

# Load Balancing Laurel Bridge Compass

Version 1.0



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# 1. About this Guide

This guide details the steps required to configure a load balanced Laurel Bridge Compass environment utilizing Loadbalancer.org appliances. It covers the configuration of the load balancers and also any Laurel Bridge Compass 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 Laurel Bridge Compass. 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. Laurel Bridge Compass

- v3.5.0 and later

## 4. Laurel Bridge Compass

Laurel Bridge Compass Routing Workflow Manager automates the ingestion, distribution, tracking, and access to medical imaging studies across disparate systems and locations, empowering healthcare organizations of all sizes to easily build and manage a scalable imaging workflow layer that enhances interoperability between PACS, VNA, and clinical IT environments. It acts as a router for DICOM images/messages and HL7 version 2.x messages and is able to route from one or more Sources to one or more Destinations.

## 5. Load Balancing Laurel Bridge Compass

#### Note

It's highly recommended that you have a working Laurel Bridge Compass environment first before implementing the load balancer.



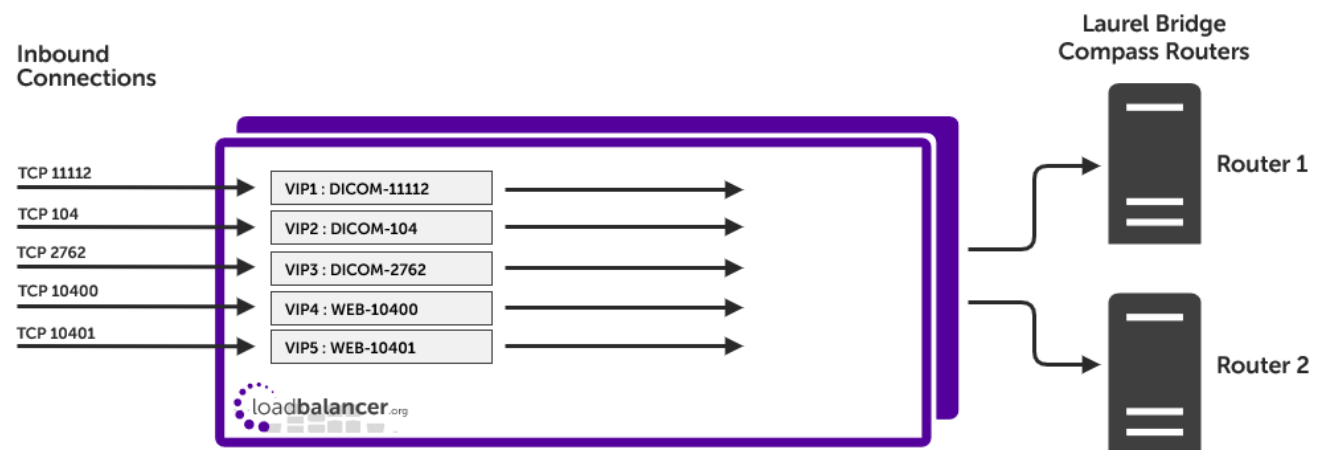
## 5.1. Virtual Service (VIP) Requirements

To provide load balancing and HA for Laurel Bridge Compass, the following VIPs are required:

Ref.	VIP Name	Use	Mode	VIP Port(s)	Persistence Mode	Health Check Mode
VIP 1	DICOM-11112	DICOM	L4 SNAT	11112	None	External Script
VIP 2	DICOM-104	DICOM	L4 SNAT	104	None	External Script
VIP 3	DICOM-2762	DICOM TLS	L4 SNAT	2762	None	Connect to Port
VIP 4	WEB-10400	HTTP	L4 SNAT	10400	Source IP	Connect to Port
VIP 5	WEB-10401	HTTPS	L4 SNAT	10401	Source IP	Connect to Port

## 6. Deployment Concept

Once the load balancer is deployed, clients connect to the Virtual Services (VIPs) rather than connecting directly to one of the Laurel Bridge Compass routers. These connections are then load balanced across the Laurel Bridge Compass routers to distribute the load according to the load balancing algorithm selected.



