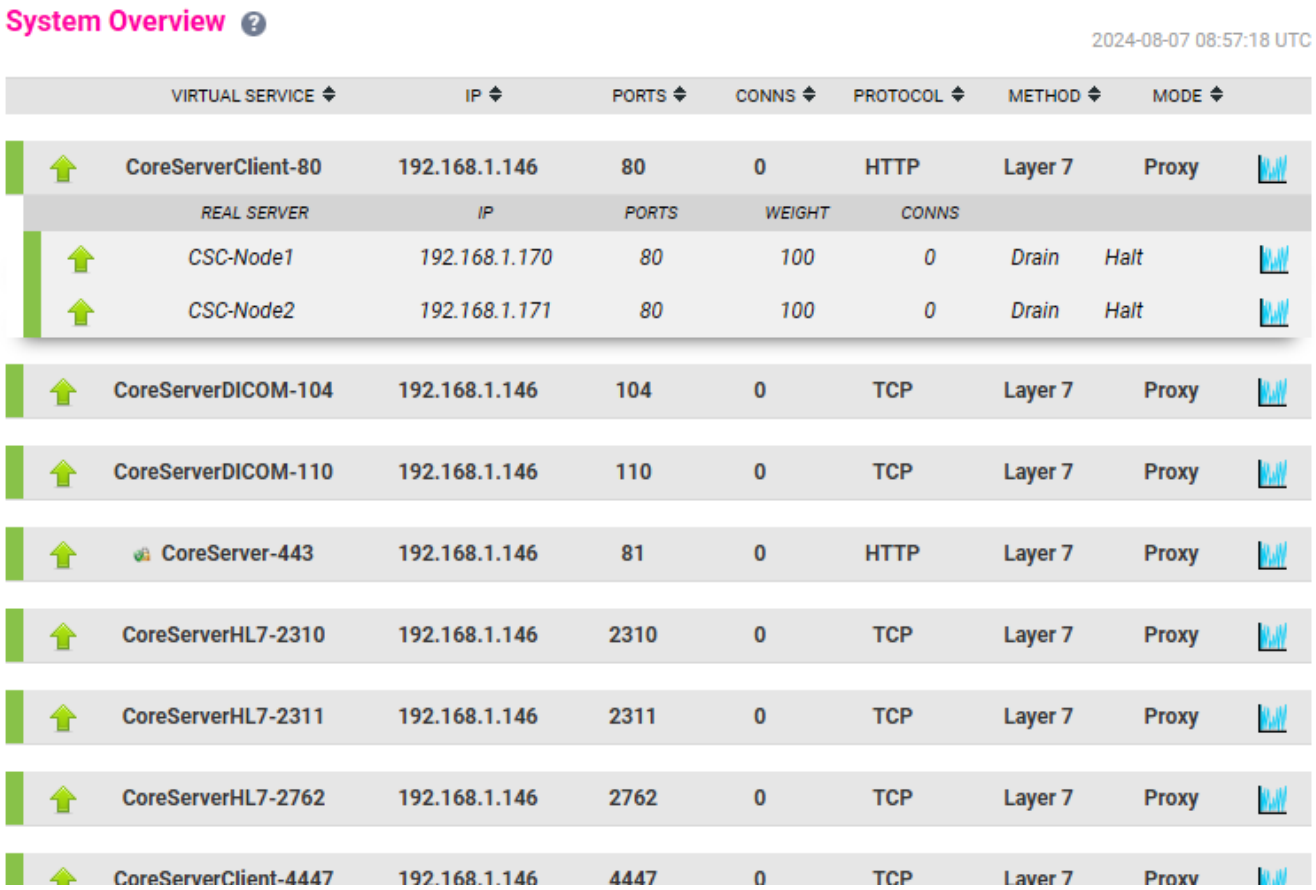
10.1. Accessing AGFA HealthCare Enterprise Imaging via the Load Balancer

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:



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.

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.

13.1.1. 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:

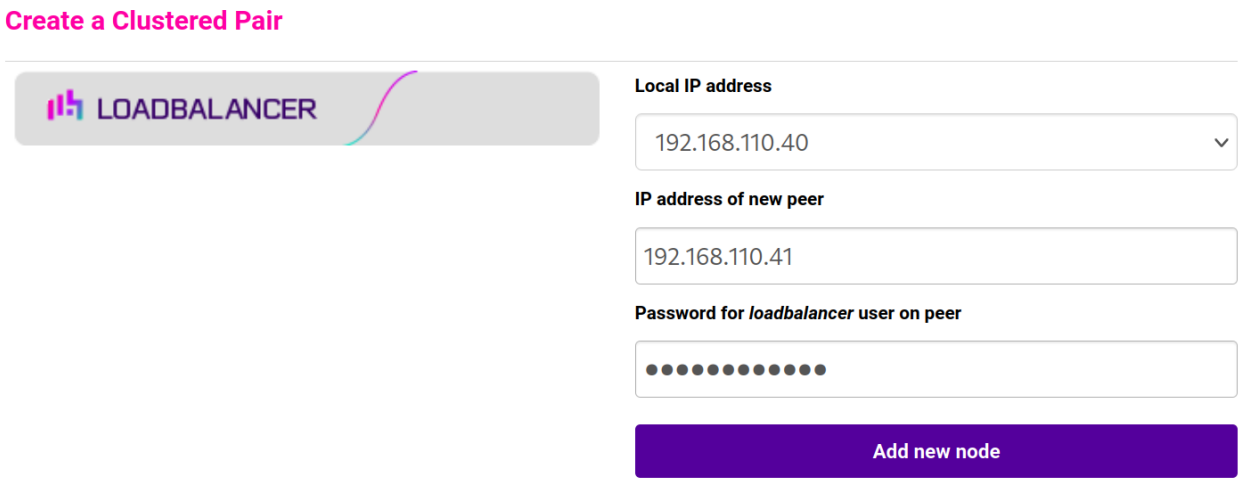
WebUI Main Menu Option	Sub Menu Option	Description
Local Configuration	Hostname & DNS	Hostname and DNS settings
Local Configuration	Network Interface Configuration	Interface IP addresses, bonding configuration and VLANs
Local Configuration	Routing	Default gateways and static routes
Local Configuration	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.

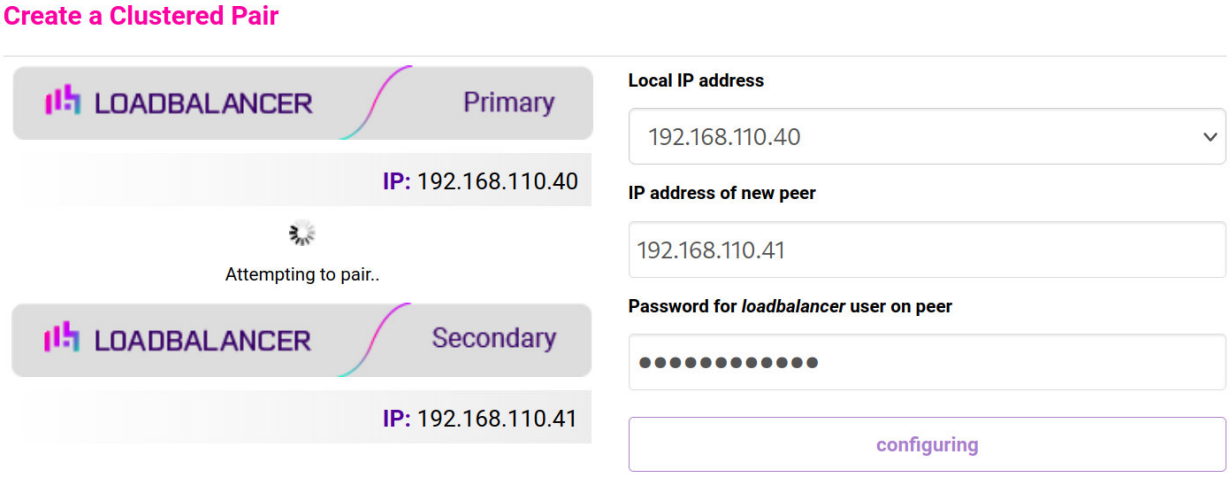
13.1.2. Configuring the HA Clustered Pair

> **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.

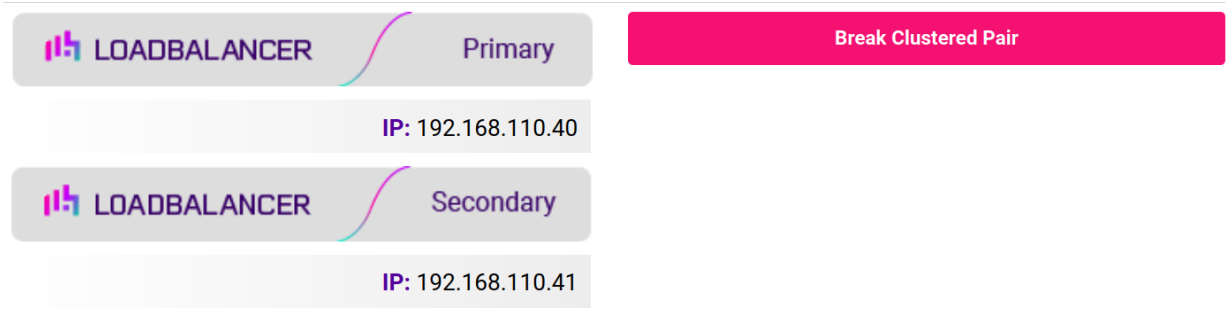
1. Deploy a second appliance that will be the Secondary and configure initial network settings.
2. Using the WebUI on the Primary appliance, navigate to: *Cluster Configuration > High-Availability Configuration*.



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:



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



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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