VIP = Virtual IP Address

### Note

For a more detailed system diagram, please refer to [Laurel Bridge System Topology](#).

## 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*.

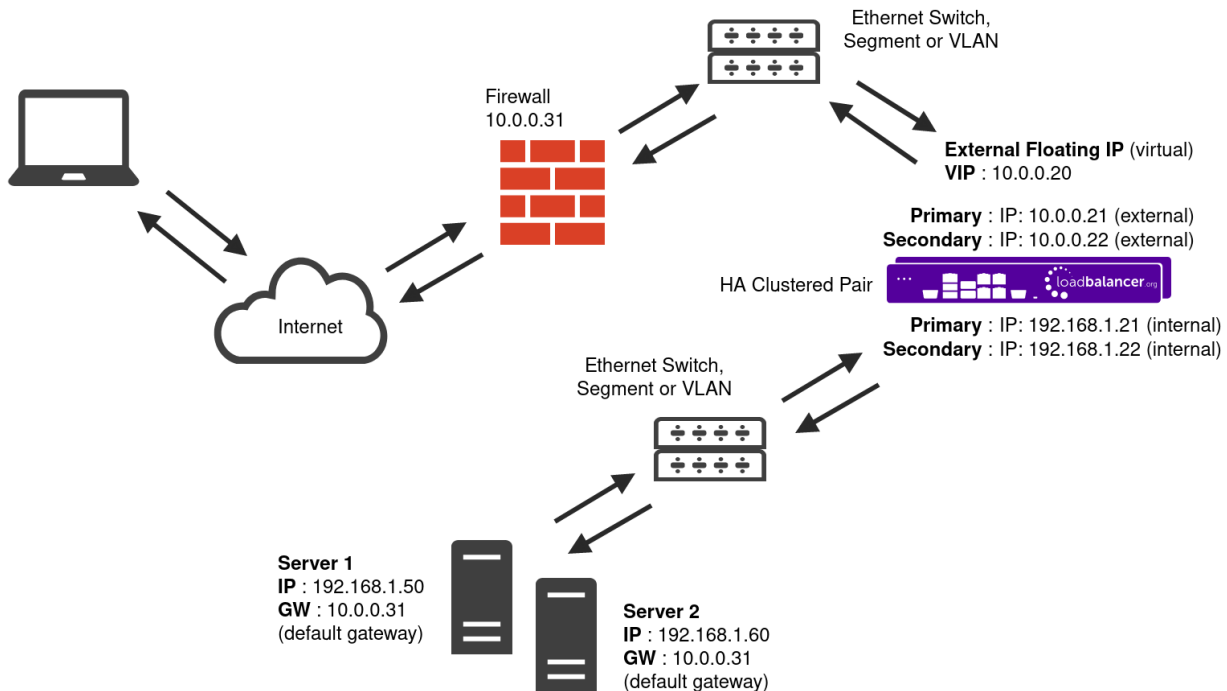
For Laurel bridge Compass, layer 4 SNAT mode is recommended. This mode is described below and is used for the configuration presented in this guide.

### 7.1. Layer 4 SNAT Mode

Layer 4 SNAT mode is a high performance solution, although not as fast as Layer 4 NAT mode or Layer 4 DR



mode.



- The load balancer translates all requests from the external Virtual Service to the internal Real Servers in the same way as NAT mode - please refer to [Layer 4 NAT Mode](#) for more information.
- Layer 4 SNAT mode is not transparent, an iptables SNAT rule translates the source IP address to be the load balancer rather than the original client IP address.
- Layer 4 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.
- If the Real Servers require Internet access, **Auto-NAT** should be enabled using the WebUI option: **Cluster Configuration > Layer 4 - Advanced Configuration**, the external interface should be selected.
- Requires no mode-specific configuration changes to the load balanced Real Servers.
- Port translation is possible with Layer 4 SNAT mode, e.g. VIP:80 → RIP:8080 is supported.
- You should not use the same RIP:PORT combination for layer 4 SNAT mode VIPs and layer 7 SNAT mode VIPs because the required firewall rules conflict.

## 8. Configuring Laurel Bridge Compass for Load Balancing

Complete the following on each Laurel Bridge Compass router:

1. Navigate to the *Dicom Options > Sources* tab.
2. Click **Add Source**.



Description:

**Compass**

AE Title:   Allow Any

**Source**

Source Enabled

AE Title:   Allow Any

IP:   Allow Any

Max Simultaneous:

Report errors for non-routed images

Send email for accepted associations

**Compass-Generated Responses**

Store Commit:  Enabled

Compass AE Title:

Remote AE Title:

Host/IP:

Port:

Verification:  Enabled

Query/Retrieve:  Enabled

**Transfer Syntaxes**

Enabled:

- Explicit VR Little Endian
- Implicit VR Little Endian
- Explicit VR Big Endian (Retired)

↑ ↓

Add:

Favor Source's Transfer Syntax

**Advanced**

Filters: 0 in, 0 out [edit](#)

General Settings: Default [edit](#)

Log Settings: Off [edit](#)

Logging:

Outbound IP:

3. Set the *Description* to **Loadbalancer Health Check**.
4. In the *Compass* section set the *AE Title* to **HealthCheck** and uncheck the *Allow Any* checkbox.
5. In the *Source* section set the *AE Tile* to **Loadbalancer** and uncheck the *Allow Any* checkbox.

## 9. Loadbalancer.org Appliance – the Basics

### 9.1. 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.

## 9.2. 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.

## 9.3. 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:



Primary | Secondary    Active | Passive    Link    15 Seconds ↻

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

**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](#)

[Buy Now](#)

**System Overview** 2024-03-15 16:27:21 UTC

Would you like to run the Setup Wizard?

[Accept](#)    [Dismiss](#)

VIRTUAL SERVICE    IP    PORTS    CONNS    PROTOCOL    METHOD    MODE

No Virtual Services configured.

#### Network Bandwidth

Bytes/s

20 k  
15 k  
10 k  
5 k  
0

Thu 18:00    Fri 00:00    Fri 06:00    Fri 12:00

■ RX    3k Min, 4k Avg, 32675k Total  
■ TX    6k Min, 7k Avg, 56693k Total

#### System Load Average

System Load

1.0  
0.8  
0.6  
0.4  
0.2  
0.0

Thu 18:00    Fri 00:00    Fri 06:00    Fri 12:00

■ 1m average    0.00 Min, 0.12 Avg, 0.60 Max  
■ 5m average    0.00 Min, 0.06 Avg, 0.21 Max  
■ 15m average    0.00 Min, 0.02 Avg, 0.08 Max

#### Memory Usage

- 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



## 9.4. 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:

Copyright © Loadbalancer.org Inc. 2002 – 2024  
ENTERPRISE VA Max - v8.11.1

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 v8.11.2 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.

## 9.5. 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



Protocol	Port	Purpose
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](#).

## 9.6. 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.

# 10. Appliance Configuration for Laurel Bridge Compass

## 10.1. Configure the DICOM Health Check

- Using the WebUI, navigate to *Cluster Configuration > Health Check Scripts* and click **Add New Health Check**.
- Enter the following details:

**Health Check Details**

Name:  ?

Type:  ?

Template:  ?

- Specify an appropriate *Label* for the health check, e.g. **Compass\_Dicom\_Echo**.
- Set *Type* to **Virtual Service**.
- Using the *Template* dropdown select **DICOM-C-ECHO** from the list.
- Change **aet** and **aec** in the script to the following values:

```
aet=Loadbalancer
aec=HealthCheck
```

as shown below:



```

1  #!/bin/bash
2  #
3  # loadbalancer.org (c) Jan 2017 Andrew Smalley
4  # DICOM echoscu healthcheck v0.1
5  #
6  # DCMTK - DICOM Toolkit has been used to make this healthcheck possible
7  # For source code and copyright please see below
8  #
9  # http://dicom.offis.de/dcmk.php.en
10 #
11 # ftp://dicom.offis.de/pub/dicom/offis/software/dcmk/dcmk360/COPYRIGHT
12 #
13 #####
14 if [ -z $1 ] && [ -z $2 ] && [ -z $3 ] && [ -z $4 ]; then
15     echo we need input "DICOM-C-ECHO vip vpt rip rpt"
16     exit 1;
17 fi
18 vip=$1
19 vpt=$2
20 rip=$3
21 aet=Loadbalancer
22 aec=HealthCheck
23 if [[ $4 -eq 0 ]]
24     then
25     rpt=$2; else rpt=$4
26 fi
27 # Simple DICOM ECHO Check
28 /usr/local/bin/echoscu -aet $aet -aec $aec $rip $rpt
29
30
31

```

3. Click **Update** to save the new health check script.

## 10.2. VIP 1 - DICOM-11112

### Virtual Service (VIP) Configuration

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

Virtual Service	
Label	DICOM-11112 <span>?</span>
IP Address	192.168.110.100 <span>?</span>
Ports	11112 <span>?</span>
Protocol	
Protocol	TCP <span>?</span>
Forwarding	
Forwarding Method	SNAT <span>?</span>

Cancel
Update

2. Specify the *Label* (name) for the virtual service, e.g. **DICOM-11112**.
3. Set the *IP Address* field to the required IP address, e.g. **192.168.110.100**.
4. Set the *Ports* field to **11112**.



5. Set the *Protocol* to **TCP**.
6. Set the *Forwarding Method* to **SNAT**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Connection Distribution Method* section.
  - Set the *Balance Mode* to **Weighted Round Robin**.
10. Scroll to the *Persistence* section.
  - Un-check the *Enable* checkbox to disable persistence.
11. Scroll to the *Health Checks* section.
  - Set the *Check Type* to **External Script**.
  - Set the *External Script* dropdown to the health check script created above, e.g. **Compass\_Dicom\_Echo**.
12. Click **Update**.

## Defining the Real Servers (RIPs)

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

Label	<input type="text" value="LBCompassRouter1"/>	?
Real Server IP Address	<input type="text" value="192.168.110.150"/>	?
Real Server Port	<input type="text" value="11112"/>	?
Weight	<input type="text" value="100"/>	?
Minimum Connections	<input type="text" value="0"/>	?
Maximum Connections	<input type="text" value="0"/>	?

2. Specify the *Label* (name) for the Real Server, e.g. **LBCompassRouter1**.
3. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.110.150**.
4. Set the *Real Server Port* field to **11112**.
5. Click **Update**.
6. Repeat these steps to add the remaining Laurel Bridge Compass Routers.

## 10.3. VIP 2 - DICOM-104

### Virtual Service (VIP) Configuration



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

Virtual Service		
Label	<input type="text" value="DICOM-104"/>	?
IP Address	<input type="text" value="192.168.110.101"/>	?
Ports	<input type="text" value="104"/>	?
Protocol		
Protocol	<input type="text" value="TCP"/>	?
Forwarding		
Forwarding Method	<input type="text" value="SNAT"/>	?

2. Specify the *Label* (name) for the virtual service, e.g. **DICOM-104**.
3. Set the *IP Address* field to the required IP address, e.g. **192.168.110.101**.
4. Set the *Ports* field to **104**.
5. Set the *Protocol* to **TCP**.
6. Set the *Forwarding Method* to **SNAT**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Connection Distribution Method* section.
  - Set the *Balance Mode* to **Weighted Round Robin**.
10. Scroll to the *Persistence* section.
  - Un-check the *Enable* checkbox to disable persistence.
11. Scroll to the *Health Checks* section.
  - Set the *Check Type* to **External Script**.
  - Set the *External Script* dropdown to the health check script created above, e.g. **Compass\_Dicom\_Echo**.
12. Click **Update**.

## Defining the Real Servers (RIPs)

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

Label	<input type="text" value="LBCompassRouter1"/>	?
Real Server IP Address	<input type="text" value="192.168.110.150"/>	?
Real Server Port	<input type="text" value="104"/>	?
Weight	<input type="text" value="100"/>	?
Minimum Connections	<input type="text" value="0"/>	?
Maximum Connections	<input type="text" value="0"/>	?

2. Specify the *Label* (name) for the Real Server, e.g. **LBCompassRouter1**.
3. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.110.150**.
4. Set the *Real Server Port* field to **104**.
5. Click **Update**.
6. Repeat these steps to add the remaining Real Servers.

## 10.4. VIP 3 - DICOM-2762

### Virtual Service (VIP) Configuration

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

<b>Virtual Service</b>		
Label	<input type="text" value="DICOM-2762"/>	?
IP Address	<input type="text" value="192.168.110.102"/>	?
Ports	<input type="text" value="2762"/>	?
<b>Protocol</b>		
Protocol	<input type="text" value="TCP"/>	?
<b>Forwarding</b>		
Forwarding Method	<input type="text" value="SNAT"/>	?

2. Specify the *Label* (name) for the virtual service, e.g. **DICOM-2762**.
3. Set the *IP Address* field to the required IP address, e.g. **192.168.110.102**.
4. Set the *Ports* field to **2762**.



5. Set the *Protocol* to **TCP**.
6. Set the *Forwarding Method* to **SNAT**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Connection Distribution Method* section.
  - Set the *Balance Mode* to **Weighted Round Robin**.
10. Scroll to the *Persistence* section.
  - Un-check the *Enable* checkbox to disable persistence.
11. Click **Update**.

## Defining the Real Servers (RIPs)

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

Label	<input type="text" value="LBCompassRouter1"/>	?
Real Server IP Address	<input type="text" value="192.168.110.150"/>	?
Real Server Port	<input type="text" value="2762"/>	?
Weight	<input type="text" value="100"/>	?
Minimum Connections	<input type="text" value="0"/>	?
Maximum Connections	<input type="text" value="0"/>	?

2. Specify the *Label* (name) for the Real Server, e.g. **LBCompassRouter1**.
3. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.110.150**.
4. Set the *Real Server Port* field to **2762**.
5. Click **Update**.
6. Repeat these steps to add the remaining Real Servers.

## 10.5. VIP 4 - WEB-10400

### Virtual Service (VIP) Configuration

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

Virtual Service		
Label	<input type="text" value="WEB-10400"/>	<a href="#">?</a>
IP Address	<input type="text" value="192.168.110.103"/>	<a href="#">?</a>
Ports	<input type="text" value="10400"/>	<a href="#">?</a>
Protocol		
Protocol	<input type="text" value="TCP"/>	<a href="#">?</a>
Forwarding		
Forwarding Method	<input type="text" value="SNAT"/>	<a href="#">?</a>

2. Specify the *Label* (name) for the virtual service, e.g. **WEB-10400**.
3. Set the *IP Address* field to the required IP address, e.g. **192.168.110.103**.
4. Set the *Ports* field to **10400**.
5. Set the *Protocol* to **TCP**.
6. Set the *Forwarding Method* to **SNAT**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Connection Distribution Method* section.
  - Set the *Balance Mode* to **Weighted Round Robin**.
10. Click **Update**.

## Defining the Real Servers (RIPs)

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

Label	<input type="text" value="LBCompassRouter1"/>	?
Real Server IP Address	<input type="text" value="192.168.110.150"/>	?
Real Server Port	<input type="text" value="10400"/>	?
Weight	<input type="text" value="100"/>	?
Minimum Connections	<input type="text" value="0"/>	?
Maximum Connections	<input type="text" value="0"/>	?

2. Specify the *Label* (name) for the Real Server, e.g. **LBCompassRouter1**.
3. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.110.150**.
4. Set the *Real Server Port* field to **10400**.
5. Click **Update**.
6. Repeat these steps to add the remaining Real Servers.

## 10.6. VIP 5 - WEB-10401

### Virtual Service (VIP) Configuration

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

<b>Virtual Service</b>		
Label	<input type="text" value="WEB-10401"/>	?
IP Address	<input type="text" value="192.168.110.104"/>	?
Ports	<input type="text" value="10401"/>	?
<b>Protocol</b>		
Protocol	<input type="text" value="TCP"/>	?
<b>Forwarding</b>		
Forwarding Method	<input type="text" value="SNAT"/>	?

2. Specify the *Label* (name) for the virtual service, e.g. **WEB-10401**.
3. Set the *IP Address* field to the required IP address, e.g. **192.168.110.104**.
4. Set the *Ports* field to **10401**.

5. Set the *Protocol* to **TCP**.
6. Set the *Forwarding Method* to **SNAT**.
7. Click **Update** to create the Virtual Service.
8. Now click **Modify** next to the newly created VIP.
9. Scroll to the *Connection Distribution Method* section.
  - Set the *Balance Mode* to **Weighted Round Robin**.
10. Click **Update**.

## Defining the Real Servers (RIPs)

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

Label	<input type="text" value="LBCompassRouter1"/>	?
Real Server IP Address	<input type="text" value="192.168.110.150"/>	?
Real Server Port	<input type="text" value="10401"/>	?
Weight	<input type="text" value="100"/>	?
Minimum Connections	<input type="text" value="0"/>	?
Maximum Connections	<input type="text" value="0"/>	?

2. Specify the *Label* (name) for the Real Server, e.g. **LBCompassRouter1**.
3. Set the *Real Server IP Address* field to the required IP address, e.g. **192.168.110.150**.
4. Set the *Real Server Port* field to **10401**.
5. Click **Update**.
6. Repeat these steps to add the remaining Real Servers.

## 11. Testing & Verification

### Note

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

### 11.1. Accessing the Application































First ensure that any DNS records that are used for access are updated so that the FQDNs resolve to the relevant VIP. Then verify that clients & devices can successfully access the load balanced services.

## 11.2. Using System Overview

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

### System Overview

2024-05-02 09:18:56 UTC

VIRTUAL SERVICE	IP	PORTS	CONNS	PROTOCOL	METHOD	MODE	
 <b>DICOM-11112</b>	192.168.110.100	11112	0	TCP	Layer 4	SNAT	
<i>REAL SERVER</i>							
<i>IP</i>	<i>PORTS</i>	<i>WEIGHT</i>	<i>CONNS</i>				
 LBCompassRouter1	192.168.110.150	11112	100	0	Drain	Halt	
 LBCompassRouter2	192.168.110.151	11112	100	0	Drain	Halt	
 <b>DICOM-104</b>	192.168.110.101	104	0	TCP	Layer 4	SNAT	
<i>REAL SERVER</i>							
<i>IP</i>	<i>PORTS</i>	<i>WEIGHT</i>	<i>CONNS</i>				
 LBCompassRouter1	192.168.110.150	104	100	0	Drain	Halt	
 LBCompassRouter2	192.168.110.151	2762	100	0	Drain	Halt	
 <b>DICOM-2762</b>	192.168.110.102	2762	0	TCP	Layer 4	SNAT	
<i>REAL SERVER</i>							
<i>IP</i>	<i>PORTS</i>	<i>WEIGHT</i>	<i>CONNS</i>				
 LBCompassRouter1	192.168.110.150	2762	100	0	Drain	Halt	
 LBCompassRouter2	192.168.110.151	2762	100	0	Drain	Halt	
 <b>WEB-10400</b>	192.168.110.103	10400	0	TCP	Layer 4	SNAT	
<i>REAL SERVER</i>							
<i>IP</i>	<i>PORTS</i>	<i>WEIGHT</i>	<i>CONNS</i>				
 LBCompassRouter1	192.168.110.150	10400	100	0	Drain	Halt	
 LBCompassRouter2	192.168.110.151	10400	100	0	Drain	Halt	
 <b>WEB-10401</b>	192.168.110.104	10401	0	TCP	Layer 4	SNAT	
<i>REAL SERVER</i>							
<i>IP</i>	<i>PORTS</i>	<i>WEIGHT</i>	<i>CONNS</i>				
 LBCompassRouter1	192.168.110.150	10401	100	0	Drain	Halt	
 LBCompassRouter2	192.168.110.151	10401	100	0	Drain	Halt	

## 12. 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).

## 13. Further Documentation

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



# 14. Appendix

## 14.1. 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.

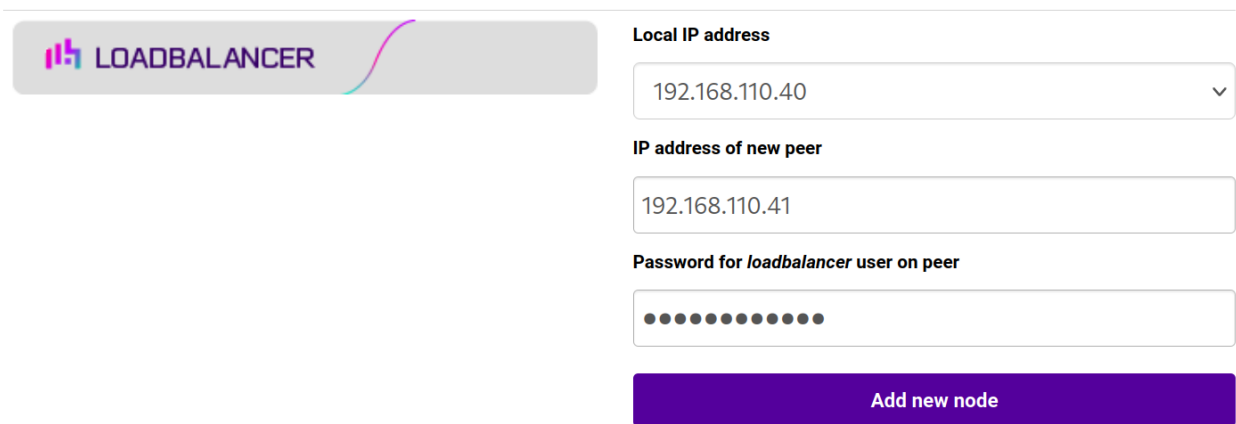
## Configuring the HA Clustered Pair

### 📌 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.

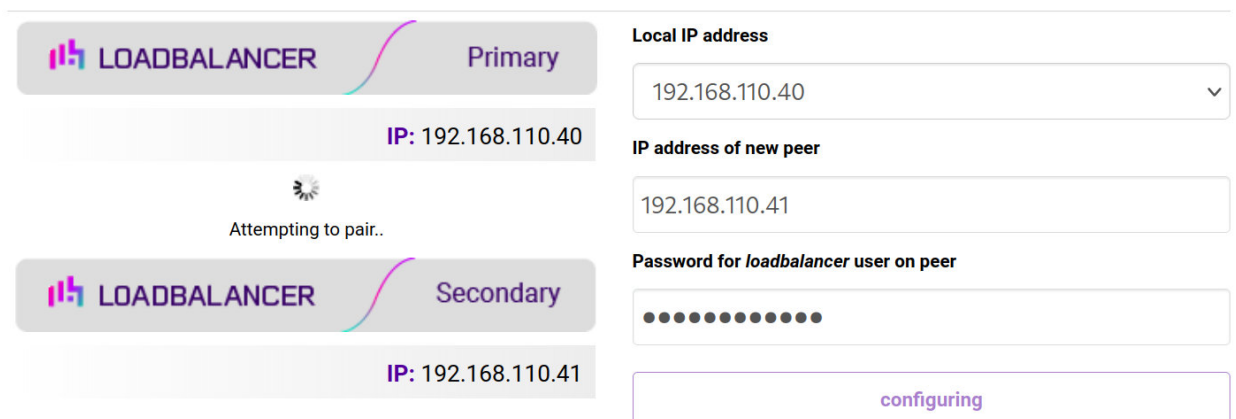
1. Deploy a second appliance that will be the Secondary and configure initial network settings.
2. Using the WebUI on the Primary appliance, navigate to: *Cluster Configuration > High-Availability Configuration*.

### Create a Clustered Pair



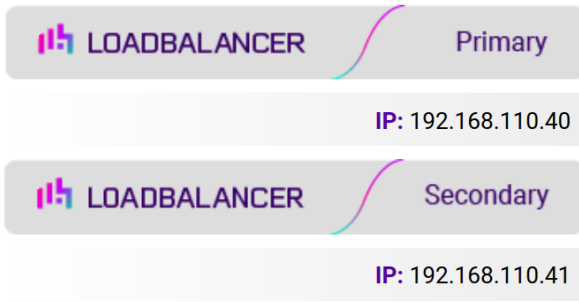
3. Specify the IP address and the *loadbalancer* user's password for the Secondary (peer) appliance as shown in the example above.
4. Click **Add new node**.
5. The pairing process now commences as shown below:

### Create a Clustered Pair



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

## High Availability Configuration - primary



Break Clustered Pair

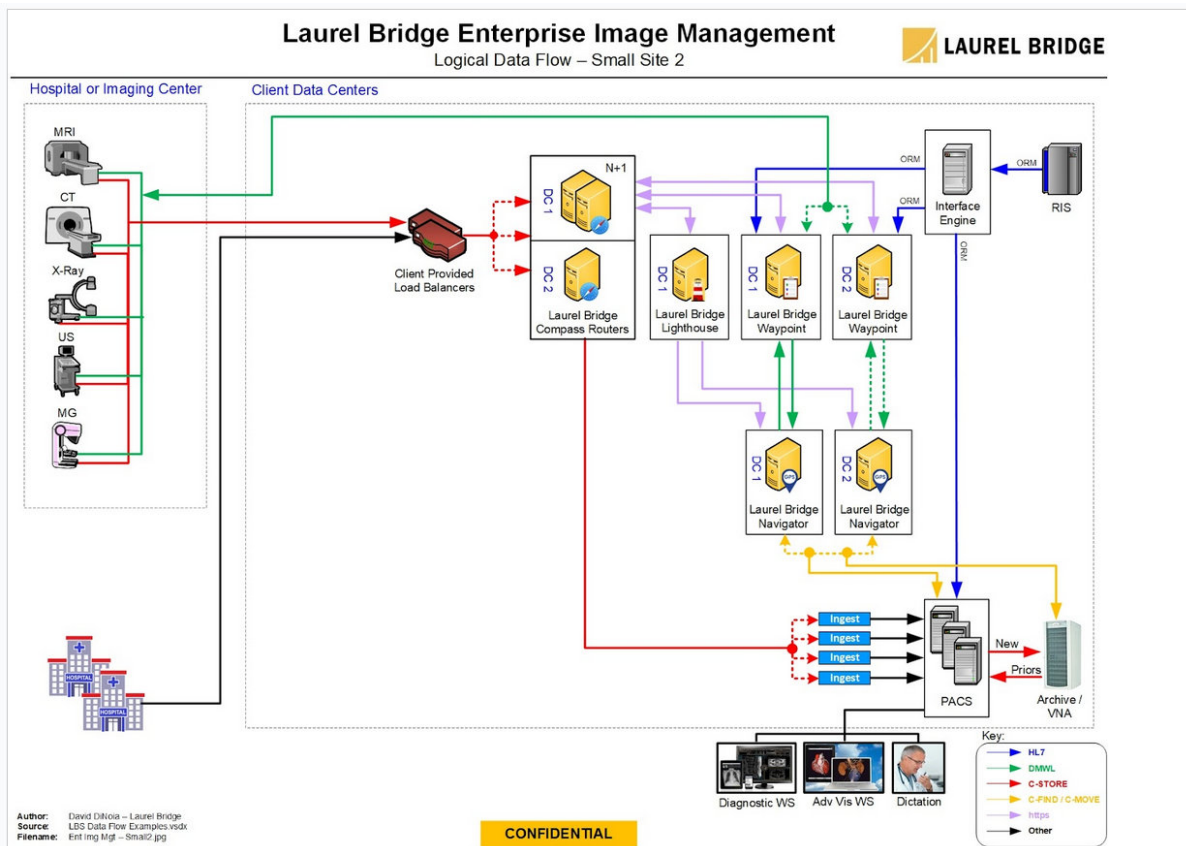
- To finalize the configuration, restart heartbeat and any other services as prompted in the "Commit changes" message box at the top of the screen.

**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](#).

## 14.2. Laurel Bridge System Topology





## 15. Document Revision History

Version	Date	Change	Reason for Change	Changed By
1.0	4 July 2024	Initial Version		RJC





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